

SEVENTH
BIENNIAL REPORT
OF THE
BOARD OF HEALTH
OF THE
STATE OF IOWA,
FOR THE
FISCAL PERIOD ENDING JUNE 30, 1893.



DES MOINES:
G. H. HAGSDALE, STATE PRINTER.
1893.

Resolved, That the Board is in nowise responsible for the sentiments and opinions entertained in the following papers, prepared by special request of the Board, the respective author of each paper being responsible for its contents.—*Resolution adopted by the Board and ordered printed in the Biennial Report.*

STATE OF IOWA, }
OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH, }
DES MOINES, July 1, 1893. }

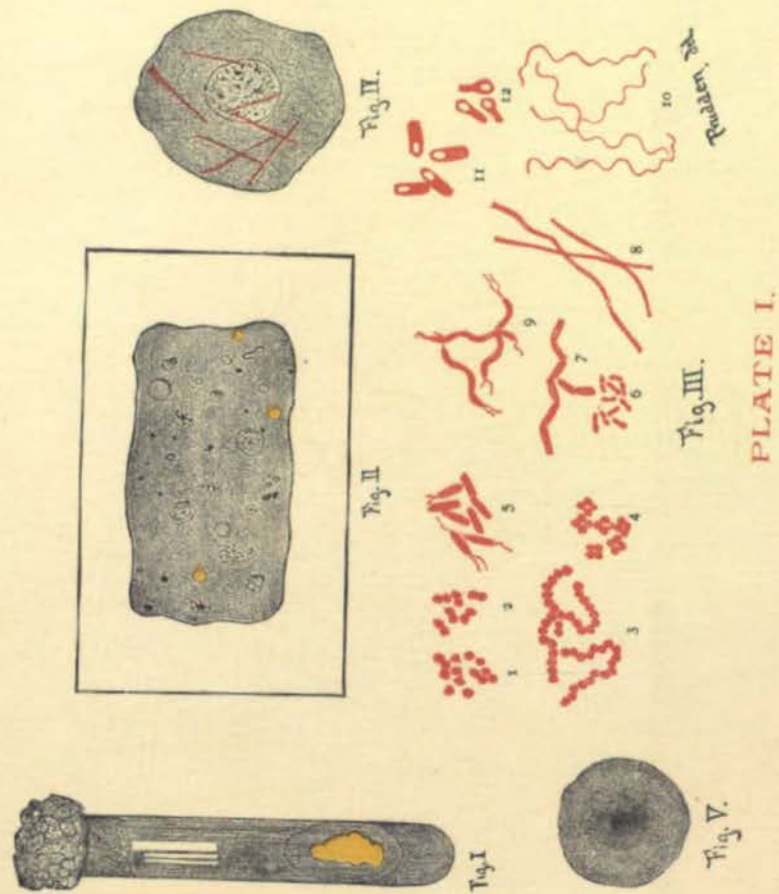
To HORACE BOIES, Governor of Iowa :

SIR—In accordance with the provisions of section 11, chapter 151, laws of Eighteenth General Assembly, the Seventh Biennial Report of the State Board of Health, for the fiscal term ending June 30, 1893, is herewith presented.

J. F. KENNEDY, M. D.,
Secretary.

MEMBERS OF THE BOARD.

	TERM EXPIRES
E. M. REYNOLDS, M. D., Centerville (Regular).....	January 31, 1894
JOHN C. SHRADER, M. D., Iowa City (Regular), President.....	January 31, 1895
FREDERICK BECKER, M. D., Clermont (Homeopathic).....	January 31, 1896
E. A. GUILBERT, M. D., Dubuque (Homeopathic).....	January 31, 1897
E. H. CARTER, M. D., Des Moines (Eclectic).....	January 31, 1898
J. M. EMMERT, M. D., Atlantic (Regular).....	January 31, 1899
R. E. CONNIF, M. D., Sioux City (Regular).....	January 31, 1900
JAMES L. LORING, Civil Engineer, Dallas Center.....	May 4, 1894
JOHN Y. STONE, Attorney-General <i>ex-officio</i> .	
M. STALKER, Ames, State Veterinary Surgeon, <i>ex-officio</i> .	



EXPLANATION OF PLATE I.

FIG. I. A large mass of bacteria growing in a tube, on a transparent culture medium. This species is called *Micrococcus luteus*.

FIG. II. A gelatin plate culture, showing several colonies of different species of bacteria growing in the thin layer of solidified gelatin. Each colony is composed of thousands of individual bacteria (see Fig. V). The yellow colonies are those from which a small portion was taken on the end of a sterilized needle and planted in the tube shown, after a few days' growth in Fig. I. The tube and plate in Figs. I and II represent about one-third the natural size.

FIG. III. Several different forms of bacteria represented as they look when stained with one of the anilin dyes and magnified about 1,000 times. See Frontispiece. Nos. 1 and 2, micrococci, single and in pairs. No. 3, micrococci in chains, called streptococci. No. 4, tetrads of micrococci. Nos. 5, 6, 7 and 8, bacilli, showing different sizes and groupings—in No. 5 cilia are seen at the ends of some of the bacilli. Nos. 9 and 10, spiral bacteria; those in No. 9 with cilia. Nos. 11 and 12, bacilli with spores.

FIG. IV. A cell in which are seen seven long, slender bacilli, magnified about 3,000 times.

FIG. V. A single colony as seen under a low power of the microscope on the plate culture. Fig. VI.—This is magnified about 20 times.

CONTENTS.

	PAGE.
1. Prefatory	1
2. Meetings of the Board.....	4
3. Cholera	34
4. Consumption	43
5. Diphtheria	53
6. Typhoid Fever.....	57
7. Scarlet Fever....	68
8. Cancer.....	71
9. What is a Filth Disease.....	73
10. Trichinosis.....	78
11. Rabies	81
12. Small Pox.....	84
13. Vaccination ...	87
14. Contagion by Importation.....	90
15. Bacteria—Our Hidden Foes.....	93
16. Microbes of the Soil.....	114
17. Adulterated Food.....	116
18. Milk	128
19. Fraud in Butter-Making.....	136
20. Water and Ice.....	144
21. Disposal of Rural Sewage.....	183
22. Hygiene—The Science.....	214
23. Myopia.....	225
24. Sanitation in Construction of the Residence.....	231
25. Sanitary Education of Plumbers.....	236
26. Sewer Air and Modern Plumbing.....	240
27. Sewer Ordinances.....	242
28. Emergency Hospitals.....	248
29. Aphous Fever among Dairy Cows.....	257
30. How to Bandage a Finger.....	261
31. Railroads	268
32. Shipping of Corpses.....	271
33. Kerosene	274
34. Vital Statistics.....	282
35. Legislative Suggestions.....	288
36. Meteorological Tables.....	294
37. Financial Statement.....	304
38. Decisions of Supreme Court.....	305
39. Decisions of Attorney-General.....	330
40. Health Laws.....	339

STATE BOARD OF HEALTH.

[Chapter 151, Laws of 1880.]

AN ACT to establish a State Board of Health in the State of Iowa, to provide for collecting vital statistics, and to assign certain duties to local boards of health and to punish neglect of duties.

SECTION 1. *Be it enacted by the General Assembly of the State of Iowa:* That the governor, with the approval of the executive council, shall appoint nine (9) persons, one of whom shall be the attorney general of the State (by virtue of his office), one a civil engineer and seven (7) physicians, who shall constitute a State Board of Health. The persons so appointed shall hold their offices for seven years; *provided*, that the term of office of the seven physicians first appointed shall be so arranged by lot that the term of one shall expire on the thirty-first (31st) day of January of each year; and that vacancies thus occasioned, as well as all other vacancies otherwise occurring, shall be filled by the governor, with the approval of the executive council.

SEC. 2. The State Board of Health shall have the general supervision of the interests of the health and life of the citizens of the State. They shall have charge of all matters pertaining to quarantine; they shall supervise a State registration of marriages, births and deaths, as hereinafter provided—they 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 or improvement of the public health; and it shall be the duty of all police officers, sheriffs, constables and all other officers of the State, to enforce such rules and regulations, so far as the efficiency and success of the board may depend upon their official co-operation.

SEC. 3. The clerk of the district and circuit courts of each of the several counties in the State shall be required to keep separate books for the registration of the names and post-office address of physicians and mid-wives, for births, for marriages and for deaths, which record shall show the names, date of birth, death or marriage; the names of parents and sex of the child, when a birth, and when a death, shall give the age, sex and cause of death, with the date of the record and the name of the person furnishing the information. Said books shall be always open for inspection without fee; and the clerk of said courts shall be required to render a full and complete report of all births, marriages and deaths to the secretary of the board of health annually, on the first day of October of each year, and at such other

Law Creating State Board of Health.

times as the board may direct. [For which service the clerk shall receive, in addition to the compensation already allowed him by law, the sum of ten cents for each birth, marriage or death so recorded by him, and the further sum of ten cents for each one hundred words of written matter contained in said report, the same to be paid out of the county fund.]—*Chapter 140, Section 1, Laws 1882.*

SEC. 4. It shall be the duty of the Board of Health to prepare such forms for the record of births, marriages and deaths as they may deem proper; the said forms to be furnished by the secretary of said board to the clerks of the district and circuit courts of the several counties, whose duties it shall be to furnish them to such persons as are herein required to make reports.

SEC. 5. It shall be the duty of all physicians and midwives in this State to register their names and postoffice address with the clerk of the district and circuit courts of the county where they reside; and said physicians and midwives shall be required, under penalty of ten dollars (\$10), to be recovered in any court of competent jurisdiction in the State, at suit of the clerk of the court, to report to the clerk of the courts, within thirty (30) days from the date of their occurrence, all births and deaths which may come under their supervision, with a certificate of the cause of the death, and such other facts as the board may require, in the blank forms furnished, as hereinafter provided.

SEC. 6. When any birth or death may take place, no physician or midwife being in attendance, the same shall be reported by the parent to the clerk of the district and circuit courts within thirty days from the date of its occurrence, and if a death, the supposed cause of death, or, if there be no parent, by the nearest of kin, not a minor; or, if none, by the resident householder where the birth or death shall have occurred, under penalty provided in the preceding section of this act. Clerks of the district and circuit courts shall annually, on the first day of October of each year, send to the secretary of the State Board of Health a statement of all births and deaths recorded in their offices for the year preceding said date, under a penalty of twenty-five dollars (\$25) in case of failure.

SEC. 7. The coroners of the several counties shall report to the clerk of the courts all cases of death which may come under their supervision, with the cause or mode of death, etc., as per form furnished, under penalty as provided in section 5, of this act.

SEC. 8. All amounts recovered under the penalties of this act shall be appropriated to a special fund for carrying out the objects of this law.

SEC. 9. The first meeting of the board shall be within twenty days after its appointment, and thereafter in May and November of each year, and at such other times as the board shall deem expedient. The November meeting shall be in the city of Des Moines. A majority of the members of the board shall constitute a quorum. They shall choose one of their number to be president, and shall adopt rules and by-laws for their government, subject to the provisions of this act.

Law Creating State Board of Health.

SEC. 10. They shall elect a secretary, who shall perform the duties prescribed by the board and by this act. He shall receive a salary, which shall be fixed by the board, not exceeding one thousand two hundred dollars per annum. He shall, with the other members of the board, receive actual traveling and other necessary expenses incurred in the performance of official duties; but no other member of the board shall receive a salary. The president of the board shall [monthly (1)] certify the amount due the secretary, and on presentation of said certificate the auditor of State shall draw his warrant on the State treasurer of [for] the amount.

SEC. 11. It shall be the duty of the Board of Health to make a biennial report, through their secretary or otherwise, in writing, to the governor of the State, on or before the fifteenth day of September (2) of each year preceding that in which the General Assembly meets; and such report shall include so much of the proceedings of the Board, such information concerning vital statistics, such knowledge respecting diseases, and such instruction on the subject of hygiene as may be thought useful by the Board, for dissemination among the people, with such suggestions as to the legislative action as they may deem necessary.

SEC. 12. The sum of five thousand dollars (\$5,000) per annum, or so much thereof as may be necessary, is hereby appropriated to pay the salary of the secretary, meet the contingent expenses of the office of secretary and the expenses of the Board, and all cost of printing, which together shall not exceed the sum hereby appropriated. Said expenses shall be certified and paid in the same manner as the salary of the secretary. The secretary of State shall provide rooms suitable for the meetings of the Board and office room for the secretary of the Board.

SEC. 13. The mayor and aldermen of each incorporated city, the mayor and council of any incorporated town or village in the State, or the trustees of any township, shall have and exercise all the powers and perform all the duties of a board of health within the limits of the cities, towns and townships of which they are officers.

SEC. 14. Every local board of health shall appoint a competent physician to the board, who shall be the health officer within the jurisdiction and shall hold his office during the pleasure of the board. The clerks of the townships and the clerks and recorders of cities and towns, shall be clerks of the local boards. The local boards shall also regulate all fees and charges of persons employed by them in the execution of the health laws and their own regulations.

SEC. 15. It shall be the duty of the health physician of every incorporated town, and also the clerk of the local board of health in each city or incorporated town or village in the State, at least once a year to report to the State Board of Health their proceedings and such other facts required on blanks and in accordance with instructions received from said State Board. They shall also make special reports whenever required to do so by the State Board of Health.

(1) As amended by chapter 173, acts Twentieth General Assembly.
(2) As amended by chapter 82, Laws of 1888.

Law Creating State Board of Health.

SEC. 16. Local boards of health shall make such regulations respecting nuisances, sources of filth, causes of sickness, rabid animals, and quarantine, not in conflict with regulations made by the State Board of Health, and on board any boats in harbors or ports within their jurisdiction, as may be necessary for the public health and safety. Upon written notice given by any practicing physician, that small-pox, diphtheria, scarlet fever, or any other contagious disease dangerous to the public health exists in any place, it shall be the duty of the mayor of any incorporated city or town, and the clerk of any district township, forthwith, without other authority, to establish quarantine in such cases, as may be required by regulations of the State Board of Health and said local boards, and to maintain and remove such quarantine in like manner. If any person shall violate any such regulation as herein provided, he shall be fined not less than twenty-five dollars for each and every day he knowingly disregards and violates the same, to be recovered before any court of competent jurisdiction. Notice shall be given of all regulations made by said local boards, by publishing the same in a newspaper published in their jurisdiction, or where there is no newspaper, by posting in not less than five public places. (1)

SEC. 17. The board of health of any city or incorporated town or village shall order the owner of any property, place or building (at his own expense) to remove any nuisance, source of filth or cause of sickness, found on private property, within twenty-four (24) hours, or such other time as is deemed reasonable after notice served as hereinafter provided; and if the owner or occupant neglects to do so, he shall forfeit a sum not exceeding twenty (\$20) dollars for every day during which he knowingly or willingly permits such nuisance or cause of sickness to remain after the time prescribed for the removal thereof.

SEC. 18. If the owner or occupant fails to comply with such order, the board may cause the nuisance, source of filth or cause of sickness to be removed, and all expenses incurred thereby shall be paid by the owner, occupant or other person who caused or permitted the same, if he has had actual notice from the board of health of the existence thereof, to be recovered by civil action in the name of the State, before any court having jurisdiction.

SEC. 19. The board, when satisfied upon due examination that any cellar, room, tenement or building, in its town occupied as a dwelling place, has become, by reason of the number of occupants, or want of cleanliness, or other cause, unfit for such purpose, and a cause of nuisance or sickness to the occupants or the public, may issue a notice in writing to such occupant, or any of them, requiring the premises to be put in a proper condition as to cleanliness, or, if they see fit, requiring the occupants to remove or quit the premises within such time as the board may deem reasonable. If the persons so notified, or any of them, neglect or refuse to comply with the terms of the notice, the board may cause the premises to be properly

(1) As amended by Chapter 59, Laws 1892.

Law Creating State Board of Health.

cleaned, at the expense of the owners, or may remove the occupants forcibly, and close up the premises, and the same shall not again be occupied, as a dwelling place, without permission in writing of the board.

SEC. 20. Whenever the board of health shall think it necessary for the preservation of the lives or health of the inhabitants to enter a place, building or vessel in their township, for the purpose of examining into and destroying, removing or preventing any nuisance, source of filth, or cause of sickness, and shall be refused such entry, any member of the board may make complaint, under oath, to any justice of the peace of his county, whether such justice be a member of the board or not, stating the facts of the case, so far as he has knowledge thereof. Such justice shall thereupon issue a warrant, directed to the sheriff or any constable of the county, commanding him to take sufficient aid, and being accompanied by two or more members of said board of health, between the hours of sunrise and sunset, repair to the place where such nuisance, source of filth or cause of sickness complained of may be, and the same destroy, remove or prevent, under the direction of such members of the board of health.

SEC. 21. When any person coming from abroad, or residing within any city, town or township within this State shall be infected, or shall lately have been infected with small pox, or other sickness dangerous to the public health, the board of health of the city, town or township, where said person may be, shall make effectual provision, in the manner in which they shall judge best, for the safety of the inhabitants, by removing such sick or infected person to a separate house, if it can be done without damage to his health, and by providing nurses and other assistance and supplies, which shall be charged to the person himself, his parents or other person who may be liable for his support, if able, otherwise at the expense of the county to which he belongs.

SEC. 22. If any infected person cannot be removed without damage to his health, the board of health shall make provision for him, as directed by the preceding section, in the house in which he may be, and in such case they may cause the persons in the neighborhood to be removed, and may take such other measures as may be deemed necessary for the safety of the inhabitants.

SEC. 23. Any justice of the peace, on application, under oath showing cause therefor by a local board, or any member thereof, shall issue his warrant, under his hand, directed to the sheriff or any constable of the county, requiring him, under the direction of the board of health, to remove any person infected with contagious diseases, or to take possession of condemned houses and lodgings, and to provide nurses and attendants, and other necessities for the care, safety and relief of the sick.

SEC. 24. Local boards of health shall meet for the transaction of business on the first Monday of April¹ and the first Monday in October¹ of each year and at any other time that the necessities of the health of their respective jurisdictions may demand, and the clerk of each board shall transmit

¹As amended by Chapter 65, Acts Twenty-second General Assembly.

Law Creating State Board of Health.

his annual report to the secretary of the State Board of Health within two weeks after the October* meeting. Said report shall embrace a history of any epidemic disease which may have prevailed within his district. The failure of the clerk of the board to prepare, or cause to be prepared, and forward such report as above specified, shall be considered a misdemeanor, for which he shall be subject to a fine of not more than twenty-five (\$25) dollars.

SEC. 25. All laws in conflict with this act are hereby repealed.

*The statute, however, above cited [Secs. 21 and 22], makes it the imperative duty of the local board of health to provide for such person, regardless of his settlement, and if no county can be charged there is no provision in the statute in question for the payment of their expenses. It appears to us that where there is no settlement the sick or infected person must be deemed to belong to the county where the relief becomes necessary. * * * * * In our opinion, they are to be construed as if the provisions of both sections had been embraced in one section, and the provision as to charging had been placed at the close. If we are correct, then the sick person is properly chargeable with all the expenses which may properly be incurred under either section, including the expenses of removal, if that is adopted, and the expense of isolation, if that is adopted; and we think that the county is ultimately liable for the same, if the sick person, and those liable for his support, are unable to pay.—*Supreme Court, City of Clinton v. County of Clinton, June, 1883.*

PREFATORY.

A glance at the table of contents accompanying this report will show that the report of the State Board of Health for the biennial fiscal term ending June 30th, 1893, is one of unusual interest.

The Board has been unusually active during the last term—not only industriously employed at the various meetings, but meeting quarterly instead of semi-annually.

The threatened invasion of cholera was a source of great anxiety, requiring special meetings and the adoption of special measures in case of its appearance in the State. Happily, notwithstanding the greatly increased number of visitors and immigrants to the United States, including Iowa, the disease did not get beyond New York city.

There have been many and able workers in the field of Sanitary Science and Preventive Medicine, and while not a great many new facts have been added to our store of knowledge respecting the causes and best means for the prevention of contagious diseases, yet former views and theories have been fully confirmed or greatly strengthened. Much that has been in the domain of speculation has passed into that of demonstration.

Not only this, but the practical results of the application of these theories have been highly satisfactory. The promptness and efficiency with which restrictive measures were used in New York harbor and on Fire Island during the late cholera invasion demonstrate as no words could the success of intelligently applied sanitary endeavors.

Prefatory.

There is scarcely a state in the United States, nor a province in Canada, that has not an efficient general health organization, as well as local or municipal auxiliaries.

The Iowa State Board of Health, not satisfied with the investigation of others, has made arrangements to institute a series of original researches respecting water and food analyses, and the pathogenic bacteria that will be of untold benefit to the State.

As an adjunct to the State Board of Health, there has been organized the Iowa Public Health Association. Its work, while scientific and along the line of sanitary and hygienic methods, is purely philanthropic, there being no paid officers, nor emoluments of any kind, except those compensating reflections that come to those who work for the good of others, rather than for themselves. Conjointly, the State Board of Health and this association have arranged to hold in various parts of the State sanitary conventions, at which the best means of not only preventing sickness, but of promoting the highest type of health will be discussed in a practical manner.

It is now over thirteen years since the law was passed creating the State Board of Health. The appropriation for the work of the Board was then, under economic management, sufficient to carry on its work, though never in a way satisfactory to its members. Since then the population of Iowa has nearly doubled; mechanical industries have multiplied; a necessity for a publication from the office of the secretary at regular periods was imperative, and led to the publication of the *Monthly Bulletin*; increased demands have been made for the circulars and other literature of the Board by local boards and the people; for personal visits by the members and the secretary to infected localities; for the service of a chemist to conduct analyses, and of a bacteriologist to do microscopic and other biologic work. All this has added greatly to the efficiency and value of the work of the Board, and yet had to be so limited in extent and character as to come within the appropriation made so many years ago.

Prefatory.

It is regretted that the Board has not done more for the public good, but it has done all that was possible with the limited means at its command.

With a more liberal appropriation, and thereby a more tangible expression of appreciation of the work and success of the Board, its usefulness along the lines suggested would be greatly enhanced.

With so many topics considered in this report, it would be an invidious distinction to call special attention to any. The illustrations used in connection with several of the articles will add greatly to their interest and value, and the State, as well as the Board of Health, are debtors to the publishers who so generously furnished and permitted their use.

September 15, 1893.

J. F. KENNEDY,
Secretary.

Meetings of the State Board.

MEETINGS OF THE STATE BOARD.

At the semi-annual meeting of the State Board of Health, December 19, 1891, the secretary presented a brief report, setting forth a general healthful condition of the State, and a marked absence of epidemics of any contagious disease.

Dr. Becker read a communication setting forth the unsanitary condition of most country houses, and calling attention to the fact, that however disposed and willing the people were to improve their sanitary condition, yet they were often uninformed as to the best methods of proceeding. He recommended heartily a pamphlet written by William Paul Gerhard, C. E., of New York city, entitled, "The Disposal of Sewage of Isolated Country Houses," and moved that the secretary be instructed to condense the pamphlet and publish it in the biennial report. The motion was unanimously adopted.

Dr. E. A. Guilbert, Chairman of the Committee on Education, to whom was referred a synopsis of the paper of Mr. L. F. Andrews, upon the "Lighting and Seating of School Houses," reported in favor of the paper as condensed, after a few changes made by the committee, and recommended its publication in pamphlet form.

The report was adopted.

A communication was presented from the State Undertakers' Association, recommending uniformity and scientific methods in embalming, calling attention to the fact that much, almost all that went under the name of embalming in this State was but so in name; that proper methods of embalming were of great sanitary, as well as æsthetic advantage, and asking a law providing for the education and licensing of those pretending to embalm in this State.

The Board pledged itself to aid in all proper ways in securing such a law.

Meetings of the State Board.

At the annual meeting, May 12, 1892, Dr. J. M. Emmert presented his commission as a member of the Board, dated February 6, 1892, to succeed Dr. H. H. Clark.

The Secretary presented a review of infectious diseases, for the year. Since the November meeting, diphtheria, in a few localities, has been epidemic. In other localities, though few cases have occurred, it has been of especially malignant form, and the death rate has been large. The reports from all over the State justify stating that wherever prompt and vigorous preventive measures were observed, where isolation and disinfection were faithfully enforced, the disease gained but little if any foothold. The little ones, and in many cases adults, who have been laid away because of the culpable, if not criminal, negligence of those entrusted with the sacred duty of protecting the public against the invasion and spread of this unnecessary, because preventable disease, furnish a sad commentary upon the low estimate placed upon human life.

Scarlet fever has been more general than for many years. In many places it has been so mild in form as to disguise its true nature, and only when among a number of mild cases a severe and fatal one occurred was its true nature detected.

It is still very fashionable in many localities for the physicians to call the disease "scarlatina," or "scarlet rash," and thus lead the friends and public to believe the disease, if contagious, was not serious, and should not be quarantined; that it was in no way related to scarlet fever. Nearly always in these cases, however, the unexpected appearance of severe cases brought some one in the community, often a good many, to the sad realization that they were warming and nursing a disease, that viper-like would sting to the death some loved one. If local boards of health could realize in a measure the great responsibility the State has laid upon them, and if those having this and other infectious diseases in their homes were unselfish and humane enough to cheerfully submit to isolation, and such other preventive measures as observation and experience have demonstrated to be necessary and efficient, the time would soon come when these diseases would be the exception and not the rule.

From the heavy rainfall there has been large surface as well as sub-soil drainage into the wells and springs of the State. Under

Meetings of the State Board.

such circumstances wells, because of their contiguity to privies, stables, alleys and cess-pools, too often become vertical cylinders for the retention of all manner of organic matter and pathogenic bacteria, which find their way uncooked into the human stomach to produce typhoid fever and other filth diseases. The water of wells so situated should be condemned for drinking purposes, unless thoroughly boiled before using, and every source of contamination so far as possible should be removed to preserve the purity of the air and soil as well as of the water. Great rains are great scavengers, but too often our sources of water supply become the most convenient receptacles for all the filth they transport.

Dr. Becker reported to the Board the following interesting case of poisoning after eating meat which came under his notice:

May 5th, Mr. B and family, of Clayton county, Iowa, were taken sick with symptoms of poisoning under the following circumstances:

On May 2d, Mr. B slaughtered a calf a month old. The calf at the time of slaughtering was nice and fat, and to all appearances perfectly healthy. On May 5th, Mrs. B prepared some of the calf's liver for the family dinner, not mistrusting for a moment that anything could be wrong with it. A few hours after the meal, one member of the family after another was taken sick with nausea, vomiting, pain in bowels and violent diarrhoea, all the symptoms resembling cholera morbus. They were taken down in the following order: First the little girl about three years of age, next the little boy five years old, next the mother, then the servant girl, then the hired man, and lastly Mr. B himself. Nausea and violent vomiting were the first symptoms to make their appearance, and the duration of the diseased condition varied with the age of patients, lasting on an average about two days each; those taken first were the last to recover. The poisoning was no doubt due to the development of tyrotoxin; but the peculiar features are that it developed in so short a time. From the time of slaughtering until the use of the liver was less than three days. No doubt the age of the calf had something to do with the rapid decomposition of the meat.

In consequence of considerable misunderstanding of the rules regarding the disinterment of the bodies of human beings, and the relation of such rules to the regulations concerning the transportation of such bodies, Dr. Guilbert presented the following resolution, which was adopted:

Resolved, That the rules of this Board relating to the shipment of the bodies of persons dying of specified infectious diseases, or from any cause, are held not to apply to the disinterment of dead bodies for the purpose of reinterment in another part of the same cemetery, or in a contiguous ceme-

Meetings of the State Board.

tery. But it is held that such disinterment can only be made by authority of the local board of health, formally approved by the State Board, and then only by night and not by public conveyance.

Rule No. 2, regarding the inspection of kerosene, was rescinded and a substitute adopted, which will be found in another place in this report.

The following officers were elected for the year:

President, E. M. Reynolds, M. D., Centerville.

Secretary, J. F. Kennedy, M. D.

Mr. L. F. Andrews was re-elected Assistant Secretary.

April 18th, 1892, notice was given of the appearance of small pox in the city of Des Moines, to-wit:

DES MOINES, IOWA, April 18th, 1892.

State Board of Health,

East City:

GENTLEMEN—Two cases of small pox are reported to this office; one at 621 East Second street, and one at 206 East Maple street, in this city.

Respectfully,

W. M. LEWIS,

Asst. City Clerk.

Soon after some others were alleged to have small pox, and an emergency hospital was constructed by the city and the patients sent there. Dr. J. O. Skinner was placed in charge. Serious doubts were expressed as to the character of the disease, and upon an invitation by the city, an investigation was made by Dr. Carter, of the State Board, who presented the following report of his findings:

Mr. President and Members of the Iowa State Board of Health:

On the 30th day of April, 1892, the board of health of the city of Des Moines requested me to visit a pest house for small pox, situated on the low lands near Raccoon river, in the south part of the city. The persons then in the pest-house have the following history: There lived at 621 N. E. Second street, in the city of Des Moines, a dealer in second hand goods—J. M. Friedman, whose family consisted of a wife, wife's mother, and four children. The children were all girls, and aged respectively, one, three, five and seven years. During the first week of April, 1892, the three year old child was indisposed, and as described to me by the father and uncle a few weeks later, had a vesicular eruption, more or less over the entire surface, which continued a few days, and passed away entirely within eight or ten days, no physician having been called. On the 13th day of the same month the seven year old child, who had attended school the day before, was attacked

Meetings of the State Board.

with an eruptive disease which, according to the same authority, was an exact counterpart of the former, except being somewhat complicated with a disease of the face and scalp, which the child had sustained during the former spring and winter months. The child, though allowed to attend school during this time, had scabs or scales continuously about the face and scalp. I suppose this disease to have been herpeticiform. The following day—the 14th—a physician was called, who, after having council, decided that the disease was small pox. The child was examined by the physician to the local board of health and others, and was quarantined as having small pox. The child's arm displayed a well defined vaccine mark.

At the same time and near by appeared another case in the family of J. M. Good, whose family consisted of a wife and five children, none of whom had been vaccinated except himself and wife. The children were aged respectively two, seven, ten, twelve and fourteen years, four girls, and one boy who was twelve years old. The seven year old girl was the afflicted one. She was in school on the 11th of the month, complained of toothache on the 12th and remained at home, and a vesicular eruption appeared on the 13th. Several physicians, together with the physician to the local board of health, pronounced this case small pox and it was quarantined as such. On the 18th of the month these two families except Mr. Friedman's mother, who had undergone small pox, and the two seven year old children now having the eruption, were vaccinated. A pest house was hastily erected on the site above named and on the 22nd the two families, consisting of fourteen persons, were placed therein.

An experienced physician had been given charge of them and was regularly in attendance. On the 23rd, ten days after the appearance of the eruption, the two children who had been sick played on the green sward around the pest house and the eruption had nearly disappeared, but showed more on the Friedman child, who had undergone vaccinia some years before, and was scarcely observable on the Good child, who had not been protected by vaccination.

On the 26th vaccination had taken effect on the twelve year old boy and on the fourteen year old girl, and the vesicles were well formed. On the 27th three of the girls, aged respectively one, five and fourteen years, were more or less covered with a vesicular eruption on the limbs, body, neck, and some on the face, scalp, and mucous membranes of the eyes, mouth and vulva. There was but little fever, and they went about the house and out in the yard as usual. All those were again vaccinated upon whom vaccination had taken no effect. On the 28th the ten year old child and on the 29th the two year old child had a similar eruption. There was no stage of invasion. On the 30th they were out about the building and there was but little fever. On the second day of May, in company with the attending physician and in compliance with the request of the local board of health, I examined the fourteen patients in the building. The two children on whom the eruption appeared on the 13th day of April were entirely well, and the vesicles on others were in various stages of desiccation and the last attacked, four

Meetings of the State Board.

days before, were beginning to dry up. The parents stated that not one of the children had missed a meal since the first appearance of the eruption on April 13th.

□ Eight of the nine children were affected by the eruption, the boy twelve years old only escaping. None of the five adults were affected. I then met the local board of health at the city hall and reported that in my judgment no small pox existed at the pest house, but that the disease with which the children had been affected was chicken pox. The physician employed by the board of health to attend these children, the physician to the board and another physician were present when my report was made, and stoutly maintained that the disease was small pox and urged the board not to release the quarantine, warning them of the dire results which would surely follow. With these conflicting statements before them the board of health hesitated to release the incarcerated at once; but on the second day released the two men, who with some difficulty found shelter for their families outside of the pest house, and at the expiration of ten days the place was deserted and the former inmates went unrestrained in the heart of the city, though less than two weeks had elapsed since the last patient commenced to have the disease.

On the 5th of May, three days after my report to the local board of health, I was called to treat Friedman's three-year old child who was mentioned above as having passed through an attack of eruptive disease during the first weeks of April. The child, as stated above, was vaccinated on the 18th of April and again on the 27th of the same month. I found it in the midst of vaccinia with the vesicle well formed, fever high, and on that day a papular eruption appeared all over the surface except the face. The eruption resembled measles, but there were no other symptoms indicating that disease. On the seventh the eruption was still prominent and very red, on the 8th the eruption was receding and fever declining. I dismissed the patient on the 11th, the eruption and fever having disappeared, leaving the surface rough. This was evidently a lichenous eruption caused by vaccinia.

It seems incredible that in the city of Des Moines two families should have been taken from their homes, placed in a pest house, guarded by officers and kept there for nearly a month during the development of six or eight well marked cases of chicken pox.

Had it been duly considered in the examination of the first case that the child had for several months previous to the attack been afflicted with a chronic skin disease, that it attended school the day before the attack, that there was no stage of invasion, and that another child in the family not having been vaccinated had just recovered from a mild vesicular disease, the chagrin of this mistake would have been avoided. The first case being an anomalous one was pronounced small pox, the second appearing near by and while the excitement unbalanced judgment, was classed with it. Then came another and another until the simplest form of chicken pox was held quarantined as small pox.

Most respectfully submitted,

E. H. CARTER.

Meetings of the State Board.

Mr. President and Members of the Iowa State Board of Health:

May 18, 1892, I went to Newton by request of the local board of health of that place, to examine a case of supposed small pox, which had for several days been kept under quarantine in that city. Arriving at the depot I was met by some of the members of the local board of health and a physician, who gave me the following history of the case: On the 14th inst. the physician was called to see a young lady in that city, who had been indisposed since the 11th inst. The marked feature of the case was an eruption of the skin. On the 15th he saw her again, and the eruption, which was vesicular, appeared in the throat and eyes, and presented some well defined umbilicated vesicles, which convinced him that the disease was small pox, and it was accordingly quarantined. On the following day two or three other physicians were called in consultation, and confirmed the former diagnosis. The patient had recently received a present from a small pox infected district of another state, and at that time it was supposed that small pox existed in Des Moines. The patient was put under the care of one of the consulting physicians, who possessed an army experience with small pox. In company with Dr. Failor, the physician to the local board of health, who was out of the city when the case occurred, I went to the residence of the gentleman whose daughter was the patient under consideration. We interviewed the patient, who was a well developed over grown girl, thirteen years old, who informed us that on the 11th of the month, one week previous to that time, some eruption appeared on the right side of the chest, which itched. The next day she was in school, as usual, and that evening she was out with some friends and walked a long distance, returning home fatigued and hot. A burning heat came over the surface. She was restless, slept but little, and an eruption appeared all over her during the night. She arose the next morning, but did not attend school because of the eruption. During the day the eruption increased on the face, and some vesicles appeared in the mouth and on the conjunctiva. On the next day the doctor was called, the history of which has been given you. At the time of our visit the vesicles were in an advanced stage of desiccation, leaving their marks on the skin, mucous membrane of the mouth and conjunctiva. The patient was convalescent. No doubt remained in our minds as to the nature of the disease, and we reported to the local board of health that it was varicella, and they immediately raised the quarantine, which relieved the nervous strain of the inhabitants of the town.

Respectfully submitted,

E. H. CARTER.

An emergency meeting of the Board was held September 22, 1892, to consider the threatened approach of cholera; also the action of the conference of State Boards of Health held at Chicago September 14th, and to take such action as was deemed necessary. Measures were formulated for an inspection service throughout the State, which are set forth in another place in this report.

Meetings of the State Board.

At the semi-annual meeting of the Board, held November 3, the rules for inspection service regarding Asiatic cholera and small pox imported by immigrants, were revised, amended and adopted.

The standard of potable water was changed, which will be found in another place, under the title, "Water."

The committee on regulations presented the following regulations applicable to cities and towns, in the form of an ordinance, to be adopted by the council, or to govern the local board of health thereof, and the same was adopted, to-wit:

AN ORDINANCE FOR THE PROTECTION OF THE PUBLIC HEALTH, AND FOR THE RESTRICTION AND PREVENTION OF CONTAGIOUS DISEASES.

SECTION 1. Be it ordained by the common council of the.....of that it shall be the duty of every physician residing, or practicing, within the limits of this, to give written notice to the mayor or the health officer immediately of any case of Asiatic cholera, small pox, diphtheria, membranous croup, scarlet fever (scarlet rash, scarlatina), typhoid fever, typhus fever, measles or other disease dangerous to the public health that he may be called to attend professionally, and any physician who shall neglect or refuse to give such notice as herein required, within twenty-four hours after he shall first visit and ascertain the character of any such disease herein named, shall be fined not less than ten dollars nor more than twenty-five dollars for each and every day he so neglects to give such notice. In all cases where no physician is in attendance, it shall be the duty of any person having charge of, or being at the head of a family, or having the care or custody of any lodging rooms, to give notice in like manner as required herein of physicians, and with like penalty for neglect or refusal.

SEC. 2. It shall be the duty of the mayor immediately on receiving notice of the existence of a case of Asiatic cholera, small pox, diphtheria, (membranous croup), typhoid fever, typhus fever, scarlet fever (scarlet rash, scarlatina), measles or other dangerous contagious disease, to take such measures as may be necessary and proper for the restriction and suppression of such disease; and to investigate all the circumstances attendant upon the occurrence of the same, and to provide for the proper care and maintenance of the sick, and all quarantined persons; and for this purpose he shall call to his aid the health officer of the local board of health, and in case the health officer shall be in doubt as to the true nature of the disease, or for other good reason, he shall have power to call to his aid any competent physician with whom to advise with reference to the course proper to be pursued for the public safety; and the reasonable fees of any physician so called upon for advice shall be audited by the board of health, and paid in the same manner as other expenses of the.....are paid. And it shall be the duty of the mayor at the termination of any case of contagious dis-

Meetings of the State Board.

ease herein named, to disinfect, or cause to be disinfected, the premises on which such disease shall have occurred, together with all infected furniture, bedding, clothing, and other articles, as provided by regulations of the State Board of Health.

SEC. 3. For the purpose of this ordinance quarantine shall be deemed to be:

1. The placing of a yellow cloth or card not less than eighteen inches square, having imprinted thereon the name of the disease in large letters, upon such conspicuous place on each building, hall, lodging room, or place wherein exists a contagious disease, as will best protect the public health;

2. The separation of the sick room from all other persons, if possible, and from all persons except the members of the family, the attending physician, and nurses;

3. The complete exclusion of all persons from the premises;

4. That no person shall leave said premises except the attending physician, without a permit therefor signed by the mayor and countersigned by the health officer;

5. That no article that has been used on or about a person sick with a contagious or infectious disease shall be removed from the sick room, nor from the premises, until the same has been properly disinfected;

6. That when nurses are employed to care for the sick they shall not be permitted to leave the premises during such employment, and where neighbors, relatives or friends serve as nurses, they shall not be permitted to leave the premises without previous change of clothing, proper disinfection, and a permit from the mayor. Any person who shall violate any of the provisions for quarantine as defined in this section shall be fined not less than twenty-five dollars for each offense, or be imprisoned for not less than ten days.

SEC. 4. Quarantine shall be established and maintained in each and every case for the period named herein, to-wit:

Asiatic cholera, twenty-one days;

Small pox, forty days;

Scarlet fever (scarlet rash, scarlatina), thirty-five days;

Diphtheria, thirty-five days;

Membranous croup, thirty-five days;

Measles, twenty-one days;

Typhus fever, until complete recovery and twenty-one days thereafter.

SEC. 5. Upon notice being given of the existence of any of the diseases named in this ordinance the mayor shall cause a yellow cloth or card not less than eighteen inches square, having the name of the disease in large letters printed thereon, to be fastened upon some conspicuous place of each building in which such disease prevails, said cloth or card to be maintained during the existence of the disease, and until the premises have been properly cleaned, disinfected and purified, and until quarantine is released.

SEC. 6. If any person shall willfully or maliciously remove or deface or cause to be removed or defaced, any signal of danger, or cloth or card placed

Meetings of the State Board.

upon any quarantined premises, without the proper authority as provided herein, he shall be fined not less than twenty-five dollars, or imprisoned not less than fifteen days, or be both fined and imprisoned at the discretion of the court.

SEC. 7. During the existence of any contagious or infectious disease in any family or household, or place, in this..... and until after the recovery of the sick, and the disinfection of the premises where such disease shall have existed, no person residing in such household, family or place, shall be permitted to attend any public or private school, nor any public place, without written permission from the mayor countersigned by the health officer, and no superintendent, teacher, or officer of any school shall permit any child or person from any such family, household, or place, to attend any school without a permit from the mayor countersigned by the health officer, upon the recommendation of the attending physician showing thorough disinfection of the person, clothing and premises. And any person who shall knowingly violate any of the provisions of this section shall be fined not less than twenty-five dollars, or be imprisoned not less than ten days.

SEC. 8. Whenever there is complete recovery of persons who have been sick with a contagious disease, and there are no further exposures thereto, the quarantine may be released, although the period prescribed in section four hereof has not elapsed. *Provided*, that no release of quarantine shall be permitted until proper disinfection of persons and premises is made as hereinafter provided.

SEC. 9. No order for the release of quarantine shall be made by the mayor until he has received from the attending physician a statement showing the number of persons under his supervision sick with a contagious disease; their name; age when the disease first appeared; when recovered; and what means for disinfection, if any, have been used. Said statement shall be submitted to the health officer of the board of health, who, if he shall find that the provisions of this ordinance and the regulations of the State Board of Health have been complied with, shall approve the said statement, whereupon the mayor shall forthwith release the quarantine, but if the health officer shall find that this ordinance and said regulations have not been complied with, the mayor shall order the same to be complied with under the direction of the attending physician, or by some other person under the supervision of the health officer, and the expense thereof shall be paid by the if the sick are unable to pay.

SEC. 10. The body of a person who has died from Asiatic cholera, small pox, typhus fever, typhoid fever, diphtheria, (membranous croup), scarlet fever (scarlatina, or scarlet rash), or measles, shall not be removed from the sick room until it has been wrapped in a cloth saturated with a solution of corrosive sublimate (one ounce to six gallons of water), and then tightly enclosed in a coffin. The body shall then be buried immediately without the attendance of any person other than is necessary for the interment thereof. And any person who shall violate any of the provisions of

Meetings of the State Board.

this section shall be fined not less than twenty-five dollars, or imprisoned not less than twenty days, or both fined and imprisoned at the discretion of the court.

SEC. 11. No person, company, corporation or association having charge of, or control of, any school-house or church, or of any building, room or place used for school or church purposes, or for any public assembly in this shall permit the body of any person dead from any of the contagious or infectious diseases named in this ordinance, or any other dangerous contagious disease, to be taken into such school-house, church, building, room, or place, for the purpose of holding funeral service over such body; and no sexton, undertaker or other person having charge of, or direction of, the burial of any body dead from any of the said diseases, shall permit the coffin or casket containing such body to be opened in the presence of any child, nor shall any child be permitted to act as pall-bearer, or carrier at any such funeral. And any person who shall violate, or cause to be violated any of the provisions of this section shall be liable to a fine of not less than twenty-five dollars, or to imprisonment not less than thirty days, or to both fine and imprisonment at the discretion of the court.

SEC. 12. If any person, whether as owner, occupant, lessee or agent, shall rent or lease, or permit the occupation by any person, of any house, room or place in which there has been any of the contagious diseases named in this ordinance, unless the same has been previously thoroughly disinfected, and such disinfection approved by the mayor and health officer, he shall be fined not less than one hundred dollars, or be imprisoned not less than sixty days, or be both fined and imprisoned at the discretion of the court, and it shall be the duty of the mayor and sanitary police to maintain a danger signal upon any such premises as provided in section three of this ordinance, until such disinfection is made.

SEC. 13. After death or recovery of persons sick from a contagious or infectious disease, the room, furniture, and other contents not to be destroyed, shall be thoroughly disinfected. The paper on the walls and ceiling, if any there be, shall be removed and completely burned. The floor, wood-work, and wooden furniture shall be painted over with a solution made by dissolving one ounce of corrosive sublimate in six gallons of water, the painting to remain one hour and then be removed by washing with clean water. The walls, if not papered, shall be thoroughly scrubbed with soap and water. When a room and its contents are to be disinfected by fumigation, heavy woolen clothing, silks, furs, stuffed bed-covers, beds and other articles which cannot be treated with the solution, shall be so arranged in the room as to expose the greatest amount of surface, all pockets turned inside out, and after fumigation they shall be hung in the open air, beaten and shaken. Pillows, beds, stuffed mattresses, upholstered furniture, etc., shall be cut open, the contents spread out, and thoroughly fumigated. Carpets shall be taken from the floor and so placed as to be thoroughly fumigated. All clothing, or bedding, or other articles, that have been in contact with a person sick with Asiatic cholera or small pox shall be burned. During fumigation all openings to the room shall be closed tight.

Meetings of the State Board.

SEC. 14. No person shall give, lend or sell, or offer for sale, any clothing or other article liable to convey infection of any contagious disease unless the same has been disinfected and such disinfection approved by the health officer. And any person who shall violate the provisions of this section shall be fined not less than one hundred dollars, or be imprisoned not less than thirty days.

SEC. 15. When Asiatic cholera, small pox, diphtheria, (membranous croup), scarlet fever (scarlatina, scarlet rash), typhoid fever, typhus fever, measles, or any other contagious disease exists in any house or dwelling place of a dealer in, or seller of milk, he shall discontinue, and cease to give, or sell, or distribute milk to any person, or to creameries or butter factories, or in anywise handle such milk, until a permit is granted therefor by the mayor, countersigned by the health officer. And no person who attends cows, and the milking, or who has the care of milk vessels, or the sale or distribution of milk, shall be permitted to enter any premises or place wherein exists any of the diseases named herein, nor have any communication direct nor indirect with any person who resides in, or is an occupant of, such infected place; nor shall any milk or butter be given away, sold or distributed from such infected place. And any person, either as principal, agent, or employe, who shall violate any of the provisions of this section, shall be fined not less than twenty-five dollars, nor more than fifty dollars, or be imprisoned not less than twenty days, nor more than thirty days, or both fined and imprisoned at the discretion of the court.

SEC. 16. Any railroad car, street car, omnibus, cab, hack, or other vehicle, in which a person has been carried affected with any of the diseases named herein, shall be forthwith removed from service and be disinfected before being used again. And any person, either as owner, lessee, agent, or employe, who shall violate the provisions of this section in the use of such vehicle, shall be fined not less than fifty dollars, nor more than one hundred dollars, or be imprisoned not less than thirty days, nor more than sixty days, or both fined and imprisoned at the discretion of the court.

SEC. 17. Rules and regulations made by the State Board of Health and by the local board of health of this concerning Asiatic cholera, small pox, diphtheria (membranous croup), typhoid fever, typhus fever, scarlet fever, measles, or other contagious or infectious diseases, shall be enforced by the mayor under the supervision of the health officer; and all police, and other public officers of the city, in their proper capacity, are hereby commanded and enjoined to aid and assist the board of health, the mayor, and health officer in the enforcement of said rules and regulations.

SEC. 18. It shall be the duty of all police officers to observe the sanitary condition of their districts, and to report through their chief to the health officer promptly, any nuisance or accumulated filth found in any portion of the corporation.

SEC. 19. The mayor shall have authority to appoint sanitary police whose duty it shall be to aid in the establishment and enforcement of quarantine regulations, and such other sanitary regulations as may be provided by the

Meetings of the State Board.

local board and the State Board of Health, and at such time, and in such manner as the mayor or the health officer may direct. Said sanitary police shall visit each quarantined premises at least once each forty-eight hours, and at such other times as the mayor or health officer may direct. He shall see that strict quarantine is maintained, and the premises properly placarded. *Provided*, he shall not enter any dwelling or place unless so requested by the occupants thereof, nor shall he disturb the inmates or the sick unless he has good and sufficient reason to believe there is willful violation of the quarantine regulations therein. He shall have full power of a police officer to make arrests for violation of quarantine or health regulations, and shall file information against such offenders before the police court. He shall appear for duty at the office of the mayor on or before ten o'clock A. M. each day. His compensation shall be the same as that allowed other police officers.

BURIALS.

SEC. 20. Upon the death of any person within the limits of this..... it shall be the duty of the physician who was attending at the time of death, or of the coroner when the case comes under his official jurisdiction, to furnish within twenty-four hours after such death, to the undertaker, or other person superintending the burial of said decedent, a certificate setting forth the full name, age, sex, color, place of death, date and cause of death, and such other facts as may be required by regulations of the State Board of Health, and the statutes of the State of Iowa. If any person shall die without the attendance of a physician, or if the physician who did attend the decedent at the time of death, shall neglect or refuse to give such certificate as aforesaid, it shall be the duty of the undertaker, or of any person acquainted with the facts, to report the same to the health officer of the local board of health, who is hereby authorized to give a certificate of death as aforesaid, *provided*, it be not a case requiring the attendance of a coroner.

SEC. 21. No sexton, or other person or persons, having charge or control of any cemetery, burying place, or tomb, or vault within the limits of this..... or under the control of this.....; and no undertaker, or other person or persons, shall inter, entomb, or place in any vault, within the limits of this..... the dead body of any person, or remove such body from or out of the without having procured a certificate of death as herein provided; and it shall be the duty of any undertaker, or other person or persons having charge of the burial or removal of the dead body of any person to deliver said certificate of death forthwith to the clerk of the local board of health.

SEC. 22. It shall be the duty of the clerk of the local board of health upon the presentation of a certificate of death in accordance with the provisions of this ordinance, and not otherwise, to issue a permit to inter, entomb, or place in a vault the body of the deceased person named in such certificate, and said clerk shall be entitled to charge and receive for issuing such permit, a fee of.....cents. And for the purposes of this ordinance, the placing of a dead body in a receiving vault shall be deemed an interment.

Meetings of the State Board.

SEC. 23. Upon the presentation of the proper application in accordance with the regulations made by the State Board of Health for the removal of the dead body of a human being out of the limits of this..... it shall be the duty of the clerk of the local board of health to issue a permit countersigned by the mayor, for such removal. *Provided*, that where said body is to be disinterred such application must be accompanied with a disinterment permit from the State Board of Health, but no permit for such removal shall be granted in any case of a body dead from Asiatic cholera, small pox, diphtheria (membraneous croup), leprosy, typhus fever, or yellow fever, or from any sequela or complications of said diseases; nor shall any permit be granted in any case whatsoever, where the cause of death was a contagious or infectious disease, or any sequela of such disease, unless the permit be approved and signed by the health officer of the local board of health, nor shall a permit be granted except upon the presentation of the proper certificate of the cause of death.

SEC. 24. The clerk of the local board of health shall enter in a suitable book to be kept for that purpose, a record of all burial permits issued, specifying the date of issue, to whom issued, together with all the items of information contained in the certificate upon which the permit was issued. And on or before the first day of each month he shall deliver to the clerk of the District Court all certificates of death in his possession, and on or before the tenth day of each month he shall report to the State Board of Health the deaths and causes thereof for the preceding calendar month.

SEC. 25. No hack, omnibus, street car, or other closed vehicle used for the conveyance of the living, shall be permitted to carry the body of any person dead from an infectious or contagious disease; nor with the knowledge of the owner, driver or person in charge thereof, to carry any person or article liable to communicate the infection or contagion of such disease.

SEC. 26. Each undertaker or sexton, and every person engaged or concerned in the burial of the body of a human being in violation of the provisions of sections nineteen and twenty-three of this ordinance, and the owners, officers and employes of any transportation company, or any other person, engaged or concerned in the removal of such dead body from the limits of this..... in violation of any of the provisions of this ordinance, shall be fined not less than fifty dollars, nor more than two hundred dollars, or be imprisoned not less than thirty days, nor more than ninety days, in the discretion of the court, for each offense.

SEC. 27. If any person shall neglect or refuse to furnish the certificate of death as required by section eighteen of this ordinance, he shall be fined not less than five dollars for each offense. *Provided*, that this section shall not apply to coroners engaged in an official investigation of a cause of death.

SEC. 28. If any physician, or any other person within the limits of this..... shall knowingly attempt to secrete, or withhold the true character of any of the contagious or infectious diseases specified in this ordinance, or shall in any manner whatsoever attempt to deceive or defraud, or who shall make any false statement in making a certificate of

Meetings of the State Board.

cause of death as required by this ordinance, by giving any other than the true cause of such death; or, if the decedent was affected with any of such contagious or infectious diseases during his last sickness, he shall neglect or refuse to state such facts in such certificate, he shall be fined not less than twenty-five dollars, nor more than one hundred dollars, or be imprisoned not less than twenty days, nor more than ninety days, or be both fined and imprisoned at the discretion of the court.

SLAUGHTER-HOUSES.

SEC. 29. No slaughter-house shall be erected nor used within the limits of this.....unless a permit from the mayor has first been obtained, with the advice and assent of the health officer, and no slaughter-house shall be erected, nor used, within 300 feet of any public highway, nor within 600 feet of any dwelling house, school-house or church, or any building used for church purposes. It shall be erected on dry, hard land, that can be well drained. It shall be amply supplied with clean, wholesome water from springs, wells, or unpolluted streams. It shall be floored with a tight, solid floor of hard wood, or cement, or well joined stone. The yards, sheds and close pens shall be dry, and free from mud and filth, and their sides or walls shall be thoroughly whitewashed at least twice each year. All its apparatus shall be kept in a neat and orderly manner, and free from offensive smells. When the slaughtering for the day is completed, the sides and floor of the slaughter-room shall be thoroughly washed with an abundance of clean water. No other disinfectant will be required. No animal matter of any kind shall be permitted to remain in, under, or near the slaughter-house to decompose or putrify. When blood or offal, or immature animals are fed to swine on the premises, such arrangement shall be made that such material shall be speedily consumed. The blood of all slaughtered animals shall be conducted by a water-tight gutter to a water-tight trough in the hog yard. The offal and bodies of immature animals shall be thrown into a pen with a tight, dry floor, to be consumed at once by the swine; and all portions not consumed within twelve hours shall be removed from the pen and burned, buried or composted with fresh earth. When the blood or offal are not fed to swine on the premises, they shall be carried away each day in close tanks, or be converted into fertilizers, or otherwise utilized by some apparatus, the gases from which shall be carried under the furnace and consumed. The fat, and all material from which fat or oil are to be extracted, shall be rendered within such a time after the slaughtering of the animals that no offensive odors shall arise from them, or from the process of rendering. Any person who shall violate any of the provisions of this section shall be fined not less than twenty-five dollars, nor more than one hundred dollars, or be imprisoned not less than fifteen days, nor more than ninety days. And upon conviction thereof, all grants, licenses, or privileges contemplated herein, shall be immediately revoked and annulled.

Meetings of the State Board.

DISEASED ANIMALS.

SEC. 30. Any person owning, or having the care or custody of any animal which he shall know, or have reason to suspect, is affected with glanders, farcy, anthrax, or any other contagious or infectious disease, shall immediately isolate such animal from all other animals, and shall give notice thereof to the mayor or marshal of theof the location of such animal. And no person having the care or the custody of, or owning any animal affected with, or which there is good reason to believe is affected with, such disease, shall lead, drive, or permit such animal to go on or over any public grounds, uninclosed land, or on any street, public highway, lane or alley; nor permit it to drink at any public water-trough, pail or spring; nor keep such diseased animal in any enclosure in or from which such diseased animal may come in contact with, or close proximity to, any animal not affected with such disease. And for the purpose of this ordinance, an animal will be deemed as "suspected" when it has stood in a stable with, or been in contact with any animal known to have any of said communicable diseases; or if placed in a stable, yard or other enclosure where such diseased animal has been kept. Whenever an animal affected with any of the diseases herein named shall die, or shall be killed, the body of such animal shall be immediately burned, or buried not less than four feet deep, without removing the hide from the carcass. All bedding, litter, excrement, etc., that have accumulated about such animal, together with all blood, or other fluid elements that have escaped from it shall be burned. Dirt floors of stables wherein such animal has been kept shall be removed to the depth of four inches, and burned. Everything about the stable, combs, brushes, or any post or fence where it has stood, and every part of harness or wagon used with such animal, and the stable where it has been kept, shall be destroyed and burned. And it shall be the duty of the mayor, upon the declaration of a veterinary surgeon that any animal is affected with any of the diseases herein named, to enforce and carry into effect the provisions of this section. And any person who shall neglect, or refuse, to obey any of the provisions of this section shall be fined not less than twenty-five dollars, nor more than fifty dollars for each diseased animal, and for each day of such refusal, and for all damages that may result therefrom.

GENERAL PROVISIONS.

SEC. 31. It shall be the duty of every police officer who has any knowledge of, or has good reason to believe, that any of the provisions of this ordinance is being violated to make report of the same through his chief to the health officer of the local board of health.

SEC. 32. Any citizen who has reason to believe that any of the provisions of this ordinance is being violated, may file an information under oath, describing the person and the offense charged, and it shall be the duty of the attorney of the.....forthwith to prosecute the same before the proper court.

Meetings of the State Board.

SEC. 33. If any person by himself, or by his agent or employe, shall willfully violate any of the provisions of this ordinance, where no other penalty is provided, he shall be fined not less than ten dollars, nor more than two hundred dollars, or be imprisoned not less than ten days, nor more than ninety days, or be both fined and imprisoned, in the discretion of the court.

SEC. 34. THIS ORDINANCE SHALL take effect and be in force from and after its publication.

The following regulations applicable to townships and to all local boards were also adopted, to-wit:

FOR PREVENTION OF DISEASE.

RULE 1. No privy vault, cess-pool, nor reservoir into which a privy, water-closet, stable or sink is drained, except it be water tight, shall be established nor permitted within eighty feet of any well, spring or other source of water used for drinking or culinary purposes.

RULE 2. All privy vaults, cess-pools or reservoirs named in Rule 1, must be cleaned out at least once a year; and from the first of May to the first of November of each year, shall be thoroughly disinfected by adding to the contents of the vault, once every month, one or two pounds of copperas dissolved in a pail full of water.

RULE 3. No privy vault nor cess-pool shall open into any stream, ditch nor drain, except common sewers.

RULE 4. All sewer drains that pass within fifty feet of any source of water used for drinking or culinary purposes shall be water-tight, and in sandy soil the limit shall be eighty feet.

RULE 5. No sewer drain shall empty into any lake, pond, or other source of water used for culinary purposes, nor into any standing water within the jurisdiction of the Board.

RULE 6. No house offal nor dead animal of any kind, shall be thrown upon any lot, nor left exposed by any person, uncovered by earth upon any of the lots or lands within this township; and all putrid and decaying animal and vegetable matter must be removed from all cellars and out-buildings on or before May first in each year.

RULE 7. Between the first day of May and the first day of November no hogs shall be kept within the jurisdiction of this board, within twenty-five rods of any dwelling, except in pens with dry floors, or pens free from all filth and standing water. Cattle yards, barns and stables, must be kept clean and free from all filth and offensive smell. This board will order the removal of such animals at any time, when they appear to be prejudicial to the public health, safety or comfort.

RULE 8. It shall be the duty of every physician residing, or practicing, within the limits of this township, to give written notice to the clerk or the health officer of any case of Asiatic cholera, small pox, diphtheria, (membranous croup), scarlet fever (scarlet rash, scarlatina), typhoid fever, typhus fever, measles, or other disease dangerous to the public health that he may

Meetings of the State Board.

be called on to attend, within twenty-four hours after he shall first visit and ascertain the character of any such disease herein named. In all cases where no physician is in attendance, it shall be the duty of any person having charge of, or being at the head of a family, or having the care and custody of any lodging rooms, to give notice in like manner as required herein of physicians.

RULE 9. It shall be the duty of the clerk of the board immediately upon receiving notice of the existence of a case of Asiatic cholera, small pox, diphtheria, (membranous croup), typhoid fever, typhus fever, scarlet fever (scarlet rash, scarlatina), measles, or other dangerous contagious disease to forthwith quarantine the premises and take such measures as may be necessary and proper for the restriction and suppression of such disease, and to investigate all the circumstances attendant upon the occurrence of the same and to provide for the proper care and maintenance of the sick, and all quarantined persons, and for this purpose he shall call to his aid the health officer of the local board of health, and in case the health officer shall be in doubt as to the nature of the disease, or for other good reason, he shall call to his aid any competent physician with whom to advise with reference to the course proper to be pursued for the public safety. And it shall be the duty of the said clerk at the termination of any case of contagious disease herein named, to disinfect or cause to be disinfected, the premises on which such disease shall have occurred, together with all infected furniture, bedding, clothing, and other articles as provided by regulations of the State Board of Health.

RULE 10. Quarantine shall be deemed to be:

1. The placing of a yellow cloth or card not less than eighteen inches square, having imprinted thereon the name of the disease in large letters upon such conspicuous place on each building, hall, lodging room, or place wherein exists a contagious disease, as will best protect the public health.

2. The separation of the sick room from all other persons, if possible, and from all persons except the members of the family, the attending physician and nurse.

3. The complete exclusion of all persons from the premises.

4. That no person shall leave said premises except the attending physician, without a permit therefrom signed by the clerk and countersigned by the health officer.

5. That no article that has been used on or about a person sick with a contagious or infectious disease shall be removed from the sick room, nor from the premises, until the same has been properly disinfected.

6. That when nurses are employed to care for the sick, they shall not be permitted to leave the premises during such employment, and where neighbors, relatives or friends serve as nurses, they shall not be permitted to leave the premises without previous change of clothing, proper disinfection, and a permit from the clerk.

RULE 11. Quarantine shall be established and maintained in each and every case for the period named herein, to-wit: Asiatic cholera, twenty-one

Meetings of the State Board.

days; small pox, forty days; scarlet fever (scarlet rash, scarlatina), thirty-five days; diphtheria (membranous croup), thirty-five days; measles, twenty-one days; typhus fever, until complete recovery and twenty-one days thereafter.

RULE 12. Upon notice being given of the existence of any of the diseases named herein the clerk shall cause a yellow cloth or card not less than eighteen inches square, having the name of the disease in large letters printed thereon, to be fastened upon some conspicuous place of each building in which such disease prevails, said cloth or card to be maintained during the existence of the disease, and until the premises have been properly cleansed, disinfected and purified, and until quarantine is released.

RULE 13. If any person shall willfully or maliciously remove or deface or cause to be removed or defaced, any signal of danger, or cloth or card placed upon the quarantine premises, without the proper authority as provided herein, he shall be prosecuted, as provided by law.

RULE 14. During the existence of any contagious or infectious disease in any family or household, or place, in this township, and until after the recovery of the sick, and the disinfection of the premises where such disease shall have existed, no person residing in such household, family or place, shall be permitted to attend any public or private school, nor any public place, without written permission from the clerk countersigned by the health officer, and no superintendent, teacher, or officer of any school shall permit any child or person from any such family, household, or place, to attend any school without a permit from the clerk countersigned by the health officer, upon the recommendation of the attending physician showing thorough disinfection of the person, clothing and premises.

RULE 15. Whenever there is complete recovery of persons who have been sick with a contagious disease, and there are no further exposures thereto, the quarantine may be released, although the period described in Rule 11 hereof has not elapsed, *Provided*, that no release of quarantine shall be permitted until proper disinfection of persons and premises is made as hereafter provided.

RULE 16. No order for the release of quarantine shall be made by the clerk until he has received from the attending physician a statement showing the number of persons under his supervision sick with the contagious disease; their name; age; when the disease first appeared; when recovered; and what means of disinfection, if any, have been used. Said statement shall be submitted to the health officer of the board of health, who, if he shall find that the provisions of the regulations of the State Board of Health have been complied with, shall approve the said statement, whereupon the clerk shall forthwith release the quarantine, but if the health officer shall find that said regulations have not been complied with, the clerk shall order the same to be complied with under the directions of the attending physician, or by some other person under the supervision of the health officer.

RULE 17. The body of a person who has died from Asiatic cholera, small pox, typhus fever, typhoid fever, diphtheria (membranous croup),

Meetings of the State Board.

scarlet fever (scarlatina, or scarlet rash), or measles, shall not be removed from the sick room until it has been wrapped in cloth saturated with a solution of corrosive sublimate (one ounce to six gallons of water), and then tightly enclosed in a coffin. The body shall then be buried immediately without the attendance of any person other than is necessary for the interment thereof.

No public funeral shall be held of any person who has died from either of the diseases named herein, and no public funeral shall be held at a house, nor on any premises where there is a case of, or where there has recently occurred a death from either of said diseases.

RULE 18. No person, company, corporation or association having charge of, or control of, any school-house or church, or any building, room or place used for school or church purposes, or for any public assembly in this township shall permit the body of any person dead from any of the contagious or infectious diseases named in these regulations, or any other dangerous contagious disease to be taken into such school-house, church, building, room, or place, for the purpose of holding funeral service over such body; and no sexton, undertaker, or other person having charge of, or direction of, the burial of any body dead from any of the said diseases, shall permit the coffin or casket containing such body to be opened in the presence of any child, nor shall any child be permitted to act as pall-bearer, or carrier at any such funeral.

RULE 19. No person, whether as owner, occupant, lessee, or agent, shall rent or lease, or permit the occupation by any person, of any house, room or place in which there has been any of the contagious diseases named herein, unless the same has been previously thoroughly disinfected, and such disinfection approved by the clerk and the health officer, and it shall be the duty of the clerk to maintain a danger signal upon any such premises as provided in rules twelve and sixteen, until such disinfection is made.

RULE 20. After death or recovery of persons sick from contagious or infectious disease, the room, furniture and other contents not to be destroyed, shall be thoroughly disinfected. The paper on the walls and ceilings, if any there be, shall be removed and completely burned. The floor, wood work and wooden furniture, shall be painted over with a solution made by dissolving one ounce of corrosive sublimate in six gallons of water, the painting to remain one hour and then be removed by washing with clean water. The walls, if not papered, shall be thoroughly scrubbed with soap and water. When a room and its contents are to be disinfected by fumigation, heavy woolen clothing, silks, furs, stuffed bed-covers, beds and other articles which cannot be treated with the solution, shall be so arranged in the room as to expose the greatest amount of surface, all pockets turned inside out, and after fumigation they shall be hung in the open air, beaten and shaken. Pillows, beds, stuffed mattresses, upholstered furniture, etc., shall be cut open, the contents spread out and thoroughly fumigated. Carpets shall be taken from the floor and so placed as to be thoroughly fumigated. All clothing, or bedding, or other articles, that have

Meetings of the State Board.

been in contact with a person sick with Asiatic cholera or small pox shall be burned. During fumigation all openings to the room shall be closed tight.

RULE 21. No person shall give, lend or sell, or offer for sale, any clothing or other article liable to convey infection of any contagious disease unless the same has been disinfected and such disinfection approved by the health officer.

RULE 22. When Asiatic cholera, small pox, diphtheria (membranous croup), scarlet fever (scarlatina, scarlet rash), typhoid fever, typhus fever, measles, or any other contagious disease exists in any house or dwelling place of a dealer in, or seller of milk, he shall discontinue, and cease to give, or sell, or distribute milk to any person, or to creameries or butter factories, or in anywise handle such milk, until a permit is granted therefor by the clerk, countersigned by the health officer. And no person who attends cows, and the milking, or who has care of milk vessels or the sale or distribution of milk, shall be permitted to enter any premises or place wherein exists any of the diseases named herein, nor have communication, direct or indirect, with any person who resides in, or is an occupant of, such infected place; nor shall any milk or butter be given away, sold or distributed from such infected place.

RULE 23. Rules and regulations made by the State Board of Health, and by the local board of health of this township concerning Asiatic cholera, small pox, diphtheria (membranous croup), typhoid fever, typhus fever, scarlet fever, measles, or other contagious or infectious diseases, shall be enforced by the clerk under the supervision of the health officer; and all public officers of the township, in their proper capacity, are hereby commanded and enjoined to aid and assist the clerk and health officer in the enforcement of said rules and regulations.

CORPSES.

RULE 24. Upon the presentation of the proper application in accordance with the regulations made by the State Board of Health for the removal of the dead body of a human being out of the limits of this township, it shall be the duty of the clerk of the local board of health to issue a permit for such removal. *Provided*, that where said body is to be disinterred such application must be accompanied with a disinterment permit from the State Board of Health, but no permit for such removal shall be granted in any case of a body dead from Asiatic cholera, small pox, diphtheria (membranous croup), leprosy, typhus fever or yellow fever, or any sequela or complications of said diseases; nor shall any permit be granted in any case whatsoever where the cause of death was a contagious or infectious disease, or any sequela of such disease, unless the permit be approved and signed by the health officer of the local board of health, nor shall a permit be granted except upon the presentation of the proper certificate of the cause of death.

RULE 25. Each undertaker or sexton, and every person engaged or concerned in the removal of the body of a human being in violation of the pro-

Meetings of the State Board.

visions of rule twenty-four, and the owners, officers and employes of any transportation company, or any other person engaged or concerned in the removal of such dead body from the limits of this township in violation of any of the provisions of these regulations, shall be prosecuted as provided by law.

RULE 26. If any physician, or any other person within the limits of this township, shall knowingly attempt to secrete, or withhold the true character of any of the contagious or infectious diseases specified in these regulations, or shall in any manner whatsoever attempt to deceive or defraud, or who shall make any false statement in making a certificate of cause of death as required thereby, by giving any other than the true cause of such death; or if the decedent was affected with any of such contagious or infectious diseases during his last sickness, he shall neglect or refuse to state such fact in such certificate, he shall be prosecuted as provided by law.

SLAUGHTER-HOUSES.

RULE 27. No slaughter-house shall be erected nor used within the limits of this township unless a permit from this board has first been obtained, with the advice and assent of the health officer, and no slaughter-house shall be erected nor used, within 300 feet of any public highway, nor within 600 feet of any dwelling house, school-house or church, or any building used for church purposes. It shall be erected on dry, hard land, that can be well drained. It shall be amply supplied with clean, wholesome water from springs, wells, or unpolluted streams. It shall be floored with a tight solid floor of hard wood, or cement, or well joined stone. The yards, sheds and close pens shall be dry, and free from mud and filth, and their sides or walls shall be thoroughly white-washed at least four times each year. All its apparatus shall be kept in a neat and orderly manner, and free from offensive smells. When the slaughtering for the day is completed, the sides and the floor of the slaughter-room shall be thoroughly washed with an abundance of clean water. No other disinfectant will be required. No animal matter of any kind shall be permitted to remain in, under, or near the slaughter-house to decompose or putrefy. When blood and offal, or immature animals are fed to swine on the premises, such arrangement shall be made that such material shall be speedily consumed. The blood of all slaughtered animals shall be conducted by a water-tight gutter to a water-tight trough in the hog yard. The offal and bodies of immature animals shall be thrown into a pen with a tight, dry floor, to be consumed at once by the swine; and all portions not consumed within twelve hours shall be removed from the pen, and burned, buried or composted with fresh earth. When the blood or offal are not fed to swine on the premises, they shall be carried away each day in close tanks, or converted into fertilizers, or otherwise utilized by some apparatus the gases from which shall be carried under the furnace and consumed. The fat, and all material from which fat or oil are to be extracted, shall be rendered within such time after the slaughtering of the animals that no offensive odors shall arise from them, or from the process of rendering.

Meetings of the State Board.

DISEASED ANIMALS.

RULE 28. Any person owning, or having the care or custody of any animal which he shall know or have reason to suspect, is afflicted with glanders, farcy, anthrax, cholera, or any other contagious or infectious disease, shall immediately isolate such animal from all other animals, and shall give notice thereof to the clerk of this board of the location of such animal. And no person having the care or custody of, or owning any animal affected with, or which there is good reason to believe is affected with, such disease, shall lead, drive, or permit such animal to go on or over any public grounds, uninclosed land, or on any street, public highway, lane or alley; nor permit it to drink at any public water-trough, pail or spring; nor keep such diseased animal in any inclosure in or from which such diseased animal may come in contact with, or close proximity to, any animal not affected with such disease. And an animal will be deemed as "suspected" when it has stood in a stable with, or been in contact with an animal known to have had any of said communicable diseases; or if placed in a stable, yard or other enclosure where such diseased animal has been kept. Whenever an animal affected with any of the diseases herein named shall die, or shall be killed, the body of such animal shall be immediately burned, or buried not less than four feet deep, without removing the hide from the carcass. All bedding, litter, excrement, etc., that have accumulated about such animal, together with all blood or other fluid element, that have escaped from it shall be burned. Dirt floors of stables wherein such animal has been kept shall be removed to the depth of four inches, and burned. If the animal be affected with glanders or farcy everything about the stable—combs, brushes, or any post or fence where it has stood, and every part of harness or wagon used with such animal, and the stable where it has been kept shall be destroyed and burned. And it shall be the duty of the clerk upon the declaration of a veterinary surgeon that any animal is affected with any of the diseases herein named, to enforce and carry into effect the provisions of this rule. And any person who shall neglect, or refuse, to obey any of the provisions of this section shall be prosecuted as provided by law.

PUBLIC SCHOOLS.

RULE 29. Every person entering any public school must give satisfactory evidence of protection by vaccination.

□ RULE 30. The fact of vaccination and protection must be entered with each name on the school record, and on transfer and promotion lists.

RULE 31. Persons affected with diphtheria (membranous croup), measles, scarlet fever (scarlatina scarlet rash), whooping cough, or small pox must be excluded from school until the school officers, by authority of the attending physician, approved by the local board of health, grants permission for their admission, and all persons from families where such diseases exist must also be excluded.

RULE 32. It is the duty of every school teacher and school officer who discovers, or who has knowledge of a case of these contagious diseases, to cause the fact to be immediately reported to the local board of health.

Meetings of the State Board.

RULE 33. If a person is ascertained to have attended school when affected with either of these contagious diseases, the local board of health will immediately close the room wherein such person attended, and direct its proper disinfection.

Dr. Guilbert presented the following resolution, which was unanimously adopted:

Resolved, That whenever the Rules and Regulations of this Board relating to local boards, conflict with or are at variance with the ordinances and Rules and Regulations adopted to-day, such rules and regulations shall be so modified as to conform to the legislation had at this session of the State Board.

The following resolution, introduced by Dr. Guilbert, was also unanimously adopted:

Resolved, That the Iowa State Board of Health in session assembled do hereby recommend to the legislature of the State of Iowa at its next session, and to the United States, the setting apart by legal enactment, of two days in each year, at intervals of six months, for the education under the direction of the State Superintendent of Public Instruction, of our people, especially our school children, in sanitary science; and for the promotion of sanitary sentiment and conditions, by suitable work in individual, municipal, and national sanitation, believing that cleanliness is the best means of making our people healthy, happy, and prosperous in mind and body.

Dr. R. E. Conniff presented his commission as a member of the Board, to succeed Dr. P. W. Lewellen.

Dr. Carter presented the following reports of investigations made on request of local boards in cases where there was a difference of opinion among local physicians as to the nature of certain diseases then prevalent:

Mr. President and Members of the Iowa State Board of Health:

In answer to a call from Danbury, Woodbury county, June 11, 1892, I visited that locality to see some persons supposed to have small pox. This call coming as it did so soon after the spurious cases previously reported, I very naturally supposed them to be of the same kind. But upon arriving on the field I found five well marked cases of confluent small pox. They were receiving excellent treatment by Dr. Murphy, the health physician of Danbury, and as evidence of this I merely have to state that they all recovered.

The disease was brought to Danbury by a man coming from Bloomfield, New Mexico, where small pox prevailed, who stopped at a hotel in Danbury and took sick with the disease. Four other persons contracted it directly or indirectly from him.

Meetings of the State Board.

After visiting the patients who were on a farm a mile or so from the town I met the board of health and also some of the citizens who objected to a rigid quarantine. I approved of the good work that the board were doing and urged them to continue it. I explained to those who were complaining the necessity of a rigid quarantine and the necessity of a law giving the local board almost unlimited power and also its firm and prompt action in cases like the one then under consideration. I tried to have them understand that to stop the spread of disease was to their advantage, in a commercial way as well as to prevent sickness, suffering and probably loss of life, and urged that they should be foremost in enforcing the orders of the health officers.

It was evident to my mind that Mayor Ostrom and his assistants were determined to do all in their power to prevent the spread of the disease. It seems wonderful taking into consideration all of the circumstances attending these cases which I have not space here to detail that no other cases developed. Vaccination was thorough and extensive, quarantine was judiciously enforced, disinfectants used lavishly and the people kept at their homes as much as possible.

After my visit some little difficulty was experienced in maintaining perfect order among those who had been exposed, but a vigilant health board confined the disease to narrow limits and it soon became extinct.

Respectfully submitted,

E. H. CARTER.

DIPHTHERIA IN GREENE COUNTY.

Mr. President and Members of the Iowa State Board of Health:

By request of Dr. W. P. Tigner health officer of Churdan, I visited a family on a farm a mile or two from Churdan Green county on the fifteenth day of last June. The family consisted of eleven persons, father, mother and nine children. The oldest of the children was twenty-two or twenty-three years old and the youngest about two years old. Some of the children had been away visiting with a relative in whose family an only child had recently died rather suddenly with some throat difficulty, not named by the two physicians in attendance. A few days after their return they were taken sick and Dr. Tigner being called readily diagnosed the disease diphtheria and directed treatment accordingly. Other members of the family contracted the disease until the nine children were stricken. One or two of them died and a consulting physician was called, but they continued to die until the morning of the fifteenth day of June. About ten days from the time of the appearance of the disease, the fourth child died. The children who succumbed were not the oldest or the youngest, but the middle-aged. The fourth child died a few hours previous to the time of my arrival. At that time the five surviving children lay sick in the house. The building was an ordinary one-story farm house, of four or five rooms and beginning to decay. The carpets, furniture, and paper on the walls were in condition to retain the germs of a contagious disease. Dr. Tigner had commenced to put the place in a better sanitary condition.

Meetings of the State Board.

On the day of my visit a room was vacated, the furniture moved out, the floor and all of the woodwork thoroughly scrubbed with a solution of bi-chloride of mercury. The loose paper on the walls (and much of it was loose) was removed and the walls washed with the same solution. A fire was then made in the room. It was then directed that as soon as the room was dry a part of the patients be moved into it and another room be treated in the same manner and so on until all had been cleansed. The yard was to be raked and the rubbish burned. The youngest child particularly was very sick. There was near the anus a deep ragged ulcer an inch in diameter with precipitous edges. Prognosis doubtful.

After a few hours attention to the hygienic surroundings I made such suggestions in regard to treatment as seemed to be indicated in each particular case. I advised Dr. Tigner to continue to make frequent visits to the patients until they were relieved.

The following is an extract from a letter written by Dr. Tigner July 11th in answer to some questions which I asked him:

"The R— family have entirely recovered. No deaths after you were here. Those who were away came down first—four days after their return. They saw no children on the train and were not with any sick person during their trip. A singular fact is that a son who came to help care for the sick children (from Janesville) came down with diphtheria three days after his arrival and he knew of no cases where he lived. We have no other cases here yet."

Very respectfully submitted,

E. H. CARTER.

SCARLET FEVER AT AUDUBON.

To the President and Members of the Iowa State Board of Health:

GENTLEMEN:—In consequence of difference of opinion in the diagnosis of some cases of sickness at Audubon I was called to that place on the 27th day of September. I was met at the depot by Dr. Brooks and conducted to the residence of Mr. D—. His child, a little girl about six years old, was very sick with scarlet fever. The eruption had passed its height and was beginning to decline, with slight furfuraceous desquamation about the chest, but the fever continued. I examined the child carefully and there was no hesitancy in pronouncing the disease scarlet fever.

Dr. Brooks had been treating this child only a few days. It had been treated by Dr. E— of Audubon who declared that the disease was not scarlet fever and refused to report it as such. He had also treated Mr. D—'s son who was convalescent and had been in school a few days previous to my visit, but at that time was kept at home by order of Dr. Brooks. I examined the boy and his skin was rough and scaly. He said that he sat at his desk in school, rubbed the scales from his hands and arms and swept them up with his hands in a pile on his desk. This boy undoubtedly had scarlet fever, though it had not been so classed by Dr. E—.

Meetings of the State Board.

A few days previous to my visit Mr. D— sent for Dr. Brooks and requested him to treat his child instead of Dr. E—. Dr. Brooks reported the case to the mayor of the city and a card was placed on the house; but it was stated that Dr. E— continued to visit the place and told Mr. D— to tear down the card and that he could recover damages for being quarantined, etc., etc. This difference of opinion unsettled the minds of the people and there was danger of a wide spread of the disease. I recommended that strict quarantine be maintained and that the school room where the boy had attended be disinfected.

On October 1st Dr. Brooks wrote me that his patient had parenchymatous nephritis and that another case of scarlet fever had appeared in an adjacent house. A later report from Dr. Brooks informed me that his patients had recovered; but that there was still some opposition to quarantine. Very respectfully submitted,

E. H. CARTER.

At the meeting held May 4, 1893, the Secretary's annual report showed that no epidemic of serious character had visited any part of the State since the previous meeting. Diphtheria and scarlet fever had decreased, while measles had largely increased. Trichinosis had been reported in January in Plymouth, Buena Vista, Woodbury and Union counties among German families, caused by eating uncooked pork. There were several deaths. In several cases the victims were treated for typhoid fever, and the true nature of the disease discovered when too late. The indications are that in a large number of instances reported as typhoid fever, the real cause of sickness was trichinosis, the latter being a rare occurrence, and the early symptoms resembling those of the former.

The rules for disinterment of dead bodies were amended by striking out the requirement that it must be done in the night time, for the reason that it would require artificial light, causing disturbance to people living in proximity to cemeteries.

The Auditing Committee, after examining the bills and vouchers for expenses of the Board for the preceding year, reported as follows:

There are no items therein unauthorized by action of the Board. The bills, as paid, are mainly for salaries, expenses of members, some books for the library, printing ordered, telephone and express charges and a few minor items for necessary expenses of the office.

It is evident from an examination of the bills that no extravagant payment or uncalled for expense is discoverable, but it is also plain that the legislative appropriation made in the initiatory of the Board is insufficient to-day.

Meetings of the State Board.

The Board was instituted in May, 1880. Thirteen years of progress have enlarged the State of Iowa in population, and a consequent increase of demands upon the resources of the Board. The publication of the "BULLETIN," so necessary to the dissemination of the rules, decisions and instructions of the Board, is a call upon resources that were evidently meant, when appropriated by the legislature, to be simply for absolute and needful expenses. The subsequent addition to the original personnel of the Board in the appointment of so worthy a member as Dr. Stalker, was not met by a corresponding increase in appropriation. The added work of coal-oil inspection, did not receive any further aid from the State.

All these matters are essential to the perfect working of the State Board of Health. The increasing population, the constantly growing expense of printing, dissemination of literature, postage, telegraphic and telephonic service, cause a constant and absorbing drain on the small amount appropriated.

It is right that when gentlemen accept position wherein they agree to give service for the minimum of recompense, that they should hold steadily to their pledges, faith and honor. But it is not right that in pursuance of their so doing they should be bound down to figure ahead, to see if they can or cannot afford to buy a postage stamp or dispatch a telegram.

We therefore recommend that the Attorney-General be requested to prepare for this Board in legal shape, the suggestions of a committee skilled in legislative enactments, presenting forcibly to the legislature, reasons why the appropriation for this Board should be increased at least one thousand dollars yearly.

The following were elected officers for the ensuing year:

PRESIDENT.—J. C. Shrader, M. D., Iowa City.

SECRETARY.—J. F. Kennedy, M. D.

ASSISTANT SECRETARY.—L. F. Andrews.

The President appointed the following standing committees:

AUDITING.—Loring, Reynolds and Stalker.

ANIMALS.—Stalker, Guilbert and Carter.

CONTAGIOUS DISEASES.—Guilbert, Reynolds and Secretary.

CORPSES.—Emmert, Becker and Secretary.

FOOD AND WATER.—Carter, Becker and Stalker.

KEROSENE.—Reynolds, Guilbert and Andrews.

LEGISLATION.—The Board.

LIBRARY.—Conniff, Emmert and Secretary.

PLUMBING.—Loring, Carter and Stalker.

PUBLICATION OF PAPERS.—Becker, Emmert and Conniff.

RULES AND REGULATIONS.—Attorney-General, Stalker and Secretary.

SCHOOLS.—Conniff, Guilbert and Emmert.

VENTILATION.—Reynolds, Loring and Stalker.

Meetings of the State Board.

Regulations for the prevention of measles were adopted and ordered printed.

It was ordered that hereafter the Board shall meet on the first Thursday of February, May, August and November.

At the meeting of the Board held August 3, 1893, regarding the cholera inspection service, the Secretary reported that the Board has made ample arrangements for the inspection of immigrants in case of an outbreak of cholera in this country, but a most important and essential part of the work has been overlooked. How shall the expenses of the sanitary inspectors be paid? This Board has appointed the inspectors and has everything ready to set them to work vigorously in case an invasion by cholera should be imminent, except money to pay for expenses of travel, time, food, etc. The Board itself could hardly meet one day's expense if all were set to work. Some financial plan for carrying out the beneficent designs of the Board should be devised, and a plan agreed upon that would render the protective measures proposed by the Board effective. It is to be hoped that such a calamity may not befall us, and yet the danger is great, if not imminent.

In regard to visits to infected localities the Secretary said:

The varied and increasing demands made upon the limited resources of the Board, suggest the necessity of requiring all local boards desiring an official visit by any member of the State Board, or by its Secretary, to make provision for the immediate payment of all expenses incurred by such visit. It certainly was not intended by our law makers, that the individual members of the Board who are not even allowed a per diem while attending the regular sessions of the Board, much less a salary, shall go to remote places of the State, at their own expense for travel and loss of time, and in return get nothing at all unless paid by the State Board of Health. If it is a district township to which the call is made, the trustees as a local board of health, require a visit to help adjust a serious local difficulty. After the duty is well and satisfactorily done he is informed that the expenses of the visit will be certified to and laid before the board of county supervisors, who generally after a long delay refuse to pay it, and the member who has been for months out of his pay for expenses has to apply to the State Board of Health or go without any compensation. This is generally the result of all such visits. Even in some incorporated towns after officially calling for such a visit, the town or city council refuses to pay the bare expenses of the person called for.

The propriety of heating and ventilating school buildings by the so-called Smead system was called to the attention of the Board by boards of school directors in different portions of the State, and

Meetings of the State Board.

the opinion of the board as to its utility and healthfulness was requested. The subject was referred to the Committee on Schools to report at the next meeting.

An important and somewhat novel case was presented to the Board from Birmingham, Van Buren county. The local board of health condemned a school house and its site as unhealthful, and dangerous to the public health. A request made that an investigation be made by the sanitary engineer of the State Board, and it was done, the investigation confirming the action of the local boards. The board of school directors resisted the action of the local board, on the ground of expense. The local board became quiescent, whereupon the health officer appealed to the State Board for such action as was necessary to secure protection against the perpetuation of what was deemed a menace to the public health. The whole matter was referred to the Attorney-General.

The following resolutions were adopted:

Resolved, That leprosy be included by this Board in the list of diseases to be placarded.

Resolved, That in view of the increased expenses of this Board by reason of the increased number of meetings, and the steadily increasing contingent expenses of the Board to meet the demands of the local boards for rules and regulations, and other printed literature important to their efficiency, the rule providing for analysis of water for public water supply or of other substances supposed to injure the public health, when requested by a local board of health, at the expense of this board, be and the same is hereby rescinded.

Resolved, That when a request is made for members of this Board, or for the Secretary, to visit localities for the investigation of contagious diseases, or other subjects connected with the public health, a reasonable per diem, and the travelling and other necessary expenses of such member shall be paid by the person or locality making the request, and not by this Board.

It having come to the knowledge of the Board that immigrants from foreign countries were being sent to points of destination in this State without evidence of an inspection of their baggage at the port of debarkation, the following was adopted:

WHEREAS, Information having been received that the baggage of immigrants arriving at New York on vessels infected with contagious disease, is not inspected at such port before the departure of such immigrants for points of destination, therefore that the public may be protected against the importation of such diseases it is hereby ordered and directed that upon the arrival of immigrants from vessels infected with contagious diseases at their

Cholera.

point of destination in this State, the local board of health, or the mayor of a city or town, or the clerk of a township, shall take immediate possession of the entire baggage and belongings of each and every such immigrant, and hold the same, until released by order of the Secretary of this Board, and notice shall be immediately given, by wire, if possible, of such seizure, to the State Board.

The following rules were adopted:

That a body dead from diphtheria (membraneous croup), scarlet fever (scarlatina, scarlet rash), small pox, Asiatic cholera, typhus fever, or yellow fever must not be deposited in a receiving vault.

That a receiving vault in which has been deposited a body dead from Asiatic cholera, small pox, diphtheria (membraneous croup), leprosy, scarlet fever (scarlatina, scarlet rash), typhus fever or yellow fever shall not be opened for the removal of such body, nor for the deposit of bodies dead from non-contagious diseases, nor for the entrance of living persons, and no permit shall be granted for the removal of such body from such vault, except with special limitations, by the State Board when in session.

It was ordered that all bodies dead from cholera, typhus fever, small pox, diphtheria (membraneous croup), scarlet fever (scarlet rash, scarlatina), yellow fever and leprosy shall be buried in the ground, or cremated immediately.

That no permit for disinterment of bodies dead from scarlet fever shall hereafter be granted.

The use of sulphur candles for disinfection was commended by the Board, and directions for their use was ordered to be given in the future publication of rules for fumigation.

CHOLERA.

India is the home of Asiatic cholera. From this country it extends along such routes of travel, and into such localities, as afford the most favorable means for its propagation and spread. While it exists all the time in India in certain localities, it is often so mild in type that it does not spread extensively. It usually assumes an epidemic form in the early Spring during the religious devotions of the pilgrims who go annually to Benares and other sacred cities on the Ganges river. At such times through the utter lack of any sanitary precaution, the river by the constant bathings

Cholera.

of countless thousands of devotees becomes little better than a vast sewer. Its water is drunk, and the bodies of persons dying of the cholera, or any disease, are thrown into it to decompose or to feed the crocodiles. At these times cholera asserts its power, hundreds die, their excreta while sick, and their bodies after death, are thrown into the river, and if the disease is of an unusually severe form it gets beyond India and travels eastward and westward along the great lines of travel.

Asiatic cholera is a specific disease, characterized by excessive vomiting and purging, rice-water evacuations from the bowels, severe crampings, great prostration, collapse and tendency to run a rapidly fatal course, and communicable to persons otherwise in good health, through the discharges of persons affected by the disease. The method of communication is generally by drinking water or by anything swallowed that has been in any way contaminated by the discharges from cholera patients.

In badly ventilated rooms the air may become so foul from these excreta as to poison, by inhalation, those who are nursing the sick; or those who have charge of the bodies after death, or wash their soiled clothing. If these discharges become dried they may retain their infectious properties for a long time, and becoming detached and floating in the air may drop into water and milk and thus swallowed, or may be drawn into the mouth, mixed with the saliva and thus propagate the disease.

The causes producing the disease may be briefly enumerated: The presence of the specific cholera germ is absolutely essential; contact with those poisoned by this germ, especially the swallowing of matters contaminated by, or the breathing of air polluted by the exhalations and excreta of cholera patients; impaired health, unsanitary surroundings, such as accumulations of filth or garbage; and fear; all contribute to the contraction of the disease, where exposure has taken place.

The foregoing statement of causes of cholera are submitted without comment, and the following preventive measures recommended:

1. If possible, prevent exposure by personal contact, by quarantine, and isolation.
2. Ventilate freely all premises where any are, or have been sick, or died with the disease.

Cholera.

3. Disinfect thoroughly with strong carbolic acid or mercuric chloride, all persons or things that by any possibility may have been contaminated by the disease. Prolonged boiling, steam or dry heat as great as can safely be borne by the texture treated are all good disinfectants. All discharges, whether from the stomach, bowels or bladder, after being disinfected, should be buried away from any habitation, and never under any circumstances thrown into cesspools, drains, sewers, or placed where they can gain access to water used for drinking, or for diluting milk. In addition, all water should be percolated or strained and boiled before being drunk.

4. Panic and fright should be avoided, and such articles of diet as produce diarrhoea, as unripe or over-ripe fruit and uncooked vegetables. A tendency to diarrhoea should receive prompt and judicious attention and treatment.

5. Mild cases of this disease should receive the same restrictive and preventive care as the most malignant, and cholera, so called, should be regarded not only the possible but probable progenitor of virulent Asiatic cholera.

6. In case of death a quiet and prompt interment after proper preparation and disinfection of the body should take place, and everything in contact with, or contaminated by the patient before or after death should, if not capable of perfect disinfection, be burned.

Mr. Simon, who is most excellent authority in cholera, says: "But after all, infinitely the most important preventive measures to be adopted against cholera are, to provide a pure supply of drinking water, good drainage, ventilation and cleanliness"—all of which are embodied in the last word "cleanliness."

Iowa is remarkably well situated geographically to resist an invasion of cholera, and yet she should not presume upon her location for exemption. Though she has extensive watercourses on her east and west boundaries, but little danger is to be apprehended from river navigation, from the fact that as a means of human intercourse, or travel, but comparatively few come into the State that way. Then, the quarantine at the mouth of the Mississippi is so nearly perfect that few if any cases will reach New Orleans by the river. Chicago will be Iowa's greatest menace, and

Cholera.

should the disease become prevalent there the Iowa Board of Health would be called upon to enforce such preventive measures as the law justifies.

Every town of any size should be prepared to remove to an isolated place, or hospital, on the shortest possible notice, any person taken with the disease who cannot be treated at home with such isolation as not to endanger others. Such a measure would not be any hardship to the patient, and would be a large measure of safety to those at home. Every considerable town should have a disinfecting oven belonging to the health department, where clothing, carpets, and effects of all kinds contaminated by contact with, or exposure to, those sick with any infectious disease, could be taken and fumigated, steamed, and afterward subjected to the highest heat possible without injury to the fabric. Here disinfection could be done in a scientific manner and effectively as well as economically.

CHOLERA CAUTIONS.

The following rules should be rigidly observed as preventive measures:

1. *Cleanliness.* The person, clothing, and premises should be scrupulously clean. The hands and any article of clothing, if brought in contact with any of the discharges from cholera patients should at once be thoroughly washed and disinfected.

2. Raw or uncooked articles of food, including milk should in no instance be used, because *thorough cooking destroys cholera germs.*

3. All drinking water should be boiled. And all food eaten should be as *recently* cooked and taken as hot as can well be.

4. All fruit and vegetables with skins or rinds on, should be washed clean and pared. Apples, peaches, pears and potatoes should be especially treated in this way. Good fruit in season, if not over-ripe, nor unripe, when pared, if not eaten in too great quantities is not a source of danger. Imported grapes should be shunned.

5. Secret nostrums and patent medicines claiming to cure cholera should be let alone. The proprietors of these remedies would not depend on them for themselves or for their families. *There is no specific cure for cholera.* Every case as soon as taken should

Cholera.

be seen by a competent, intelligent physician, not only with the hope of saving life by proper treatment, but to suggest and assist in such precautionary measures as will prevent others from being needlessly exposed. A large per cent of cholera patients get well under proper treatment.

6. All discharges from cholera patients should be immediately disinfected and buried where they cannot come in contact with any water supply. Full directions for disinfecting solutions, recommended by the American Public Health Association, are published by the Iowa State Board of Health, and furnished to every local board of health and health officer in the State.

7. Children and the aged, especially those lacking in physical vigor, are most frequently attacked—hence all such should be specially guarded against infection.

8. The use of tobacco is not a safeguard against the disease. It has been noted that the disease is especially violent among those whose constitutions are impaired by narcotics and stimulants.

9. The depressing influence of fear contributes largely to the contraction of the disease. A cheerful, hopeful spirit in such a time not only is a protection to the one possessing it, but exerts a healthful influence upon others.

10. The bowels should be kept as regular as possible. Over-eating should be especially avoided, since it is likely to result in indigestion, with vomiting and purging; a tendency to diarrhoea should be promptly checked.

11. Keep at home as closely as possible. A clean comfortable, home, where all its inmates are careful in their habits, and do not keep bad hours, nor resort to places of questionable character, is the best place to be during such an epidemic.

12. Do not attend the funeral, nor go to the homes of those dying with the cholera. Let these works of mercy and charity be performed by those appointed and authorized to do so, from the fact that they will be done more carefully, scientifically and successfully, and with the least danger to others. Sentimental considerations in such fearful times may well be held in abeyance, and such kindly offices entrusted to those who can do them best and safest.

13. Should the disease appear and your physician through igno-

Cholera.

rance, and especially through a desire to prevent quarantine and isolation call it "cholérine," and try to minimize the danger to yourself, and other members of the family, discharge him at once and call in an *honest, intelligent* one. It is important that you and every body should know the *truth*. "Cholérine" is nothing but a compromising, temporizing, and dangerous term for cholera. Do not be deceived by it.

14. Cholera, unlike yellow fever, is not stamped out by cold weather. The disease is not nearly so prevalent in cold climates in Winter, but the germs though less active are likely with the return of warm weather to become specially virulent, and getting such an early start spread, unless checked by the measures suggested, over vast areas of territory. The disease once getting a foothold will often remain for two or three years in a country, gradually becoming less and less severe in type until it dies out.

REGULATIONS OF THE STATE BOARD.

At an emergency meeting of the Iowa State Board of Health, held September 22, 1892, the following was adopted, as recommended by the Conference of State Boards of Health held at Chicago, September 22, 1892:

RULE 1. Every immigrant passenger, before being allowed to land at any port of, or to cross the borders into, the United States, shall obtain a certificate from the health officer of the port or point of entry, or from a Sanitary Inspector of the United States Marine Hospital Service (where that service has charge of quarantine and disinfection), or from the quarantine officer at Gross Isle, setting forth the name of such immigrant, whence emigrated, name and port of clearance of vessel, and the date of arrival at port of entry, the fact of existence or non-existence of any infectious disease on said ship, the period of detention therefor at quarantine, local destination of the immigrant in any State or territory of the United States, and further certifying that he or she is free from any danger of conveying the contagion of Asiatic cholera or small pox in person or effects, and that his or her effects and belongings have been subjected to approved processes of disinfection before being allowed to enter into the United States.

RULE 2. A certificate of disinfection, as required in Rule 1, signed by the official under whose charge the work of inspection and disinfection has been performed, and giving name of owner and date of issue, shall be conspicuously attached to each piece of baggage of such immigrant.

RULE 3. Any railway or transportation company accepting, for transportation through the territory represented by this Conference, immigrants not provided with certificates described in Rule 1, or whose baggage does

Cholera.

not bear the certificate provided for in Rule 2., shall be subject to the quarantine rules of the States represented in this Conference, and to any detention at the border, or within the territory of such State, for such thoroughness of inspection as the authorities of each State may deem necessary.

RULE 4. Immigrant passengers, if not conveyed on separate trains exclusively devoted to such service, shall be transported, when practicable, in separate cars, to which access shall be denied to other passengers, and the disinfected baggage of such immigrants, other than the hand-luggage carried by them, shall not be accessible to them until they have arrived at their respective points of destination; and similar precautions shall be observed in the transportation of immigrant passengers by water.

RULE 5. Railroad or other transportation companies carrying such immigrants shall telegraph to the Secretaries of the State Boards of Health and to the designated health authorities at the distributing points, advising of the hour of the arrival of such immigrants, and in time sufficient to allow of the train being met by inspectors, and shall also telegraph notice to said authorities of any sickness occurring among such immigrants.

RULE 6. The requirements set forth in Rules 1 and 2 shall apply to passengers of any class arriving on a vessel infected with Asiatic cholera or small pox.

At a meeting of the State Board, November 4, 1892, the following additional rules were adopted:

□ RULE 7. The places named below, be and are hereby declared to be *distributing points*, to-wit: Des Moines, Keokuk, Fort Madison, Burlington, New Boston, Davenport, Clinton, Sabula, Dubuque, McGregor, Sioux City, Council Bluffs, Davis City, Coatesville, Hamburg, Blanchard, Braddyville, State Line, Blockton, Bethany Junction, Lineville, Buda, Cincinnati, Dean, Cedar Rapids, Northwood, Mona, Hawarden and Rock Rapids.

RULE 8. Sanitary Inspectors shall be appointed at these distributing points by the Secretary of the State Board of Health.

RULE 9. Sanitary Inspectors shall have authority to stop all incoming railway trains or steamers known or suspected to contain immigrants or other persons infected with cholera or small pox. They shall have power to establish quarantine at the border or within the State. They shall cause to be made at such stations, when necessary, thorough disinfection of all inspected persons and their luggage, and shall not allow the said immigrants or other infected persons to proceed on their journey until such thorough disinfection has been made. They shall hold in quarantine all such immigrants or other infected persons until sufficient time has elapsed to demonstrate their immunity from these prescribed diseases.

RULE 10. Sanitary Inspectors shall be duly sworn to the faithful performance of their official duty. They shall, when on duty, wear an official badge, to be prescribed by the State Board of Health. They shall also, during the performance of their duties, make detailed daily reports to the State Board of Health, on blanks furnished by the Secretary of said Board.

Cholera.

RULE 11. All railways or other passenger transportation companies, having in charge immigrants or other persons hailing from infected ports, or coming from infected ships or from infected places in our own country (or persons suddenly infected in transit), shall, before entering Iowa, be required to notify the Secretary of the State Board of Health, and the Sanitary Inspector at the point of intended entrance into the State, succinctly stating the names and destination of the immigrants or other infected persons. Such notification shall be by telegram and shall be sent to the Iowa Sanitary Officers sufficiently long enough in advance to enable a Sanitary Inspector to reach and examine these emigrants or other affected persons previous to their arrival at the Iowa distributing point.

RULE 12. Should cases of Asiatic cholera or small pox suddenly develop in travelers whose destination is a place intervening between the point of attack and the nearest distributing point, the officers in charge of such public conveyance shall cause telegraphic notification to be sent the mayor, if the point is within an incorporated city or town, and to the township clerk if the point of destination is not within the limits of an incorporated city or town, and also to the Secretary of the State Board of Health.

RULE 13. Each Sanitary Inspector shall have power to appoint some competent medical practitioner as his deputy, causing him to be duly sworn. The said deputy shall act as Sanitary Inspector only during the sickness or temporary absence of his chief, or as his assistant when required by him.

RULE 14. These Rules shall take effect and be in force from and after the 20th day of September, 1892.

PREVENTION OF CHOLERA EASIER THAN CURE—HOW CAUGHT.

Healthy persons "catch" cholera by taking into their systems through the mouth, as in their food or drink, or from their hands, knives, forks, plates, tumblers, clothing, etc., the germs of the disease which are always present in the discharges from the stomach and bowels of those sick with cholera.

Thorough cooking destroys the cholera germs; therefore—

Don't eat raw, uncooked articles of any kind, not even milk, unless known to be absolutely fresh.

Don't eat or drink to excess. Use plain, wholesome, digestible food, as indigestion and diarrhoea favor an attack of cholera.

Don't drink unboiled water.

Don't eat or drink articles unless they have been thoroughly and recently cooked or boiled, and the more recent and hotter they are the safer.

Don't employ utensils in eating or drinking unless they have been recently put in boiling water, the more recent the safer.

Cholera.

Don't eat or handle food or drink with unwashed hands, or receive it from the unwashed hands of others.

Don't use the hands for any purpose when soiled with cholera discharges; thoroughly cleanse them at once.

Don't allow flies in the house if possible. Keep food, drink, dishes and cooking utensils covered as a protection against pollution by them. Kill and burn all flies found in doors as promptly as possible.

Personal cleanliness and cleanliness of the living and sleeping rooms and their contents, and thorough ventilation, should be rigidly enforced. Foul water closets, sinks, cellars, etc., should be avoided, and when present should be referred to the health board at once and remedied.

PRECAUTIONARY MEASURES OF TREATMENT.

The successful treatment and the prevention of the spread of this disease demand that its earliest manifestations be promptly recognized and treated; therefore—

Don't doctor yourself for bowel complaint, but go to bed and send for the nearest physician at once. Send for your family physician; send to the health department. Don't wait, but send at once.

If taken ill in the street, seek the nearest drug store, and demand prompt medical attention.

Don't permit vomit or diarrhoeal discharges to come in contact with food, drink or clothing. These discharges should be received in proper vessels and kept covered until removed under competent directions. Pour boiling water on them, put a strong solution of carbolic acid in them (not less than one part of acid to twenty of hot soap suds or water). Use quick lime freely; it is convenient, cheap and effective.

Don't wear, handle or use any articles of clothing or furniture that are soiled with cholera discharges. Pour boiling water on them or put them into it, and scrub them with the carbolic acid solution mentioned above, and promptly request the health board to remove them.

Don't be frightened, but do be cautious, and avoid excesses and unnecessary exposures of every kind.

Consumption.

CONSUMPTION.

Since the last biennial report of the Board there has been no change in the theory as to the cause and best means of preventing this fatal as well as cosmopolitan disease. Experiments and additional observation have only tended to confirm the theory that tuberculosis is caused by the *bacillus tuberculosis*—the disease germ discovered and described so faithfully by Robert Koch.

Science and history have demonstrated that this disease is not hereditary, but that its presence and prevalence are due to contagion or infection. With that belief in view there has been organized in Philadelphia a society for the prevention of tuberculosis, entitled "The Pennsylvania Society for the prevention of Tuberculosis," of which E. Leslie Gilliams is Secretary. This Society has issued two tracts for gratuitous distribution, which should have a wide circulation, as they in plain and simple language, and yet with scientific accuracy, detail the cause and methods by which the disease is originated and disseminated, as well as the best means of prevention.

The tracts are presented herewith, believing that the facts they state should be known by all our people—especially by those who make and execute our laws.

HOW TO AVOID CONTRACTING TUBERCULOSIS (CONSUMPTION).

Tuberculosis, popularly known under the names of consumption, decline, scrofula, marasmus, wasting disease, inanition, lupus and white swelling, is a contagious disease, which means that every new case is produced by exposure to some other case. The knowledge of this fact gives the key note to personal avoidance of the disease. Fortunately science has demonstrated how a person suffering from tuberculosis can give it to another, and hence we know just what to do to avoid getting it. This knowledge moreover brings us great consolation, for it takes away all cause for fear and for oppressing the unfortunate victims of the disease. To avoid consumption ourselves we do not have to be unkind to our dear ones who have it, nor to deprive them of their relatives, or in fact of any of the comforts of this life. The contagium of tuberculosis lies entirely and alone in the pus (matter)

Consumption.

given off either in the form of spit in consumption, of matter in abscesses and in lupus, or of discharges from the bowels in marasmus and in tuberculosis of the bowels. *In short, pus (matter) given off from a tubercular sore, wherever it may be, is the means of giving the disease to somebody else.*

This tubercular pus can find its way into a healthy person principally in three ways: *First*, through the stomach; *second*, through the lungs, or *third*, through an open wound. *FIRST, THROUGH THE STOMACH:* When people eat imperfectly cooked tuberculous meat, drink milk from badly diseased tubercular cows eat food out of the same dishes, or with the same eating utensils as consumptives, eat food with unwashed hands after having been in contact with tubercular patients, eat food that has been handled by persons suffering from tuberculosis, put coin, articles of toilet or other small objects that have been handled by persons suffering from tuberculosis into the mouth, use musical instruments or implements which, when in use, are placed to the lips or in the mouth and which have been used by consumptives, kiss upon the lips persons suffering from consumption, swallow tubercular pus in the form of dust which has accumulated in the throat and fauces during the act of respiration. *Secondly, THROUGH THE LUNGS:* When people inhale dried-up tubercular pus in the form of dust. *Thirdly, THROUGH WOUNDS:* When people get tubercular pus into an open cut or an abrasion of the skin.

Of the three ways in which the disease germ gets into the system that by the stomach is the most frequent. There is not so much danger of getting tuberculosis by eating meat and drinking milk that people need be afraid to use these articles. Thorough cooking destroys the bacillus tuberculosis and therefore removes all danger; but even this need not be resorted to in the case of milk when the dairyman is known to be careful and honest. If you do not know your dairyman you had better boil your milk. You can do most toward protecting yourself against tuberculous meat, however, by exerting your influence to bring about proper government inspection of slaughter houses and dairies. If you are living in the same house with a consumptive be careful *not* to use the same dishes and eating utensils unless they have been first thoroughly boiled. Above all things *do not* eat of the delicacies which have been sent to the invalid and which he has eaten of, nor help him sip his wine. When you have been in contact with tubercular patients wash your hands at your earliest convenience, and be sure to wash them carefully before eating. *Do not* buy any food from a person suffering from tuberculosis, and as a matter of general precaution, have all food which goes on the table raw well washed. *Never put* coins, articles of toilet or other small objects into your mouth, for they may have been used by a consumptive just before falling into your hands. This is particularly true of money, and when such has been handled the hands ought to be washed before eating. *A most prudent habit to form is never to eat without first having carefully washed the hands.* *Do not* use a pipe, wind instrument, such as a flute or horn, or an instrument or implement which goes to the lips or into the mouth, that has been in use by a consumptive. *Do not*

Consumption.

kiss persons on the mouth who are suffering from tuberculosis of the lungs when the disease has arrived at a stage when they begin to spit. Even with the cleanliest persons some sputa will adhere to the lips when the handkerchief has been used. When you have for any length of time been in a room with a consumptive, in which perfect sanitary measures are not practiced, *do not* swallow your spittle until you have had an opportunity to rinse your mouth and throat. If you are compelled to be about a consumptive frequently, endeavor to have him disinfect all tubercular pus immediately upon its being thrown off, for in this way you protect yourself against all danger. Should you not be in a position to see this carried out, avoid as far as possible inhaling dust in the room or upon the premises. *Never allow* clothing or furniture that has been used by a consumptive or that has been kept in a house occupied by a consumptive to come into your house or room until it has been thoroughly disinfected. When you are compelled to change your residence be sure to make inquiry about the house into which you are going to move as to whether or not it has been occupied by a consumptive, and if has, *see that it is thoroughly disinfected before you move into it.* The walls of the room which was occupied by the consumptive ought to be scraped and washed with some powerful disinfectant, such as mercury or carbolic acid.

There is a great deal in family and individual predisposition to tuberculosis. If any of your family have died of the disease it is some evidence that you are prone to it, and you ought as a matter of prudence to keep away from it as much as possible. Individual predisposition is usually acquired, and consists chiefly in a run-down condition, or a deformed or improperly developed chest. If you are suffering from dyspepsia do not permit it to run on, but have it remedied at once. Stomach troubles are powerful predisposing causes of tuberculosis. Malnutrition of any kind predisposes to the disease. If you are losing weight, or if you find that your food disagrees with you in any way seek a remedy. Perfectly healthy digestion and assimilation are excellent guarantees against tuberculosis. *Don't forget*, however, that the excessive use of alcoholic drinks produces indigestion and irritability of the digestive tract and in this way becomes a prolific predisposing cause of tuberculosis. Loss of rest and worryment become predisposing causes by lowering the nerve force of the body and thus interfering with digestion and assimilation. Have regular hours of sleep and avoid worryment of all kind, but do this *especially* when you are unavoidably exposed to the disease. If you have a deformed or badly developed chest, you need to be especially careful not to expose yourself to tuberculosis. Develop and improve your chest by pulmonary gymnastics. Let your sleeping room be well ventilated, and spend as much time as possible in the open air. If possible obtain employment which will keep you out-of-doors.

It has been shown that a non-porous soil predisposes to tuberculosis. If your dwelling-place is damp see that it is properly drained and made dry by means of cement. If you can select your home, choose it on a porous open soil.

Consumption.

Impress indelibly upon your mind that no new case of tuberculosis can arise without an old one. If you can therefore absolutely avoid cases and every source of infection, you are safe, whatever predisposing cause you may labor under. With the present prevalence of the disease, however, no one can avoid every source of infection, and it therefore becomes important that predisposing causes, as well as sources of infection, should be avoided.

TO AVOID GIVING THE DISEASE TO OTHERS.

The disease occurs in man and in animals, and can be conveyed from one to the other. Animals, when they suffer from the disease, become a source of danger to human beings, because of domestic relations and because they supply food in the form of milk, or are used as food in the form of meat. They have no control over the disease, but are a passive means of spreading it.

Man, as a rational being, has *entire control* over the spread of the disease, when he himself is the victim. He can do this, too, without depriving himself of any of the comforts of life, or of the companionship of his relatives and friends.

His power to control the spread of the disease is *absolute*, and it is so because the contagium, by which is meant the infecting particles, is confined entirely to the matter given off by a tubercular sore, wherever that sore may be located. The infecting agent of tuberculosis is a little microscopic disease germ, called the *Bacillus tuberculosis*. Tuberculosis cannot exist without this germ—cannot be produced without it—and, when it exists, this germ is invariably given off, when the disease has progressed far enough, in the form of broken-down tissue technically called *pus*. In consumption this broken-down tissue is spat up, and is called *sputum*; in other forms of tuberculosis it is usually called *pus*.

The great and all-important rule which must be observed by a person suffering from tuberculosis in order to prevent the spread of the disease, is to *take away from all broken-down tissue its infecting power before permitting it to pass from under control*. Every person suffering from tuberculosis has it in his power to do this.

When a consumptive begins to spit, he should, when possible, spit into a cup in which has been placed a germicide (a drug having the power to kill the germ). This cup should be made of material that does not corrode, and should be of a shape that readily permits of thorough cleansing. Paper-cups, which may be used, are to be had at drug stores, and they commend themselves for the reason that they are very cheap, and can be burned after using. A large china coffee-cup, with a handle, answers all purposes very well. As germicides, one may use: *carbolic acid* (a liquid solution should be used, and thirty drops added to half a pint of water and this placed in the cup); *corrosive sublimate* (owing to the fact that corrosive sublimate coagulates albumen, it is well to use only *tartaric acid sublimate*, or *citric acid sublimate* tablets, which can be procured at drug stores—half of one tablet added to one-half pint of water will give the proper strength); or ordinary

Consumption.

lye, out of which soap is made. If no germicide can be obtained at least water should be put in the cup. The cup should be thoroughly scalded with boiling water at least twice a day.

Handkerchiefs should not be used when it is possible to use a spit-cup. When, however, the sick person is out-of-doors, or is where he cannot use a spit-cup, he should provide himself with handkerchiefs made of material which is cheap enough to permit of being burned and which does not readily absorb moisture. Paper is the best material for such purpose. It can be obtained at drug stores in a cheap and suitable form known as "Japanese handkerchiefs."

Great care should be taken by a consumptive that his hands, face and clothing, and when he is in bed his bed-clothes, do not become smeared with the sputa. If any of these accidents happen—and they do happen very readily—the parts which have thus become infected should be cleansed at once with soap and water.

Kissing, especially on the mouth, should, under no circumstances, be practiced by a consumptive. Shaking hands had also better be dispensed with. For the deprivation of these social customs, he will have the reward of knowing that he protects those near and dear to him.

A consumptive should not hold a situation in which he is compelled to handle the food and wearing apparel of others, or which brings him in very close relation with others. When the exigencies of life, however, necessitate his holding such positions, he should exercise every possible care to prevent any of his sputa from getting upon his hands, or upon the articles which he handles, or upon the person upon whom he waits. He should avoid coughing upon or in the direction of food, the dining service or kitchen utensils.

At the family table the consumptive should have his own eating and drinking utensils. These should be washed separately and should be used by no one else.

The bed-clothes and linen of a consumptive, or a person suffering from any other form of tuberculosis, should be thoroughly boiled before washing.

The living room and bed-room of a consumptive, or person suffering from any form of tuberculosis, should be kept very clean, and should be frequently aired. As much sunlight as possible should be admitted.

Persons suffering from other forms of tuberculosis than consumption should observe the same general rules as consumptives, and should carefully destroy the infecting power of all matter given off from the tuberculous sore in the manner laid down for the disinfection of the sputa of consumptives.

The careful observance of the rules herein laid down will make the persons suffering from tuberculosis entirely harmless to their relatives and friends.

Although it has already been said, it may be well to repeat for the purpose of emphasis that a consumptive *should never, under any circumstances, spit into a place where he can not disinfect or destroy his sputa; and that, therefore, he should never spit into the street, into public places, or into cars.*

Consumption.

The Michigan State Board of Health has declared that consumption (and other diseases due to the *Bacillus tuberculosis*), shall be included in the official list of "diseases dangerous to the public health," and subject to all the statutes and regulations relating to such diseases.

CONTAGIOUSNESS OF CONSUMPTION.

Dr. George G. Hopkins of Thomasville, Georgia, April 20, 1893, read before the Medical Association of Georgia, a paper upon the "Contagiousness of Consumption" which was universally endorsed by the Association. It was subsequently printed in the Journal of the American Medical Association. It fairly represents the opinion of leading sanitarians throughout the world upon this important subject. Diphtheria and consumption are the most fatal as well as the most widely distributed plagues of this continent, and hence, since the consensus of the medical world is that they are preventable, they are the most important that could command attention.

Believing this added testimony of Dr. Hopkins will help to arouse attention to the necessity of observing such preventive measures as seem most efficient and practical, his paper is reproduced in this biennial report. It will be noticed that it carefully avoids all technicalities.

The question as to whether consumption is contagious or not is one of vital importance to posterity as well as to the present generation. While the theory of Koch is becoming generally accepted, there are still many who are skeptical upon the subject. These skeptics, in a great measure, are confined to those who have not given the work of Koch and his collaborators much of their time or attention. They look upon the bacillus as septic or putrefactive rather than pathogenic. I have joined that growing army which places tuberculosis in the category of contagious diseases, and my experience with this disease during nineteen years of investigation in Thomasville, which place is a resort for consumptives, bears me out in my opinion and makes me a willing subject of the great and erudite Koch. I do not intend, in this article, to delve in the depths of science by entering into minutiae, but simply to deal with facts as we find them.

We will take, to begin with, the negro, a creature in whom, prior to and during the war between the States, consumption was unheard of. In those days he was properly fed, properly clad, kept out of doors in the day time, was never crowded, and rest at night was compulsory. This process kept him, as far as possible, up to the "norm," and he was better enabled to

Consumption.

wrestle with such disease germs as may have invaded his person. There is a vast contrast between then and now; his environments are materially changed, as any resident of, or sojourner in the South can testify. It is a well known fact, as shown by the records of our sexton, that more negroes die of consumption in Thomasville since the place has been a resort than ever before, and we find also that most of those who die of it have been at some time or other connected with some hotel or boarding-house in the capacity of chambermaid, laundress, or some other which exposed them more than others to the invasion of the tubercle bacillus. It is true that the whites escape to a far greater extent than the blacks, but it is also true that they are not as intimately connected with these subjects, and it is a well known fact that the whites possess far greater powers of resisting disease than the negro—except those of malaria and syphilis. We see this exemplified more particularly in diseases of the air passages. The percentage of recovery from pneumonia is so small that it is rare for a negro to recover from a severe case of the disease.

Frequently we find that the wife of a consumptive husband, or *vice versa*, comes down also with consumption, and dies as did the loved companion of life. Many instances of this character could be mentioned in which it was impossible to trace any family taint whatever in the subject last to succumb to the disease, the one evidently contracting it from the other. We may and do inherit color of hair, eyes and many characteristics, and we do also inherit conditions of lungs and throats which supply proper pabulum for sustenance and afford ample culture fields for the propagation to the tubercle bacillus, hence we frequently find that more than one member of the same family dies of consumption.

I do not doubt but that all men, women and children at some time or times receive into their air passages the tubercle bacilli, but fortunately the great majority possess the power of repelling them and throwing them off. They do not find that soil, so to speak, which is adapted to their growth. As we find in our fields soil within which certain grain will germinate and reproduce its kind, and other again upon which the same grain would fail to germinate, or if it did germinate would spring up but to wither and die for want of sustenance; just so we find birds, quadrupeds and persons in whom the tubercle bacillus will find ample conditions for its reproduction; others in whom this pabulum is entirely wanting; and others again in whom it is so scantily found that the bacillus, after struggling for existence for a time, is cast off, leaving the subject to regain as good health as before the invasion.

Most of the caged animals die of consumption, and the anti-contagionist would say it is because of environment. I admit that environment plays a conspicuous part in the propagation of this disease, but numerous experiments upon animals have shown conclusively that there must be more than this. Trudeau subjected a number of rabbits to similar conditions—those of confinement in damp dark places, scanty sustenance, etc., half of which number he inoculated with tubercle bacilli, and separated them from the

Consumption.

rest; within four months all of those inoculated but one had died of consumption, and this one being killed was found to have a well developed case of it. At the expiration of the fourth month all of those not inoculated were killed, not one having died, and the most searching autopsy failed to reveal the slightest evidence of disease in a single one of them. The same number of inoculated rabbits were now turned loose on an island. They were in their native element and well fed; freedom, sunlight and all conditions conducive to health were provided. Only one of them died of consumption, while at the end of four months the remainder were by autopsy proven to be in a state of perfect physical condition.

Animals confined in museums are not only subjected to an unnatural life, but to the filth and foul odors of their cages, the dampness resulting from washing out these cages, and exclusion of sunlight, all of which are strong factors in lowering vital energy, but are hourly exposed to the tubercle bacilli, which are spat about the building and often even in their cages themselves, by the consumptive spectator, who unwittingly scatters these germs of destruction broadcast as he passes by with the eager throng of lookers on. One animal may yield to the invasion, and it is not discovered until he has impregnated that cage with germs enough to destroy every animal ever put into it, for they are passed from one to another, and will be throughout eternity, unless proper action can be taken to prevent it. These creatures in their native state never die of consumption. Roaming the wilds at will, with no shelter but the broad canopy of heaven, and warmed into animation by the glorious sunlight, that mighty destroyer of germ life, they are placed beyond the ravages of the tubercle bacillus. Just so it is with the higher order of animals.

Indians in a state of nativity seem impervious to the germs of consumption, but are now dying by thousands on the reservations. The whites and the blacks in prisons and asylums all over the world, labor under similar conditions. A report from the Illinois State Prison at Joliet says:

"There are fourteen hundred convicts within the walls, and fully one-third of them have consumption in a light or bad form. Nearly all deaths of persons in the penitentiary have been caused by consumption, and as a rule, all long termers either die within the walls from the disease or are pardoned out on account of it."

The percentage of mortality from consumption at the Georgia Lunatic Asylum is thirty-nine and sixty-three-seventy-sixths per cent, and in other asylums and prisons it is much the same. In States where the "farming" system with convicts exists, this condition of things does not obtain. Statistics from the Georgia convict camps collected and published by my father, Dr. T. S. Hopkins, show that out of two thousand, eight hundred and three convicts farmed out in various sections of the State between Oct. 1, 1890 and Oct. 1, 1892, covering a period of two years, there were only nineteen deaths from consumption, making a mortality of three and sixty-three-one-hundredths per cent. Now being in possession of these facts, convincing as they are, that environment plays a prominent part in the

Consumption.

propagation of the disease, is there wisdom in congregating those already diseased, or herding together the sick and the well? There is no doubt in my mind that danger lurks in sleeping cars, in carpets, bedding, clothing and in the walls of apartments occupied by consumptives, which have not been properly renovated and rendered innocuous by antiseptic measures, and if it were not for the fact, as I believe, that the direct rays of the sun will destroy this bacillus, the inhabitants of consumptive resorts would be in far greater danger than they are from the myriads of them that are daily spat upon the streets. It is a known fact that the more nearly we approach the original man in our habits of life, the more exempt we are from disease; hence, it is apparent that isolation in the cottage system in a section of country as nearly "aseptic because it is antiseptic," as we can find, coupled with an observance of antiseptic laws will afford the most fruitful source of relief to the pulmonary invalid, and do most toward preventing contagion.

Hundreds of years have been spent in searching for a remedy which would successfully baffle this fell destroyer, whose ruthless clutches drag annually from America to eternity one hundred thousand souls, and still the search goes on. Each year serves but to convince us more fully that from drugs but little can be expected, and we can but continue, as has been done ever since the beginning of the art of medicine, to try the efficacy of climate. Ever since the days of Hippocrates, consumptives have been sent to the pine forests, as they are to-day. That the bacillus is often rendered inactive and an arrest in the progress of the disease induced by a sojourn in these pine sections is evidenced by ample proof, but how much more could we expect if these cases were scattered through the country in cottages rather than massed in the cities and towns in crowded hotels, where they are dependent, for a part of the time at least, upon oxygen abstracted from air polluted by excretions and exhalations from the bodies of other invalids, and they themselves adding to the fruitful source of contamination.

Consumptives should be forced to provide for the destruction of sputa. Whenever situated so as not to expectorate directly into a germicide or the fire, they should use some means of conveying the sputa to the germicide or the flames. If handkerchiefs or cloths be used they should not be sent to the laundry as human happiness and life are jeopardized through the probability of inoculation through abrasions upon the hands. These bacilli should never be allowed to dry up and impregnate the air, as is now done through ignorance of possible results. Numerous experiments by leading medical authorities have proven beyond doubt that consumption is an inoculable disease, and so rapidly is the throng of converts growing that I would not be surprised if, even in my day, resorts now soliciting the patronage of the consumptive, will be quarantining against him.

NOT INCURABLE.

Because of the cosmopolitan character of pulmonary consumption, as well as because of its great fatality, there is no disease so well known, nor so much dreaded as this great scourge. The popular opinion is that it is

Consumption.

incurable, and always fatal. We wish to counteract this opinion so far as we can. We believe if the facts were fully known that fifty per cent of those who have incipient consumption recover spontaneously, that is without any special medical treatment, by proper hygienic surroundings, good nutritious diet and judicious out door exercise. We have been greatly interested in reading, lately, a series of articles written by Rev. Dr. J. M. Buckley, on "An Hereditary Consumptive's Successful Battle for Life," published in the *Christian Advocate*, of which he is editor. The doctor believes that consumption is hereditary, a belief that is however, at present, less and less entertained. That there is a hereditary tendency or pre-disposition to consumption and inebriety, as well as other affections, we think is admitted by all. The best medical authority we think is overwhelmingly in favor of the germ theory, as the cause of consumption.

This theory, if true, in itself is a source of hope and encouragement to the thousands, who are the descendants of parents, who on one side or both had consumption. Dr. Buckley was of marked consumptive stock, and early showed the unmistakable signs of the disease, cough, hemorrhages, emaciation, hectic fever and night sweats. Physicians who examined him and treated him, gave him no encouragement whatever, but with a determined will and an excellent judgment, he entered upon a course of treatment, that in time not only arrested the disease, but restored him to robust health and a life of great activity and usefulness.

His treatment consisted of systematic out door exercise, especially walking and riding, gradually increased as he regained his strength, nutritious and easily assimilated food; such medication as was specially indicated for distressing symptoms; and the persistent and intelligent use of an inhaling tube. To the last named exercise he attributes more benefit than to any other means, if not all other means employed. We have not seen a description of the tube used, but it was so constructed that the air was admitted to, and expelled from the lungs slowly and gradually.

We have often recommended the use of some small tube that would admit the air to the lungs gradually and as gradually permit its expulsion. An ordinary clay pipe, that had not been used for smoking, is very suitable, but we believe no artificial apparatus was, or is superior to the lips themselves. By placing the lips, as in the act of whistling, the air can be drawn in slowly and gradually and expelled in the same manner. For years we have recommended this plan to those having weak or diseased lungs, and always with benefit. Care should be taken not to fill the lungs too full nor to expel the air too completely; and at first not more than two or three minutes should be used for this method of breathing. The time spent in breathing thus should be gradually increased. The air thus breathed should be as pure and fresh as possible, and yet it should not be too cold and frosty.

Persons of sedentary habits always fail to breathe as fully as is consistent with good health. Perhaps not more than half the lung capacity is utilized. The consequence is the air cells, from disease, become contracted, and there is, for want of proper expulsion of the air, always a large portion vitiated

Diphtheria.

residual air. If therefore, three or four times daily this method of deep inspiration and expiration were observed and practiced for fifteen minutes to half an hour, the result would be highly beneficial.

Persons with consumption or consumptive tendencies should never live in damp, poorly ventilated rooms, nor in low damp places. Such locations favor the inception and progress of the disease. The recovery of Dr. Buckley, though significant and notorious, is by no means unique. Many such recoveries take place annually, and vastly more would if the same judicious, intelligent, and persistent effort for recovery were made.

Let none because they are declared to have consumption despair. A strong determination to get well, supplemented by proper hygienic and dietetic measures and favorable climatic conditions, will in many, if not most cases, arrest the disease, and prolong life, if not effectually cure the disease.

DIPHTHERIA.

QUARANTINE PERIOD IN DIPHTHERIA.

Many good physicians believe that the isolation of diphtheria patients for thirty-five to forty days from the beginning of the disease is unnecessary in most, if not all cases.

At the late International Medical Congress the question was asked: "How long can a diphtheritic patient furnish infectious excretions?"

In reply to this it was stated that excretions were found infectious *three weeks after apparent recovery, and pieces of membrane yielded cultures fourteen weeks after discharge from the throat.* Children having had the disease should therefore be kept from school for at least four weeks after recovery, and every article of apparel worn by them should be thoroughly disinfected. *All doubtful cases of throat disease should be treated as diphtheritic until the contrary is clearly shown.* By this means a danger would be averted that under any other course might be imminent.

VITALITY OF DIPHTHERIA GERMS.

The importance, and absolute necessity for proper disinfection as immunity from the propagation and transmission of diphtheria, is notably illustrated by Dr. L. J. Rhea, of Cairo, Louisa county. He was called to see a child eight years old, and found a fully

Diphtheria.

developed typical case of diphtheria, followed in a few days by five other cases. As there were, and had been no other cases in the neighborhood, investigation was made as to the source of infection, when it was found that the father had three days previous purchased a sack of old rags from a house where nine years ago, diphtheria of a malignant type had prevailed. During this time the sack had remained undisturbed in an old out-house. The sack was opened by the children, who found some hair therein, with which they had been amusing themselves.

HOW DIPHTHERIA SPREADS.

A serious epidemic of diphtheria in Detroit, Mich., among school children, was traced to the changing of lead pencils. At the close of school each day all pencils were deposited in one box, and the next day distributed again among the pupils. The disease was spread by the habit of putting pencils in the mouth, as children do. Thus an infected pencil would serve to infect several children. Such a rule in school should be abolished.

In a county in this State was a family of nine children who had passed through a siege of whooping cough; became nearly convalescent; with their parents, visited a relative several miles distant New Years day, and one, a babe, took cold. During the evening the babe was held several hours by a woman from another county, in whose family two deaths had recently occurred from diphtheria. The babe was immediately attacked with diphtheria and died, and the other children exposed, with the probability that not one would escape. A person who thus knowingly exposes another to a contagious disease is no less guilty of an attempt to kill than he who puts poison in food or drink, and they should be made to suffer a like penalty.

Dr. Hensley, a physician of Newton-Abbott, Devon, England, was called to attend the little son of Rev. T. Hudson. The child was suffering from diphtheria and was only four years of age. As the doctor was examining him the child suddenly bit him. As the bite was not severe the doctor took no notice of it at the time, but after the child's death Dr. Hensley was also seized with diphtheria and died November 10, 1893, at the early age of 28 years.

Diphtheria.

IDENTITY OF DIPHTHERIA AND MEMBRANOUS CROUP.

As an illustration of the intimate relationship, if not the identity of diphtheria and membranous croup, a case is here given the knowledge of which came through one of the attending physicians. In the northern part of Polk county a little boy was seized with what the attending physician (my informant) called "membranous croup." No quarantine was instituted and no restrictions upon visitation. The disease proved fatal. Among those present during the sickness, or at the time of the funeral, was a brother of the father of the deceased boy, and his little son. Soon after the funeral this cousin was seized also with membranous croup; he went from bad to worse. Consultation was held and tracheotomy was resorted to. This child also died. In this case there was no quarantine and no restrictive measures, and the funeral was public. A brother-in-law of the gentleman where the second case occurred was present during the sickness, or at the funeral of the second boy. In a very few days diphtheria in a malignant form appeared in this brother-in-law's family and three died. It would seem that here is a chain of circumstances almost conclusive of the identity, except in some of their manifestations of membranous croup and diphtheria. Such facts prove the wisdom of the Board in requiring membranous croup to be quarantined and placarded as diphtheria.

DIPHTHERIA AND SUB-SOIL WATER.

It is feared that as diphtheria has been proven contagious and the special organism producing it has been discovered, that the importance of soil and water purity will be overlooked. While it is generally believed that no soil or water condition in the absence of the special diphtheria germ will produce the disease, yet the fact should be emphasized that these organisms inhabit polluted soil and that under favorable environments, heat and moisture, they remain vigorous and multiply and thus constitute a source of great danger, especially to those using water from polluted soil and breathing the air therefrom.

Dr. Mathew A. Adams, F. R. C. S., of England, presented a paper to the International Congress of Hygiene and Demography on this subject tending to show "The Relationship between the occurrence of Diphtheria and the Movements of the Sub-soil

Diphtheria.

Water." It will be noticed that Dr. Adams finds the air emanating from such polluted soil a great source of danger as a means of reproducing the disease.

The author, by daily observation of the heighth of the sub-soil water, extending over a period of six and one-half years, and other concurrent meteorological events, as well as by those respecting the occurrence of diphtheria within the Maidstone Urban Sanitary District, has collected a large number of facts which point to the conclusion that there is an intimate relationship between the circumstances relating to the height of the sub-soil water and prevalence of diphtheria.

He finds the range and method of movement of the sub-soil water varies greatly with the year, in some years there being a single high tide, and a single low tide; the high tide occurring generally during the first quarter, and the low tide during the third or at the junction of the third and fourth quarters; at other times the fluctuations are much more broken and irregular, and at the same time the range between the extremes of high and low tides is much less. In the latter case, according to his experience, diphtheria prevails in an epidemic form, but in the former it does not prevail.

The conclusions he arrives at are, that the organism of diphtheria inhabits organically polluted surface soil, and that, subject to suitable conditions of environment, especially as respects moisture, temperature and food, it thrives and multiplies in the soil, the micro-organism thus produced being liable to displacement from the interstices of the polluted surface soil and to dispersal into the superincumbent air, in this manner determining outbreaks of the disease.

So that, given the existence of the pathogenic organism, two sets of factors at least are engaged in the production of a state of affairs that culminate in an outbreak of diphtheria.

First. Those that promote and support the growth of the germ in the soil, such, for instance, as moisture, temperature, air, food, and so on.

Second. Agents of dispersal, by which the germs already existing in the soil are driven out and distributed into the atmosphere, and so come to be breathed by man and animals; for example, sudden rainfall, rise of sub-soil water, lowering of barometric pressure, etc.

Typhoid Fever.

TYPHOID FEVER.

CAUSATION AND PREVENTION.*

Our country has recently been greatly agitated on account of its threatened invasion by that dreadful scourge, Asiatic cholera. With hearts full of pity, we have read the story of death which came to us day after day from the fairest city of Germany. Every ship which has sailed from the mouth of the Elbe since the middle of last August has been regarded as a possible carrier of a poison more subtle and dangerous than any known to the chemist. Anxiously have we scanned the morning paper, fearing each day to learn that the pestilence had alighted upon our shores. Millions of people have watched the work of the health authorities in New York harbor with blended hope and fear. I am sure that no citizen of this country has felt that the national and state authorities have been too zealous in their attempts to protect us from this plague. No one has complained of the amount of money spent. Every one has felt that no expenditure could be too large if made wisely and successfully. "Let everything be done that can be done, spare no necessary expense." These and similar words doubtlessly would have expressed the universal feeling in regard to this matter. To-day we all feel that the health authorities should not relax their vigilance, that the next congress should make all needful appropriations, and that every important port of entry should be well supplied with houses for the temporary detention of travelers, with isolation wards for suspects, with hospitals for the sick, and with disinfection stations for the destruction of the specific microbes. I say that we all feel that these things should be done, and if they are not done we are not worthy of the civilization of which we boast. We should demonstrate to the thousands whom we have invited to our celebration next year, that they may

* Read before the Iowa Public Health Association at Des Moines, October 28, 1892, by Prof. Victor C. Vaughan, M. D., Ann Arbor, Michigan.

Typhoid Fever.

come with perfect safety and without prolonged and vexatious detention. All will admit that it would be a disgrace to us to invite the people of Europe to the world's fair and allow them to be robbed of their money and other valuables by thieves in New York and Chicago, and it would be a greater disgrace to allow these visitors to find among us a pestilence which might have been prevented.

These feelings concerning the necessity of continuing the good work in the prevention of Asiatic cholera is a healthful one, but I have come here to talk to you about the prevention of a scourge which is greater even than this. Typhoid fever is constantly with us, and yet there is no excuse for its existence save that which is found in our apathy and carelessness. The historian of the future will probably prove to the satisfaction of his readers that the civilization of the last years of the nineteenth century was not so advanced as we who are living now supposed it to be, and one of the most potent evidences of this he will find in our death rate from this disease.

Conservative sanitarians estimate the number of deaths from typhoid fever in this country annually at not less than forty thousand. The census of 1880 reports twenty-two thousand eight hundred and fifty-four deaths, adding to this forty per cent which has generally been found necessary in order to make the number of reported deaths equivalent to that of actual deaths, we have thirty-one thousand nine hundred and ninety-five. Supposing that typhoid fever is proportionately to the population no less frequent now than it was in 1880 (and there is no evidence that it is less frequent) the estimated number of deaths in this country from typhoid fever is more than forty-two thousand. I am sure, however, that this number is too small. In the census of 1880, twenty thousand two hundred and thirty-one deaths are attributed to malarial fever. I think that most physicians will agree with me that there can be no doubt that a large proportion of these were actually due to typhoid fever. Malarial fever has not been, in the northern States at least, a highly fatal disease. Just how many of these deaths reported as due to malaria were actually caused by typhoid no one can more than guess. I think, however, that at least fifty thousand deaths from typhoid fever occur in the United States annually. The

Typhoid Fever.

cholera epidemic of 1873, the last which we have had, destroyed seven thousand three hundred and fifty-six lives. I think, therefore, that I will not be accused of exaggeration when I say that a greater plague than Asiatic cholera is constantly with us.

We have fifty thousand deaths annually from typhoid fever, and if we know how to prevent these deaths, why do we not do it? It is estimated that the life of the average adult is worth to the State one thousand, dollars. If the young man of from twenty to twenty-five years of age loses his life, it will cost one thousand to raise another up from the cradle to the same age; and I am sure that none of you that are engaged in the pleasurable occupation of raising a family of boys, will admit that it can be done so cheaply. But on this estimate this government is losing fifty thousand times one thousand or fifty million dollars annually in the deaths from typhoid fever. Suppose that some foreign foe should invade our territory and rob us of this amount of money. The clang of arms would be heard from the Atlantic to the Pacific, from the great lakes to the Gulf of Mexico, and the country would soon avenge itself. Suppose that some infectious disease should appear among our domestic animals and destroy them to the extent of fifty million dollars' worth in one season. Petition after petition would be addressed to the state legislatures asking for the appropriation of money to pay experts to ascertain some remedy for the evil, and one political party would vie with the other in doing what it could to relieve the distress and protect the property of the people. The lives of hogs, horses and oxen are worth money, are the lives of American citizens worth nothing? This is not all that typhoid fever is costing us. For every death from this disease at least ten other people are sick with it. Five hundred thousand people who do not die are sick each year with typhoid fever. We will suppose that the average duration of the sickness is twenty-eight days and all physicians will agree that this estimate is too small. The person who has typhoid fever is often unable to resume his vocation within a shorter time than three months. However, we will make our estimate on the supposition that the average time lost from work by the man sick with typhoid fever is twenty-eight days, then the aggregate of time lost each year by people sick with this disease amounts to five hundred thousand times twenty-eight days or fourteen million days, which is equivalent to more than thirty-eight thousand

Typhoid Fever.

three hundred and sixty-six years. Suppose that the time of the individual is worth fifty cents per day, when he is well this represents an actual money loss of seven million dollars annually and this should be doubled because for every person sick the time of another person who acts as a nurse is demanded. The fourteen million dollars added to the fifty million dollars which it lost by death makes a sum total of sixty-four million dollars or about one dollar for each inhabitant, the annual tribute levied upon this nation by the one disease, typhoid fever. This represents approximately the amount which we pay every year for the ignorance and carelessness which we exercise in allowing this, a preventable disease, to prevail among us. Surely the subject of the restriction of disease is one well worthy of the study and intelligent thought of the political economist who values the welfare of his nation. In this estimate of the importance of this subject I have left out of consideration every question of sentiment.

We say that the life of the average adult is worth to the State one thousand dollars, but ask the father and mother the value of the life of that promising son or daughter just developed into full manhood or womanhood who has been cut off by this disease, and amidst their tears they will tell you that all the wealth of the world could not repair their loss.

Should some worthless vagabond waylay you as you leave this hall, knock you down and rob you of money he would most probably be arrested and made to pay the full penalty of an offended law, but your Christian neighbor builds his cesspool or locates his privy vault in dangerous proximity to your well, poisons your drinking water and causes one or more deaths in your family, and this is the civilization of which we boast.

I am not an alarmist. I am not a pessimist, but when I think of the fearful ravages which the preventable diseases cause among us I fear that we are yet far removed from real civilization, and that many generations must pass away before man realizes that he is his brother's keeper.

The prosperity and happiness of a nation are not correctly measured by its wealth, by the value of its agricultural products, by its exports and imports, by the number of immigrants which annually flock to its shores, not even by its birth-rate, but by the length of life of its inhabitants. A wise statesman, Sir Francis d'Ivernois,

Typhoid Fever.

justly observed nearly a century ago that "if the various States kept and published annually an exact account of their population, noting carefully in a second column the exact age at which its citizens die, this second column would show the relative merit of the governments and the comparative happiness of their subjects. A simple arithmetical statement would then, perhaps, be more conclusive than all the arguments that could be addressed."

Judged by this standard, what can we say of the merit of our own government and the happiness of our people, when more than one-fourth of the children born to us die before they reach five years of age, and more than eighty per cent of our deaths are due to preventable causes?

I have said that typhoid fever is a preventable disease and that the large number of deaths from the disease is unnecessary. This is true not only theoretically, but practical demonstrations are not wanting. Prior to 1859 the city of Munich, in Bavaria, was a veritable hot-bed of typhoid fever. There were no sewers and no public water supply. Most of the houses were furnished with large brick or wooden flues which were built from the cellar up through the different floors. Into these the excretion from the body were dropped and accumulated in the cellars. Other waste material was deposited in cesspools and garbage was throw into back yards. The air in the houses was foul and offensive to the smell. The drinking water was taken from shallow wells in the yards and these often received the ooze from the cesspools and vaults. In 1859 the citizens were compelled to cement tightly the bottoms and sides of these receptacles of filth and later a system of sewerage was introduced and later still, a supply of wholesome water was obtained. Notwithstanding the fact that portions of the city still remained unsewered at the time of the last report, the results have been most gratifying as is shown by the following table given by Bollinger:

Typhoid deaths in the civil population of Munich per nine thousand inhabitants:

1852-59.....	24.2	1880.....	6.4
1860-67.....	15.6	1881.....	1.4
1868-75.....	12.7	1882.....	1.9
1876.....	6.8	1883.....	1.9
1877-79.....	7.8	1884.....	1.4

Typhoid Fever.

This shows what has been done in an old and crowded city, and Vienna has practically repeated the demonstrations made by Munich.

The number of deaths from typhoid fever in the United States is about eight per ten thousand. The reduction of this mortality to the same extent that has been actually accomplished in Munich would save in round numbers not less than forty thousand lives each year.

What is our government, national, State and local doing to prevent this great loss of life? The answer is not what it should be. The national authorities are doing absolutely nothing. In times of panic, when cholera or yellow fever threatens to cripple commerce, the national authorities are driven into activity but at other times nothing is done. Many of the States have central boards of health but the support given them is, as a rule, most inadequate. You have here in Iowa a most excellent Board of Health, but I dare say, although I have no information on the subject, that the appropriation made by your legislature for the use of this Board are by no means commensurate with the importance of its work. In Michigan, six members of the State Board of Health give a portion of their time to its work without charge and the efficient secretary draws a salary of less than half the sum which many a physician of less ability is making in private practice, and although it can be demonstrated that this board saves the lives of more than a thousand citizens of the State annually, each legislature for a number of years past has had before it a bill to abolish the board, and more than one governor has recommended the same measure. Since the members of the board are not practical politicians and the cry of economy is popular it seems to strike the average statesman that it is best to begin the prominent reform by cutting off the appropriation for the only State organization whose purpose is the prevention of disease.

Local health officers are often selected for the political work which they have done and without regard to their fitness for the work. The pay which is given them is not enough to induce good men to seek the position, and the small amount given is as a result of this system, practically thrown away.

What should be done? The national government should provide for a department or bureau of public health. There is a

Typhoid Fever.

bureau of animal industry where some most excellent work has been done in the study of hog cholera. Why should not some attention be given to typhoid fever? This department should establish and equip a laboratory of practical hygiene, and the most expert bacteriologists and chemists in the country should be set to work to solve the problems connected with the causation and spread of the infectious diseases.

The marine hospital service should be furnished with every needed facility to carry on its good work in preventing the introduction of disease.

Each State should liberally support its Board of Health. This Board should have a laboratory in which suspected water, contaminated, diseased, or adulterated food or drink of any kind could be examined by men skilled in the work. When typhoid fever appears in any part of the State the Board should be able to send a sanitary expert to that locality and he should endeavor to ascertain the source of the disease, and be able to advise with the local authorities as to best means of preventing its spread. I am convinced that such an expert would be of great value to the public health service of the State. But some one may say that the expense of such an officer would be considerable. This is true, but do we not do as much in case of disease among our domestic animals? Many States at least, have a veterinarian who may be called to the most distant part of the State to decide whether or not a horse has glanders or a cow has pleuro-pneumonia. Are the lives of men worth less than those of horses and cows?

The State Board of Health should also issue instructions to local health authorities, and should interpret statistics of sickness.

Every city of five thousand or more inhabitants should have a health officer who should devote his entire time to this work. He should guard the water supply, inspect dairies, control the sale of milk, visit the markets daily and be authorized to condemn questionable food. He should placard houses where infectious diseases exist and should have charge of the disinfection of such premises. He should see that streets, alleys, commons and yards are kept clean. He should have the authority to inspect public and private houses and to abate sanitary nuisances whenever they are found to exist.

Typhoid Fever.

The house-to-house inspection which has recently been made in some cities has been a most ridiculous farce. Many of the men who have pretended to do this work are wholly unacquainted with the first principles of sanitary science. Few of them could give a trustworthy opinion as to the plumbing or ventilation of a building, and none of them have had any training as sanitary inspectors. The city treasury has been depleted by the sum of their salaries, and sanitation has been advanced, if at all, only in places where the accumulated filth was so great that it made its presence known to the community at large.

Every village and town should also have its health officer whose duties should be similar to those mentioned, but whose time need not be given exclusively to the work.

When our health service is systematized in some such way as this, and when the people in general become better informed, and more thoroughly awakened to the necessity of constant vigilance, then the death rate from typhoid fever will be much reduced.

Typhoid fever is a disease which is due to a germ which is comparatively well known to bacteriologists. Whether this germ always shows characteristic forms of growth or not is a matter about which there is still some differences of opinion, but that this germ or class of germs is the active agent in the causation of the disease there is no doubt.

The typhoid bacillus must find its way into the intestines before it can produce the disease. It is, in the great majority of instances, carried into the body with food or drink. Some very eminent authorities will tell you that the germ is never contained in the inhaled air. To this statement I should object. I believe that this is an exceptional method, but I am confident that it does occasionally occur. It may happen whenever the air passes over or through dried faecal matter containing the germ. Such was, I believe, the cause of an outbreak which occurred a few years ago in the Michigan penitentiary. The waste from the hospital on the fourth story of the main building descended to the ground through an iron soil-pipe, which emptied into a little sewer. The tile was laid in the ground a few inches under the floor. Branching off from the tile sewer was a tributary also of tile which had been laid with the intention of utilizing it to carry off the waste from the west ward, but this tributary had never been used. There was a man sick in

Typhoid Fever.

the hospital with typhoid fever, and his discharges without being disinfected were thrown into the closet. The tile sewer under the floor was subsequently found to be broken in several places. The waste from the hospital containing the typhoid germs permeated the soil, which was warmed and dried by the heat of the building, and from this contaminated soil the air was drawn by the ventilation and heating of the building through this unused sewer pipe into the west ward, and it was among the men in this ward that the outbreak occurred. Disinfection of the soil with large quantities of corrosive sublimate, the removal of the broken sewer, its replacement with an iron pipe and the closure of the unused sewer pipe were followed by an abrupt termination of the report of new cases.

I am rather insistent upon the possibility of the spread of the typhoid germ through the air, because I am convinced that the possibility of such a means of dissemination is sometimes overlooked. There is another reason for the special mention of this point and this is the custom prevalent in many places of drying the faecal matter within the building by means of the warm foul air as it is drawn into the exit flue. This method of disposing of the excretions of the human body has been adopted in many school-houses, and I believe that it is by no means devoid of danger. It is said by those who favor this method that the air of the rooms cannot become contaminated because it is constantly being drawn outward and there are never inward currents. In reply to this, I would say that there is no system of ventilation so perfect that counter currents are never formed by the opening of windows and doors. Faecal matter should never be stored in inhabited buildings. It should be removed as speedily as possible. Currents of air will not take up germs from moist surfaces, but so soon as these masses of waste matter become dry there is danger of breathing the air which comes over or through them.

The discharges from typhoid patients should always be disinfected before they are thrown into water-closets or upon the surface of the ground. Masses of filth should not be allowed to accumulate in or about houses. Back yards, barns and out-houses should be kept clean not only with the view of preventing the contamination of the drinking water supply, but for preventing the contamination of the air also.

Typhoid Fever.

The majority of cases of typhoid fever arise from a contaminated water. That a drinking water infected with the discharges from a person sick with typhoid fever may cause an epidemic of the disease there can no longer be any doubt. The records of sanitary science abound in histories of such cases. Every physician of large experience with this disease can detail one or more instances in which the disease has been clearly traced to infected water, and I will consider that this method of the dissemination of the disease is recognized by all. Some physicians will tell you that every case of typhoid fever is due to impure drinking water. I will not be so positive and will repeat that most cases are due to this cause. It probably is a safe estimate to say that bad drinking water causes forty thousand deaths every year in this country. "Actually," some one is ready to ask, "can this be true? Is our drinking water so frequently and so dangerously contaminated?"

We read that some of the inhabitants of India store their water supply during the rainy season in open tanks and that during the dry season these tanks not only supply the drinking water but they serve as laundry and bath tubs as well. Dirty clothing and unclean bodies are washed in the same water which serves to quench their thirst. Yet this is true; but then these people are not the enlightened Christians which we claim to be. The official organ of the Imperial Board of Health of Germany calmly explains the outbreak of cholera at Hamburg last August in the following manner:

"The plague is most probably due to emigrants from Russia in this manner: The barracks used for the accommodation of these emigrants discharge their sewerage, containing the waste from the laundry and the undisinfected faeces into the Elbe near the intake of the water supply for the city."

In other words, the people of Hamburg have for years been drinking the diluted excretions of the emigrants who have been housed in these barracks awaiting their departure for America. Surely the people of Hamburg cannot boast of their superiority over the heathen Hindoo.

But certainly we do better in this country. A few years ago the discharges from the body of a man sick with typhoid fever were thrown upon the snow on the banks of the stream supplying water to the city of Plymouth, Pa., and hundreds of cases of typhoid fever resulted. Louisville drinks the diluted sewerage of Cincin-

Typhoid Fever.

nati and other small cities and pays for the privilege with a high death rate from typhoid fever. Chicago pours a part of her sewerage into the same basin from which it takes its drinking water and complains because the physicians report so many cases of typhoid fever. The Iowa farmer with his many broad and fertile acres often locates privy vaults, cess-pools, pig pen and well in close proximity and demonstrates that he is not to be outdone by the inhabitant of the city in the amount of patronage which he bestows upon the undertaker. Men and women who would not sit at a table covered with a soiled cloth drink from costly glasses the diluted discharges of some sick man. It is not pleasant to recite these details, but no one can deny their truth and with shame we must admit that we should not regard the Hindoo as exceptionally filthy.

One must recognize his own faults, before he is likely to make any attempt to improve himself. If there was no way of remedying these greivous sins I would not have come here to talk to you to-night. I am sure that I could have chosen a topic which I could have discussed with more pleasure and which would have been more pleasant for you to hear. But believing as I do that the sanitarian has a gospel to preach second only to that of him who administers to man's moral nature, I have come here to urge upon each of you the necessity of your taking an active interest in these matters.

Like charity and all other good things your activity in sanitation should begin at home. See to it that cellars, back-yards and out-houses are clean. If there be any doubt about the plumbing in your house being in perfect order, call in a competent man and remedy any defects which he may detect. If there be any suspicion in regard to the water supply, boil the water which you drink. On the whole, I think it best to boil the water anyhow and then you may investigate its character afterward. Germs are more easily digested after they have been well cooked. See to the ventilation of your house. Do not take air from the cellar, heat it and bring it into the rooms for the inmates to breathe. Get the air from out of doors. The supply is more abundant there than elsewhere. Ascertain whether or not your milkman is diluting his milk, and if so, ask him to use sterilized water in the dilution. You may be willing to pay him seven cents per quart for water, but it is not unreasonable, if you are doing this, to ask him to

Scarlet Fever.

inform you of the character of the water for which you are paying. After you have seen to these matters, inquire as to the work being done by your city health officer. Ascertain how much time and attention he is giving his work, and in this connection it would not be amiss to find out how much salary your city is paying him. What is the source of water supply for your city? What are the possible sources of its contamination? It may be of great moment to you who is elected president on the 8th of November, but it is of vital interest that your family should not be compelled to drink a contaminated water.

Health and its companion, happiness, are the rewards which you may expect for the time spent in giving attention to the sanitation of your home and city.

SCARLET FEVER.

DESQUAMATION.

A wide awake health officer seeking information regarding desquamation as a necessary indication of scarlet fever writes as follows:

"Is it safe to make desquamation *the* diagnostic symptom in scarlet fever, and is it best to wait for *desquamation*, before quarantining, and endangering the health and lives of a country, by waiting for it?

2d. *Desquamation is not always present.* In one of several scarlet fever epidemics which occurred in my thirty years' experience, I very nearly lost my second oldest son, who contracted the disease by playing with two boys who had the disease so mildly that it was overlooked by the parents; they were not confined to the house. There was *no desquamation* in any of those *three cases*. The oldest sister of those two boys, however was stricken down with the malignant type, and died in a few days, without *desquamation* having showed itself. The second oldest daughter had also a severe attack, with plentiful eruption. Here *was desquamation*.

3d. Warm lard frictions when applied over the body two or three times a day affects *desquamation*.

Scarlet Fever.

4th. As the eruption fades on the fifth day of fever, in a mild case of scarlet fever and *desquamation* begins and *ends* in a *few days*, and the entire duration of such a case being but eight to ten days it is simply a matter of *impossibility* for *any physician* to say whether a child has had scarlet fever or not, by seeing it *twenty or twenty-one days* from *onset of fever*.

Dr. ———, whom I consider one of the ablest men in the State, says in his letter to me:

'Any physician who assumes that he can tell whether a child has or has not had scarlet fever, *fifteen days* after onset of a mild attack, assumes to do that which is *impossible*. He might as well say that he could tell what I had for breakfast *two weeks* ago, by looking at my tongue to-day.'

The history of exposure, vomiting, quick pulse and peculiar high temperature without intermission in a neighborhood where there are three or four cases of scarlet fever, makes me *suspicious*, and where on the *second* or *third* day of the fever, the *peculiar rash appears*; first on chest, neck and abdomen, in shape of round dots, with the peculiar coloring, without elevation, which leaves a white line when I put my finger nail over it; makes me *positive* that I have a case of *scarlet fever*, nothing more or less. The throat symptom may add to the diagnosis, so might the appearance of the tongue, and so might in five or six days *desquamation*; but it is not best to wait for the latter before diagnosing the case, and protecting the country."

The best possible, because the only *safe* way, is to isolate and quarantine, at least a few days, all suspicious cases. There are often cases of simple tonsillitis that for a day or two resembles scarlet fever. *Desquamation is the special diagnostic sign of scarlet fever*. As that does not begin for several days, and as in the meantime many exposures might take place, the State Board orders that all such suspicious cases be treated as dangerous; that the community, rather than the affected, be given the benefit of the doubt. In no other way can efficient preventive measures be carried out.

It is possible that there have been many cases of scarlet fever where there has been no eruption, and no discoverable desquamation, and yet that desquamation may occur without eruption has been attested by very good authority. Perhaps, the best authority we have upon scarlet fever, is Prof. Thomas, of Leipzig, Germany.

Scarlet-Fever.

In his very exhaustive treatise upon scarlet fever, as found in Ziemssen's Cyclopædia, Vol. II, after speaking of desquamation as always present in the usual form of scarlet fever, says on page two hundred and thirty-seven:

"The cases of scarlatina without eruption. These attacks, it should be noticed are sometimes followed by more or less well marked and extensive desquamation,"—showing that at times, even without the eruption, desquamation may occur.

On page two hundred and fifty-two, after speaking of the very slight cases where there is little constitutional disturbance, but slight, if any, throat symptoms, and no eruption; and of the difficulty of diagnosis in such cases, he says: "In the absence of satisfactory ætiological evidence, the scarlatinal nature of the attack is proven by the subsequent occurrence of the *characteristic desquamation, even when there has been no previous trace of an eruption*, and by the appearance of a moderate amount of dropsy and albumenuria."

Again under the sub-head, "Diagnosis," on page two hundred and eighty-five, he says: "In cases where an early diagnosis is impossible, the doubt will be closed up at a later period, by the occurrence of desquamation particularly the occurrence of desquamation in the palmar and plantar regions, or, perhaps, by the appearance of albumenuria, with or without dropsy, or other symptoms of nephritis." Such attacks generally disappear in a few days, but they should receive the same attention which is paid to the unmistakable disease; every throat affection during a scarlet fever epidemic is suspicious!

Cancer.

CANCER.

M. Chazin, Director of the Laboratory of the Charité Hospital of Paris, has published the results of his experiments, undertaken for the purpose of settling the question of the contagiousness or non-contagiousness of cancer. His experiments indicate that while auto-inoculation generally succeeds, the disease is not easily communicable from one animal to another, even in those of the same species. Nevertheless, the evidence which has been adduced to show the disease to be due to pathogenic microbes, is so conclusive that the infectious nature of the disease must be considered fairly well established.

CANCER AND PORK.

It is a humiliating fact that little is known yet as to the most prominent factors in the production of cancer. That a large number of cases occur from local irritation, for instance, cancer of the lips and mouth from smoking tobacco has been demonstrated, but still there is a large number of cases where no such cause can be reasonably assigned.

An unusual activity is being manifested abroad, however, at this time by some of the most renowned investigators. A league has been formed in Europe for the purpose of investigating this disease as tuberculosis was investigated, and if possible to require it to give up some of its secrets. That the number of cases is yearly increasing is sadly too true—especially in the United States.

Some startling revelations along this line are already being made and promulgated by these eminent investigators, M. M. Verneuil, of Paris, and Roux, of Lausanne. They are, as a result of observation and research, disposed to regard it as being caused most frequently by the use of pork.

M. Verneuil, in some former articles, declared that there was a marked relationship between the abuse of meat food and cancer.

Cancer.

In following up this line of thought more clearly he was led to conclude that the use of pork was a special source of danger, and said it was well worth considering if this was not the sole cause. He arrived at and enunciated the following proposition: "In the course of a long and laborious surgical career, it was observed that the Israelites who follow closely the laws of Moses respecting the use of pork as an article of food, are always refractory to cancer; and that this idea had presented itself afresh in connection with two special cases."

M. Roux gives his experience as strikingly confirmatory of conclusions reached by his renowned colleague.

This is an interesting question, and should be looked at without prejudice and divested of all mercenary or commercial considerations. The position assumed is not illogical. It is well known that certain animal foods produce special symptoms of disease. It is also well known that in many persons shrimps, lobsters and crabs produce urticaria, and that diseased meat produces intestinal and gastric irritation.

It was a common belief among the ancients that pork produced leprosy, and a common belief now prevails that the frequency with which leprosy is found in the Bergen District in Norway, is attributable to the fact that fish constitutes almost the entire animal diet of the people. It will be a satisfaction to know that these investigations will not rest at this stage, but will be prosecuted with vigor until the cause of this most alarming and fatal disease has been fully demonstrated. Science may soon demonstrate that the Biblical interdiction of swine flesh, intended for the Israelites, was not a mistake of Moses, but a wise sanitary measure, and one that would be good for all to follow.

CANCER AND TOBACCO.

Few have forgotten the lingering and painful death of our beloved soldier and President—General U. S. Grant; nor the cause of death by that fearful disease, cancer; in his case cancer of the mouth and throat. Nor will it be forgotten how promptly he gave up smoking, to which he was ardently attached when his physicians informed him that the disease was caused and aggravated thereby.

Cancer.

It is well remembered by all readers, too, that the popular young German Emperor Frederick succumbed to the same disease, caused by the same habit.

This leads to an examination of the question as to what extent smoking causes cancer.

Dr. C. Pittfield Mitchell, member of the Royal College of Surgeons, England, in a book recently published entitled "The Philosophy of Tumour—Disease," in speaking of the cancer of the lip says, "a very large majority of men suffering from epithelial cancer of the lips are great smokers. In Winiwarter's cases nearly all the patients were smokers; there were only about three who did not confess to this habit. From the Middlesex Hospital Reports we learn that of twenty-four cases in which inquiries were made as to *smoking*, etc., fifteen had been great smokers, and eight moderate smokers; five of the smokers had chewed as well; one had never smoked."

Of one hundred and sixty cases of cancer of the lip collected by Mr. Jessett, one hundred and forty were affected in the *lower* lip, five in the upper, and fifteen in both lips. Dr. Mitchell says "It is an accepted and almost trite fact that the principal cause of lip cancer is the irritation arising from the use of pipes." * * * * "The pipe of the smoker rests upon the lower lip, and it is partly owing to the greater irritation to the lower lip thus entailed that this structure is the common seat of disease." He further says that the disease invariably occurred on the side of the lip in which the pipe or cigar was held. He quotes Mr. Jonathan Hutchinson as saying "there was not a single instance of symmetrical development of the disease on *both* sides of the mouth," in a series of more than one hundred cases observed by him. Dr. Mitchell adds, "and still more remarkable, in three cases of this reported series reported by Hutchinson, the disease recurred, after excision, on the opposite side, the original scar undergoing no changes; *but in these three cases the patients held their pipes on the sound side after the operation.*"

He says further "of sixty-three cases, only one was in a woman, and of one hundred and sixty cases only three were women. Now, women as a class are neither addicted to smoking nor chewing tobacco, nor are they as intemperate as men." In six cases of cancer of the lip in women, three were in the habit of smoking, and it was

Cancer.

not shown that the other three were not. Mr. Pemberton in his "*Clinical Illustrations of Various forms of Cancer*," says: "It is remarkable that in the only instance in which I have seen the disease amongst women the short pipe should have been the constant companion for seventeen years."

Now, let us consider another location of the cancer and its relation to smoking. Let us look at cancer of the tongue, more terrible because less curable than that of the lip. The latter is often cured by excision, the former is seldom operated on until too late.

After stating that in seventy-five cases of cancer of the tongue, it was ascertained that only four patients did not smoke, Dr. Mitchell goes on to say: "It is, I think, a quite warrantable conclusion that smoking is a common cause of cancer of the tongue, and the fact may be at once connected with the circumstances to be explained, namely that the sides and edges of the organ are the most frequent seats of the disease. The pipe or cigar of the smoker is, with rare exceptions, so held in the mouth that the impact of its point falls not upon the tip, dorsum, root or under surface but upon the sides and edges. * * In the most typical instances it appears about the middle of the front part of the dorsum, but on one side of the middle line, just where the end of the tobacco pipe rests, or where the stream of smoke from the pipe or cigar impinges on the surface of the tongue."

He quotes Mr. Butlin author of "*Diseases of the Tongue*," as saying, cancer of the tongue is "incomparably more frequent in males than in female." Jessett says, "in one hundred and ninety cases of cancer of the tongue one hundred and sixty-three were in men and twenty-seven in women" and Winiwarter states that in forty-six cases forty-three were in men and three in women.

Mitchell in conclusion says, "the different habits of the two sexes is the meaning, we may be sure, of the relative frequency of the disease in males and females."

It is not claimed that smoking is the only cause of cancer of the lips and tongue but by all odds the most frequent cause, much more frequent than all other causes combined.

Does the pleasure of smoking pay for such a fearful risk, to say nothing of other diseases clearly traceable to it, or of the waste, and annoyance to others arising from this filthy habit?

What Constitutes a Filth Disease.

WHAT CONSTITUTES A FILTH DISEASE.

Dr. S. W. Abbott, the able secretary of the Massachusetts State Board of Health, read a paper before the American Public Health Association, held at Charleston, S. C., December, 1890, upon the above named topic. Dr. Abbott is not only a clear and lucid writer, but he is an eminent and trustworthy authority upon sanitary matters.

The doctrine that filth plays an important part in the causation of disease lies at the foundation of very much of the sanitary administration of cities and towns throughout all civilized countries. The popular impression, however, and undoubtedly the belief among a very large part of the medical profession as well as among many of the officials who have charge of sanitary administration, is that filth in the ordinary sense of the word is itself the active cause of disease, and that little else is essential to the production of certain infectious diseases, than to deposit a certain amount of filth, or to allow such filth to accumulate within the premises occupied by a given population, in order to generate a pestilence. Hence the activity of sanitary bureaus in sweeping out filth, in cleansing foul spots, in removing garbage, in depositing tons of disinfectants in cesspools, catch basins and sewers. This activity in the cleansing of towns, the removal of filth, the sanitation of houses, cellars and yards, is commendable so long as the true *role* of filth in the causation of disease is not lost sight of, and the entire energy of sanitary organizations is not expended in this one direction.

Undoubtedly each and all of the so-called filth diseases may find their victims in houses that are absolutely faultless; provided that conditions otherwise favorable exist in such houses, the prime condition being the presence of human beings. A child sick with diphtheria in any house whatever, constitutes a menace to the health

What Constitutes a Filth Disease.

of every one who lives in the house, and especially to the younger portion of the household. This again is but one of the essential conditions to the propagation of infectious disease.

The result of the experimental researches of recent years, in regard to the natural history of infectious diseases appears to show that what the older observers were wont to call causes were conditions only, and that over-crowding or density of population, faulty ventilation, and the presence of filth, are simply the favorable and unfavorable conditions in the propagation of disease, and not in any sense its causes.

Analogy would teach us that the actual cause of an infectious disease is the disease itself—that is to say a previous case—and the more we learn of the origin of epidemics, as well as of so-called sporadic cases, the more we are inclined to look for previous cases as the true cause of origin. Nor does the fact that we do not find the previous case prove its non-existence.

By some authorities small pox is called a filth disease, and experience has shown that the liability to its occurrence is increased by the presence of filth. About one-half the local outbreaks in Massachusetts in the last ten years have occurred in paper-mill towns and in the families of persons engaged in sorting rags, and in nearly every instance it was found that the rags had been collected in some large town in which small pox had recently prevailed. In this case the presumption is very strong that the filth or dust of the rags was simply the medium of contagion, the bales having probably contained rags which had had direct connection with persons suffering with small pox.

In the same category may be placed *anthrax*, a disease rare in the United States, but occasionally introduced into factories engaged in the sorting and preparation of foreign horsehair. The presence of the *materies morbi* in the dust of these factories is not to be wondered at, when it is known that such hair is sometimes shorn from animals which have died of anthrax.

Another disease which recent inquiries show quite conclusively to be propagated through the medium of dust-laden atmosphere is that most destructive of all diseases, *phthisis*. The danger which exists in the distribution of the dried sputa of phthisical subjects cannot be overestimated.

What Constitutes a Filth Disease.

The liability of infection by *scarlet fever* is undoubtedly increased by the presence of dust; since the contagious principle of this disease, so far as can be learned, exists largely in the particles of dried epithelial scales, which falling from the body mingle with the dust of apartments, and thus spread the infection from the sick to the well.

In the same category may be placed *typhoid fever*. In fact, this disease may fairly be styled the chief of filth diseases, and although it may not be possible to trace the typhoid bacillus *en route* from the ileum of the sick to the œsophagus of the well by the medium of any drink in which milk or water is used, the evidence as to its transmission in this manner is conclusive. Lieberman says of this disease: "Daily observation is sufficient to show that the decomposition of organic substances, and of excrementitious substances, is not of itself sufficient to produce typhoid fever. There are multitudes of houses in which the effluvia of the privies can be smelled through all the rooms, and in which the inhabitants are constantly inhaling sewer gas; and neither the temporary nor permanent residents are attacked with typhoid fever." We are, therefore, forced to the conclusion that the poison of typhoid fever does not originate in filth or decomposing substances, but simply finds in them favorable conditions for its spread.

The evidence that both *cholera* and *yellow fever* are propagated by sewage—polluted water supply—is very strong. In both cases the introduction of the disease from without appears to be essential to its propagation. Filth is simply a medium favorable to its spread.

The relation of *diphtheria* to filth is not so clear as in some of the infectious diseases, and it is often claimed that sewer gas is the common cause of the disease. That such filth may be a proper soil for the cultivation of the disease when once introduced, I have no doubt, but the claim that the disease originates in it is open to question.

The point which I desire to emphasize is not that the removal of filth should be discouraged, but that when it is done, it should be done intelligently, and with this principle in view: that filth is a condition rather than a cause; that it is the soil for the culture and transmission of the infection, and not the infection itself.

Trichinosis.

TRICHINOSIS.

The numerous reports of trichinosis from different parts of the State indicate that there is an unusual area of infected swine.

In January, 1893, there was an epidemic of this disease in the Floyd valley, in Plymouth county. Its first appearance was noted in a family of Germans, in Lincoln township. A Christmas dinner had been given to a large number of relations and friends. A hog was killed and its meat served in sausage, and other ways peculiar to Germans. The guests ate heartily. Soon after they developed the symptoms of trichinæ poisoning. Other families in the vicinity were also attacked, and there was an extensive epidemic, resulting in several deaths. The disease in several instances was not at first recognized, and from the similarity of symptoms, the patients were treated for typhoid fever. Microscopic examination of pork eaten by these families showed the flesh to be filled with trichinæ. In all these cases the meat was eaten without cooking.

Other cases were reported at Creston, Union county, Mt. Pleasant, Henry county, and Alta, Buena Vista county. There is good reason to believe that many cases reported as typhoid fever were in fact trichinosis.

For the information of the people, the symptoms and prophylaxis of this disease is repeated from the sixth report of the Board.

SYMPTOMS.

Renz divides the disease trichinosis into four stages: First, the pedromal; second, intestinal irritation; third, muscular irritation; fourth, retrogression of symptoms and convalescence.

From a few hours to a few days after eating trichinosis flesh the patient is seized with indigestion, complains of nausea, stomach pains on left side, belching, diminished appetite, tongue coated, breath fetid, vomiting or eructations, feeling of general weakness,

Trichinosis.

prostration and utter exhaustion, a "so tired" feeling, flashes of heat, coldness, fullness of the frontal head, vertigo, sharp and flying pains in the muscles, particularly in the nape of the neck, and flexors of the extremities. After two or more days appears a choleraic discharge from the bowels. The vomited matter is first slimy, then bilious. The stools, at first brownish and streaked, take on the clay-like character of many typhus stools. Severe neuralgic pain is almost always present in the abdomen, also in the arms and legs, and sometimes in the intestines.

In the severest cases the patient may suddenly die at this stage of the disease with all the appearance of cholera, or from extreme exhaustion. Those who do not vomit become by degrees excessively debilitated. As the stools become less copious, and less frequent, they still retain their clay-like appearance. The pain in the abdomen becomes duller. Thus pass the first eight days of the disease. The diarrhœa may pass off and be succeeded by obstinate constipation, or may continue into the second stage.

The most important symptoms of the second stage are œdema (swelling) about the tenth day, and profuse perspiration, acid, and often of nauseating odor. The swelling usually commences with the eyelids and spreads to surrounding parts. This does not last long, and in some cases is entirely absent; sometimes it disappears to reappear again in four or six weeks. Pain in the orbital muscles, especially in the morning, is present in all severe cases. The fever suddenly increases and may reach forty C, with the pulse at eighty to one hundred and twenty per minute; there is unquenchable thirst and overwhelming sense of heat; tongue furred, yellowish white, or covered with black, sooty, clammy coating, soon losing all mucous surface, becomes uniform dark brownish red, is smooth and covered with papillæ or blisters, and suddenly, generally in the night—there occurs extreme dyspnœa (labored breathing) often lasting several hours, and sometimes recurring for several weeks. The brain is undisturbed. Coma sometimes follows the dyspnœa. There is total indifference to surroundings, but great fear of death. Insomnia, or sleeplessness is present in adults, but does not often occur in children, who are apt to be sleepy. Delirium is occasionally permanent. Hearing is frequently impaired. If the patient has not been too much debilitated he may pass through this ordeal, but many succumb in a short time. The muscles of the

Trichinosis.

neck, loins and limbs, particularly the flexors, show more or less stiffness and increasing tenderness, the latter constantly found on pressure, in the epigastrium, or stomach; swelling commencing at the body, proceeds toward the digital extremities. Motion is extremely painful, the elbows are bent and the knees drawn up; the patient finds ease only by lying flat on his back. Children usually lie on the side with knees drawn up, elbows fixed, and plunged in profound sleep. As a rule there is an extraordinary decrease in urine.

In the severest cases, which generally progress to a fatal termination, the pulse increases in rapidity, is small and weak; the fever takes on low debilitated form, or a dynamic, and the patient becomes apathetic. The tongue, though more movable, is dry and trembling; respiration becomes more labored, and the patient lies flat on his back. In short, all the appearances of a fatal typhus fever are present. Pneumonia frequently occurs at the fourth week, the sputa being mostly blackish blood. Hiccoughs and picking the bed clothes usually precede a fatal termination. If there is progress toward recovery, there is, in the fifth week, a decrease of fever, reduction of pulse to ninety or less, the appetite improves, perspiration is less copious, urine increases, sometimes suddenly; the swelling disappears rapidly, and the only remaining symptoms are slight pains in a few muscles, emaciation, weariness and lassitude. A large number of the cases reaching the seventh week progress rapidly to convalescence.

Trichinosis of children is characterized by less danger, very copious collateral swelling, considerable dilatation or enlargement of the pupil of the eye, lessened muscular pain, ability to lie on the side, sleepiness and rapid convalescence.

SOURCE OF THE DISEASE.

In all cases known the hog has been the source of the disease in human beings, so it may be said of nearly, if not all cases, that they are caused by eating trichinosed pork, although the rabbit and the hare are considered not behind the hog in susceptibility to trichinosis. Hogs become infected mostly from rats, and rabbits and hares become mouse hunters in Winter. Muscle trichinae are more or less readily produced in all mammals, never in birds, and least of all in fishes.

Rabies.

PROPHYLAXIS.

Protection against trichinosis is secured only, first, by prevention of infection from the use of trichinosed meat; second, prevention of trichinosed hogs; third, the eradication of trichinae from hogs, and other natural bearers.

To be secured against trichinous infection, it is only necessary that the whole mass of meat shall be heated to a temperature of 150° Fahr. Meat may be subjected to a high temperature and yet not be cooked through the entire mass. It should be cooked



Portion of human muscle enclosing a single capsuled Trichina. Highly magnified. By Leuckart.

entirely through to the bone, so that there be no appearance of blood. Salt will kill trichinae, but all salted meat is not innocuous. The salt must penetrate the entire mass. Kuhn found that hams were innocuous after thirty-one days' pickling.

Trichinae possess an unusual power of resistance of heat and cold. Trichinosed meat kept frozen forty-five days, has been shown to be innocuous. The only safe rule is to eat no meat from the hog unless it has been thoroughly cooked. This rule applies to all preparations of sausage as found in the butchers' shops.

The use of trichinosed meat can only be prevented by a system of thorough inspection of all pork offered for sale or slaughtered for private use.

RABIES.

During the biennial term rabies has appeared in numerous localities in the State. The most important was that in Union township, Fayette county, and reported by M. W. Grimes, township clerk, on December 7, 1892. A dog belonging to George Fravard manifested symptoms of rabies, having previously bitten Fravard. The animal escaped to the farms adjoining where a large number of horses, cattle and hogs were bitten. On the farm of Frank Bishop two cows, four hogs, two horses and three dogs were

Rabies.

bitten. The dogs were killed. The four hogs bitten died from rabies. Other hogs from Bishop's herd were infected from the original four. Some of them were sold to neighboring markets, supposedly free from infection, but soon after developed rabies, and infected the herds in which they were placed, to be followed soon after by death.

Mr. Fravard went to the Pasteur Institute, at Chicago, and after eighteen days' treatment returned with assurance of protection from the disease.

Two of the horses died soon after bitten, the second developed the disease March 10, 1893, ninety-five days after bitten, and was shot. The fourth horse gave no sign of the disease until June 5, 1893, when in a few hours he became dangerously furious, and was shot.

The noticeable feature of this outbreak is the difference in the incubation period, the earliest being the two cows, which was less than thirty days. They were bitten December 7th and one died January 3d; the other January 5th. In one of the horses, it was ninety-five days, in the other one hundred and eighty-one days.

In December, 1893, Albert Lawrence, aged sixteen years, in Mahaska county, was bitten by his dog. He immediately killed the animal, and gave no further thought to the incident. The first week in March, symptoms of rabies presented themselves, and on the 13th he succumbed to all the agony and horrors of this disease.

In July, 1893, there was loss of a large number of horses, cattle and hogs in Horton township, Osceola county, from rabies.

In the *Fairfield Tribune* is a report of a case of rabies in a horse belonging to W. J. Rizor in Round Prairie township, Jefferson county. The horse was bitten July 30th, 1893, by a dog, on the upper and lower lip. For eighteen days he appeared to be doing well and gained in flesh. On the nineteenth day he began to show signs that he was not right. On the 20th he began to refuse his feed and water, appearing to be growing worse all the time. On the 21st day he began to bite himself, increasing in his fury until about nine o'clock, when he got so bad it was alarming; went at its master with his mouth wide open, and when he could not reach him, seized hold of an oak board and bit a piece out of it, and went on at such a rate that we were afraid that the barn would not hold him; but he finally quieted down, only he kept on biting himself.

Rabies.

About 12 o'clock he took another spell of raving and biting and we thought sure he would break out of the barn, but he quieted down again and contented himself by biting off his own hide and flesh until he had quite a space bitten off. When he would bite himself his teeth would crack so they could be heard for several rods, and when he would bite himself he would growl or groan, sometimes making a noise like a dog growling. On the 23d he had become so furious it was deemed unsafe to wait longer and he was shot.

The same dog also bit a Mrs. Hilman, at Salina, and a child of James Field at Millspaugh's Mill, both of whom were taken to the Pasteur Institute at Chicago, and there pronounced severe cases of rabies.

August 25th, 1893, B. G. Maudlin lost a valuable cow at Lynnville, Jasper county, which was bitten by a rabid dog, which also attacked several other animals in the vicinity, all of which developed rabies and were killed.

Heretofore local boards of health have had no legislative authority to protect their community from this disease, but by action of the last legislature they are now not only empowered, but required to do so.

When a human being has been bitten by a rabid dog, says John Henry Steele, member of the Royal College of Veterinary Surgeons, in his treatise on diseases of the dog: Suction of the wound by some individual whose mouth is free from abrasions; encouragement of free bleeding from the wounds; neglect of no wound, however trivial, in which the cuticle has become abraded; application of tourniquet above the seat of injury; prompt application of caustic, especially the nitrate of silver or caustic potash, butter of antimony, or the actual or galvano-cautery. In deep wounds, this must be followed by excision all around the injury, taking care never to actually cut into the wound, and to wipe the knife after each stroke, then cauterize the fresh wound thus produced. It is advisable to repeat application of the cautery after separation of the first eschar. These measures, if carefully carried out, should be considered as practically ensuring immunity from ill effects, and absolutely sufficient to allay alarm on the part of the patient and his friends. Bleeding, the cold bath, allowing a stream of water to fall from a height on the wound must never be relied upon.

Small Pox.

SMALL POX.

Events that have transpired in this State regarding alleged cases of small pox at two or three different points, lead to the conclusion that unless more encouragement is given to the spread of this formerly common disease we will have a generation of physicians unable to diagnose it. In the past nine years small pox has been reported in ten localities within the State. In nine of these cases the State Board was called upon to settle disputes as to the character of the disease. In five instances the disease was found to exist—in one of which the local board refused to recognize its presence until many persons were smitten down, and a half a score had died. In four instances the local board had quarantined, but subsequent observations proved that there was a mistaken diagnosis.

These mistakes usually occur through a too careless and hurried examination. A cautious physician with a good standard text-book before him ought not long to be mistaken in diagnosing this disease, even if he had never seen a case. There are some characteristic signs and symptoms that ought to be present in every case of small pox, and should always be looked for, even in the mildest cases.

1. The history. If an unvaccinated person, known to have been exposed to the disease, is about the twelfth or fourteenth day taken with high fever, distress in the back and perhaps vomiting, the strong probability is that the disease is small pox.

2. After these initial symptoms, the high fever, headache, etc., have lasted for *forty-eight* hours, or upward, if pimples, hard and shot-like appear on the forehead, face and wrists and gradually, extend over the body, the probability of its being small pox is greatly increased.

3. If small pox is present upon the appearance of this eruption the fever is greatly reduced and these papules (or pimples) become vesicles, and about the eighth day are pustular. Upon reaching this pustular stage the fever (a secondary fever) returns and the

Small Pox.

real crisis in the disease is reached, death usually occurring in from the ninth to the twelfth day. These pustules become flattened, circular, and have a red areola about the base and become pitted. These changes in the eruption usually occur in the same order in which the eruption appeared, on the forehead, face, etc., and thence extend over the body. If the patient is doing well, about the tenth day the secondary fever subsides and convalescence begins—crusts forming where the pustules were, and they in turn become detached and fall off.

To recapitulate: Every case of small pox, regardless of any history of exposure and non-successfulness of vaccination, should have at least forty-eight hours of fever and initial symptoms before the appearance of the eruption. The eruption should first appear upon the forehead and face, and should be elevated and shot-like to the touch; after the eruption the fever should decline, and the papules should become successively vesicles and pustules, reaching the latter stage not sooner than the eighth day, when the fever should reappear and the symptoms all become aggravated. This fever should last two or three days, when incrustation and convalescence should begin. The crusts (scabs) should fall off, from the fifteenth to the twentieth day.

SMALL POX AT DANBURY.

A Mr. P. living in the vicinity of Danbury, arrived at Danbury, Woodbury county, about April 22, 1892, from Bloomfield, New Mexico, where he had been visiting. He stopped at a hotel in the town on his arrival, and was taken down with small pox. He was taken to his home contiguous to the town, and two others of his family were also taken down with the disease. The disease was promptly recognized by Dr. Murphy, the attending physician, who is also the health officer. All who had been in any way exposed were promptly vaccinated. The hotel was disinfected and well ventilated, and the home of Mr. P. where he and the other members of the family were was well quarantined and guarded. About ten days after the disinfection of the hotel, which was not quarantined, but well disinfected it was believed, a gentleman guest was assigned to the room occupied by Mr. P. In due time he came down with small pox, and soon after another gentleman sickened with the same disease, making in all five cases.

Small Pox.

On May 25th, Mrs. P., wife of Mr. P. above referred to, and her daughter, arrived in Danbury from Bloomfield, New Mexico. They had small pox while there, and were convalescing—barely able to travel. Their route was from Bloomfield to Denver, thence via Union Pacific to Omaha, and thence via Chicago & Northwestern to Carroll, and thence to Danbury over the last named road. The scabs had not yet dried on them. The hotel was at once closed, general vaccination enforced, and all exposed premises quarantined. There were no further cases.

SMALL POX AT CUMBERLAND.

In December, 1892, a young man arrived from Germany, at New York, on the steamship *Saale*. About November 23, there had been small pox on the vessel during the voyage with several deaths. This man had been exposed to the disease, though he was protected by previous vaccination. On release from the vessel after quarantine, he was directed to throw all his clothing except what he had on his person, overboard before going ashore, but instead he rolled it into a bundle and brought it with him to the farm house of Henry Borchert, near Cumberland, Cass county. Soon after his arrival a little daughter of Mr. Borchert opened the bundle and amused herself with the contents and became infected. The disease was not recognized until five members of the family were stricken down, of whom three died. Vaccination and quarantine was rigidly enforced and there were no further cases. A passenger from the same vessel went to Berks, Pennsylvania, and from that exposure one hundred and forty-nine cases followed. There were also outbreaks at several points in Michigan, Ohio and Minnesota, traced to immigrants from this same vessel.

During the past ten years in no place in Iowa has this disease got beyond the family where it originated, so effective and efficient have been local boards.

June 2, 1893, a tramp appeared on the streets of Burlington, having been driven away from Galesburg in the eruptive stage of small pox. He was immediately placed in a pest house, where the disease ran to a favorable termination. Vigorous quarantine measures were enforced, and there were no further cases.

Vaccination.

VACCINATION.

The success of vaccination as a preventive has immortalized its founder, William Jenner, and places him in the forefront of the world's benefactors. And yet, strange as it may seem, there are anti-vaccinationists, who, because one in a million has been supposed by vaccination to have contracted some other infectious disease, not only refuse to have its benefits extended to themselves, but would gladly aid in securing and enforcing a law making vaccination a crime.

It is true there are but few such, yet because they are feeble in intellect and powerful in self-esteem, to attract attention, they are noisy and clamorous. An experience with the disease either by a personal attack, or by its presence in the family would be a splendid and lasting cure for such tom-foolery.

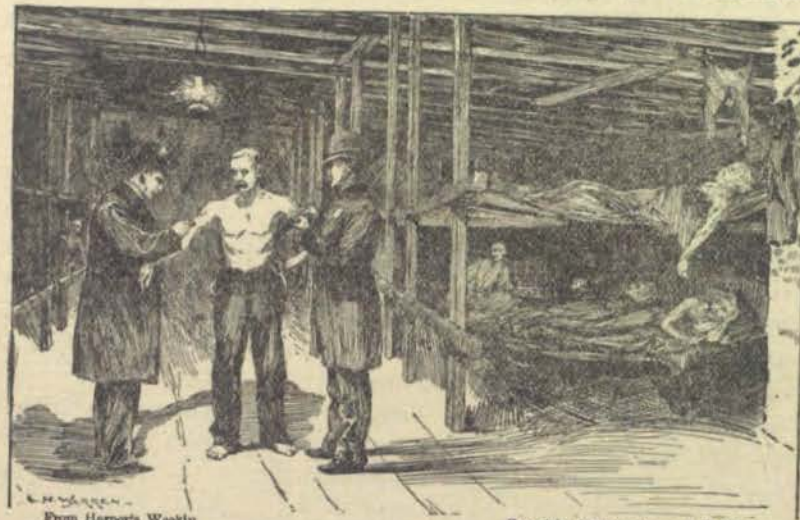
An article on this subject in *Harper's Weekly*, is so well written, and so graphically describes the benefits of vaccination that it is here reprinted by permission of the publishers.

The appointment by the Board of Health of New York of a temporary vaccinating corps of fifteen physicians calls to mind the fact that there exists in this city such an epidemic of small pox as has not visited it before for many years. That fact, however, has excited little comment and no general solicitude, even though small pox is known to be one of the most virulent of contagious diseases. For it is also known as the most preventable of diseases, and as one whose terrors are traditional rather than actual. Every one knows, in greater or less detail, the facts of its history. Up to the last decade of the eighteenth century it was a dreaded pest, sweeping the world in never-ending epidemics, claiming by death one-tenth of our race, and disfiguring a large proportion of the remainder. A bit of doggerel that has come down to us bears witness to its power in the assertion that "from small pox and love few men remain free." The companion malady here linked with small pox has in nowise abated, but a pock-marked face is as rare to-day as a smooth one must have been a century ago.

Every one knows, too, that the change has been wrought through the genius of a single man, who, just a century ago, worked out the problem of the antagonism of cow pox and small pox—a belief traditional among the

Vaccination.

English peasantry for generations before—and added the illuminating thought of voluntary inoculation with the virus of the one in order to prevent the other. The world doubted, and then believed. The people were ready to listen to anything that could promise to banish the dreaded scourge. In less than a decade after the first inoculation, vaccination had circled the globe, thousands of lives had been saved, and the name of Edward Jenner had been placed by common accord high on the list of the immortal benefactors of the human race. It is pleasing to recall that before Jenner died all Christendom did him homage. He was even a prophet honored and



From Harper's Weekly

Copyright, 1893, by Harper & Brothers.

VACCINATING LODGERS IN A TEN-CENT LODGING-HOUSE.

rewarded in his own country. Great men had opposed him, it is true, but the murmur of opposition was soon drowned in the tumult of approval. Intellectual robbers strove to take to themselves the credit of his discovery, but these were soon confounded and forgotten, while the name of the true discoverer gained fresh lustre day by day. The work he inaugurated has gone steadily on, until the dreaded scourge, small pox, has all but relinquished its hold on the race, claiming at most a mere handful of victims. The record of that decline is the grandest chapter in the history of medicine.

And yet if the truth were known it would probably appear that vaccination has not accomplished all that Jenner hoped for. Seeing his discovery so universally accepted at the outset, seeing it nip epidemics of small pox in the bud, and so vastly reduce the mortality within a few years, he would have been strangely unimaginative had he not dreamed of a day when vaccination should so fully have triumphed as to have banished small pox from the world forever. In theory such a hope found ample warrant. The human body furnishes the only soil, so far as known, on which the germs of

Vaccination.

this disease can multiply and retain their virulence. Vaccination renders the body no longer habitable for these germs. If therefore the entire race could be given immunity through vaccination, time being allowed for the destruction of such unproductive germs as had found temporary lodgment elsewhere than in the body, small pox would cease to exist. Its last germ killed, there is no more reason to suppose that it would ever originate again, than there is to expect the reappearance of the great auk, the mammoth, or the glyptodon. In theory such an achievement might require but a month or a year, but in reality a century has not accomplished it.

The chief reason why vaccination has failed of this ultimate ideal achievement is—paradoxical though it sounds—because vaccination has operated so efficiently. So nearly has it banished small pox that no one now fears that disease, and a general carelessness prevails regarding it. No better commentary in this regard could be made than mention of the fact that two physicians recently contracted the disease in New York from a case which came to a dispensary where they were in attendance. If physicians fail to give themselves immunity, what shall we expect of the public at large?

The other chief factor which coöperates with carelessness to keep small pox in existence is ignorance. So little is small pox heard of now that many among the more ignorant classes scarcely know the meaning of vaccination. Health officers find many persons who suppose they are being vaccinated to "cleanse the blood." It does not matter much what they think, perhaps, so long as they submit to the operation. But many decline the boon, and these of course remain susceptible to the disease. Our laws offer protection to all but force it upon no one. Abroad, in many places, vaccination is compulsory, a fine being imposed if any child is found unvaccinated at a certain age. The result thus aimed at is accomplished in this country in a more pleasant way by prohibiting unvaccinated children from attendance upon the public schools. This measure, together with the constant solicitations of health officers, results in the vaccination of a very large proportion of infants.

But vaccination in infancy is not enough. It gives immunity for a time, but with growth the tissues change, and after a few years the body becomes again susceptible. Revaccination must be practised when the child is six or seven years old, and again during adolescence. Even this third vaccination does not always give protection throughout life. Immunity should be tested every few years by repeated vaccinations, and only persons who have submitted to this test within a few years past can at any time feel fully assured that they are insusceptible to small pox. Ignorance of this fact is most potent in giving small pox a hold upon the community. Not alone the ignorant, but many people of intelligence suppose that so long as the scar of a previous vaccination appears they are immune, and with confidence born of this delusional belief, go about the world almost as susceptible to small pox as if they had never been vaccinated. For such persons chiefly the present words, with their obvious moral, are intended.

Contagion by Importation.

CONTAGION BY IMPORTATION.

It is deemed appropriate here to set forth the progress and plans made for the prevention of the importation of contagious diseases into this State by immigrants from foreign countries.

The United States government has established a complete and thorough system of inspection and quarantine of all immigrant vessels arriving at her ports. The Iowa State Board has supplemented the same by applying the system to all railroad lines entering the State. On the arrival of a vessel at New York having cholera, or any other contagious disease on board, the vessel and passengers are detained in quarantine until the sick have recovered and the passengers and all their belongings have been disinfected. The passengers are then given a clean bill of health under the following regulations:

Each steerage passenger and every member of a family shall be furnished with an inspection card (see form below), on which shall be inscribed or stamped the port of departure, name of the steamship, date of departure, name of immigrant or steerage passenger and last residence, and the seal or stamp of the United States consulate or the detailed medical officer. This card is to be retained by the immigrant until he reaches his point of destination in the United States. His baggage must also be properly labeled. Officers of local boards on receiving notice of immigrants enroute to their locality must require the presentation of this card from each and every person, and ascertain whether or not their baggage has been labeled. If the baggage has been inspected and passed, the label shall be *red* bearing the name of the port, the steamship on which the baggage is to be carried, the word *inspected* in large type, the date of inspection, and the seal or stamp of the consulate or of the medical officer of the United States serving in the office of consul. All baggage that has been *disinfected* shall be pasted with a *yellow* label, upon which shall be printed the name of the port, the steamship upon which the baggage is to be carried, the word *disinfected* in large type, the date of disinfection, and the seal or stamp of the consulate or of the medical officer of the United States serving in the office of the consul. It is understood, and it will be so printed on the blank, that the label is not valid unless bearing the consular or medical officer's stamp or seal.

Cabin passengers from cholera infected ports will be furnished similar cards and their baggage labeled. The following is a copy of the card*

Contagion by Importation.

INSPECTION CARD.

(Immigrants and Steerage Passengers.)

Port of departure..... Date of departure,
Name of ship.....
Name of Immigrant..... Last residence.....

Inspected and passed at	Passed at quarantine, port of U. S.	Passed by Immigration Bureau port of.....
{ Seal of Stamp of Consular or med- ical officer. }	(Date.)	(Date.)
(The following to be filled in by ship's surgeon or agent prior to or after embarkation.)		
Ship's list or manifest..... No. on ship's list or manifest.....		
Berth No.	Swamp Inspection.	1st day. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 To be presented by ship's surgeon at daily inspection.

(REVERSE SIDE)

Keep this Card to avoid detention at Quarantine and on railroads in the United States.

Diese Karte muss aufbewahrt werden, um Aufenthalt an der Quarantäne, sowie auf den Eisenbahnen der Vereinigten Staaten zu vermeiden.

Cette carte doit être conservée pour éviter une détention à la Quarantaine, ainsi que sur les chemins de fer des Etats-Unis.

Deze kaart moet bewaard worden, ten einde oponthoud aan de Quarantijn, alsook op de ijzeren wegen der Vereenigde Staten te vermijden.

Conservate questo biglietto onde evitare detenzione alla Quarantina e sulle Ferrovie degli Stati Uniti.

Tento listek musite uschovatí, nechcete li ukarantěny (zastavení ohledně zjistení zdraví) neb na dráze ve spojených státech zdrzení bytí.

Tuto kartocku treba trimat' u sebe aby sa preslo zderzovanu v karantene aj na zeleznici ve Spojených Státoch.

Vaccinated.
(Signature or Stamp.)

Contagion by Importation.

Upon the release of passengers from quarantine, notice is sent by wire to the State Board of Health of the name and destination of those coming to this State, whereupon notice is immediately given the local board of health at each destination point, to-wit:

OFFICE OF THE IOWA STATE BOARD OF HEALTH.

Des Moines 189.....

To Local Boards of Health:

Official notice has been received that the steamship.....
arrived at the port of..... from.....
on the..... having.....
among the passengers, and that.....
were destined for..... Iowa.

You are hereby notified, that you may take such measures as are necessary to protect your community from danger of infection, upon their arrival. All baggage and belongings of immigrants must be held on their arrival at points of destination, in this State, and not be permitted to enter any dwelling-house until satisfactory evidence is furnished that the same has been thoroughly disinfected.

The immigrant must show evidence of inspection and disinfection of baggage, otherwise he must be quarantined.

J. F. KENNEDY,
Secretary.

With these safeguards a wide spread epidemic of contagious disease seems well nigh impossible, and especially will Asiatic cholera be barred from getting a foot hold in our domain, and our country be saved from those scourges which formerly periodically swept over it.

Bacteria—Our Hidden Foes.

BACTERIA—OUR HIDDEN FOES.

Herewith is presented in as plain and simple language as possible a few facts regarding some of the foes of the human family—foes so small as only to be recognized by microscopes of the highest magnifying power; and yet so mighty by their multiplication, and by the chemical changes produced by their life processes that often thousands and tens of thousands fall before them like delicate plants before an untimely frost.*

At least four out of every five persons who read or hear about disease germs, micro-organism, or bacteria, regard them as belonging to the lower orders of animal life—minute animalculæ. They read of their wonderful multiplication, and of their deadly work; of their behavior under the microscope; their eccentric movements. They look into a drop of water and see by the aid of the microscope the wriggling, twisting activities of the countless specimens of animal life sporting therein; they look at the tiniest speck of a piece of sugared fig and see the busy, bustling movements of the sugar beetle, and they naturally conclude that bacteria, because of similar movements, must be animal—"flesh and blood."

Indeed, scientists, with their best microscopes and most patient researches, have only recently demonstrated the true character of these low forms of life, and transferred them from the animal to the vegetable kingdom. There is now no question among biologists but that they are lowly plants, and it can be confidently said in our battle with them that "we wrestle not against flesh and blood."

The word bacteria, now so often seen and heard, is the plural of the word bacterium, and signifies a little staff or rod. It is the

* Epitomized from Prudden's "Story of the Bacteria" and "Dust and its Dangers," by permission of the publishers, G. P. Putnam's Sons, New York, who also courteously tendered the use of the cuts illustrating the same.

Bacteria—Our Hidden Foes.

generic term of a large variety of low forms of vegetable growth, known as microbes, micro-organisms, or germs.

Biologists, with a growing and commendable enthusiasm, have taken up the study of these bacteria. About eighty different varieties have been so patiently and scientifically studied; their habits, and likes, and dislikes so well understood, that they can be grown and distinguished from each other with as much ease and certainty as the gardener grows his cabbages or cucumbers.

Of the eighty varieties thus known, about twenty-five are said to be pathogenic—or disease producing. Biologists have determined what is most favorable to their growth; under what conditions they may lie dormant for indefinite periods of time; what agencies most certainly effect their resurrection; what conditions promote their most rapid multiplication; and what agencies are most destructive to them. It is found that not all of these twenty-five disease-producing bacteria are hostile to man, some making their abode and working out their life problems in animals inferior to man.

These hidden foes, while comparatively few in number, are powerful in their influence for evil. These pathogenic bacteria, producing directly or indirectly specific diseases peculiar to their respective varieties are of three general forms: ball-like, rod-shaped, or spiral. (See Fig. 3, Plate I.) So small are they that the bacilli or rod-shaped variety, if placed end to end, would require fifteen hundred to reach across the head of an ordinary pin. Yet small as they are, their structure has been demonstrated, and they are known to consist of granular matter, surrounded by a denser membrane or envelope. In order to study their movements to the best advantage, they are usually stained by the biologist.

The rod-like and spiral bacteria when seen alive in the fluid, perform the most astonishing movements; they advance and retract; they wriggle and twist, and turn over and over. These movements are produced by little hair-like projections from their ends called cilia, so small as to be distinguished only with the greatest difficulty by the most powerful instrument, and yet not so small but that they can be distinctly photographed.

Warmth, moisture, oxygen and organic material, are the conditions most favorable for their growth and vital activities, including

Bacteria—Our Hidden Foes.

their multiplication. Their multiplication occurs by their division or separation. The germ becomes constricted about its center, and the cleavage is such, that soon two perfect germs have developed from the one. These in turn subdivide until, biologists say, one single germ may give rise to sixteen and one-half millions in twenty-four hours.

An eminent biologist has calculated, happily has not demonstrated, that a single rod-like bacterium one thousandth of an inch long, in less than five days would, by this process of subdivision, make a mass sufficient to fill all the oceans on the face of the earth at an average depth of one mile!

Even accepting this statement as true, we need not feel alarmed, for here the doctrine of the "survival of the fittest" comes in to comfort us. These micro-organisms fortunately have their enemies, and a relentless warfare is even in progress among these pigmy plants. The weaker ones go to the wall, and the stronger ones, so far as their activity is concerned, are short-lived. Some have the power of concentrating their vital energies, and contracting or corraling all their potentialities into a glistening spot, near one extremity; and thus enfolding themselves, are able to resist agencies that would be otherwise destructive. These little spots (see Figs. 11-12 Frontispiece), are termed spores, and they are the seed, the hope for future generations. Under favoring conditions they spring into life and rapidly reproduce their kind. Fortunately few of the bacteria most destructive to man have this characteristic.

Happily, while some bacteria are our hidden foes, the majority are our greatest friends, and without their aid life would soon become extinct. Strong as is the inclination, and favorable as is the opportunity, for sanitary purposes, only some of those against which we fight can be named.

It would be interesting to speak of the curiosities of bacterial life; of the gaudy colors some assume; of the superstitious dread imparted by some of the phosphorescent varieties, and of the *Bacillus prodigiosus*—the bacillus that attacked the consecrated wafer, and gave it the appearance of being covered with blood drops.

Sour milk, the delicate flavors of various cheeses (the limberger for instance), the blue milk disease, foul odors, loud-smelling feet, as well as many grateful aromas, are all evidences of special bacteria.

Bacteria—Our Hidden Foes.

While some of the bacteria are waging a constant and exterminating war against their neighbors, there are others, Pyramus and Thisbe-like, who so live for and love each other, though of different species, that separation, by death or otherwise, of one is sure to result in death to the other.



Fig. 2.

Fig. 1. A small portion of the common green mould, sending up into the air little stalks at the ends of which are strings of easily detached very light spores.—Highly magnified.

Fig. 2. Yeast: growing by sending out buds. These are the plants which as they grow in sugary solutions, break up the molecules of the sugar, setting free alcohol and carbonic acid; hence their importance in beer making and other fermentative processes.—Highly magnified.

Fig. 3. Bacteria. Showing the little plants of various shapes and sizes, but all formed on one of these types—bulbs, rods or spirals.—Highly magnified.

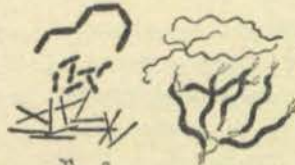


Fig. 3.



Fig. 1.

PLATE II. DIFFERENT FORMS OF MICRO-ORGANISMS.

Some of the *pathogenic* bacteria, and the diseases they are known to produce, will now be considered.

SURGICAL FEVER.

Surgical fever, or blood poisoning, because of the foul odors usually present in the wounds accompanying their condition, was usually supposed to be caused by filth. It was found by surgeons that carbolic acid, and other disinfectants, and the exclusion of air generally, prevented this condition, and promoted rapid healing. Hence, grew into general use the present antiseptic methods of operation, with the grandest results for suffering humanity. All this time the special bacillus causing surgical fever was unknown. By patient research, however, it has been demonstrated that blood

Bacteria—Our Hidden Foes.

poisoning, abscesses, erysipelas, and child-bed fever are all caused by one or two species of micrococci—the Streptococcus (in chains), or the Staphylococcus (bunched like grapes), see Nos. 1, 2, 3, Fig. 3, Plate I.) It has been found also, that these two forms of micrococci were most abundant, and got in their most deadly work in filthy places, or in hospitals and over-crowded tenement houses. They are found floating in the air with dried dust; in the mouths of the people; or settling upon wounded surfaces, where they grow and produce their kind.

TUBERCULOSIS—PULMONARY CONSUMPTION.

It is asserted that fully one-seventh of all the deaths occurring are caused by consumption. Wherever consumptive patients have gone, there other cases have occurred. It is not limited nor modified by degrees of heat nor cold—nor by parallels of latitude nor longitude. So universal is the disease, and so often have several in the same family succumbed to its ravages, that the opinion prevailed everywhere that the disease was assuredly hereditary; and a child born of consumptive father or mother was looked upon as one necessarily doomed to die eventually, if not early, of this merciless disease. Biologists, however, state confidently that we do not thus "wrestle with flesh and blood," entailed by diseased ancestors. They have demonstrated that the disease is caused only, and always, by a rod-shaped bacterium—termed the *Bacillus tuberculosis*. So constant is the presence of this bacillus in consumption, that its presence or absence is confidently relied upon as a means of diagnosis. All the physical signs and symptoms of consumption may be found in a patient, and yet if none of these bacilli can be found in the sputum, the intelligent physician will confidently affirm that the party is free from this dreaded disease. On the other hand, if but few symptoms of the disease are present and these bacilli are found it may as confidently be asserted that consumption exists. The subsequent clinical history of the patient will generally confirm the opinion expressed.

The children of consumptive parents may, and perhaps do, inherit a predisposition to the disease, but would never develop it unless by some means the bacilli of some other consumptive gained access to their air-passages, or to the intestinal canal. It is a fact generally admitted, because easily demonstrated, that

Bacteria—Our Hidden Foes.

bacteria seldom if ever rise from moist surfaces. They gain access to the lungs after being dried and pulverized. They float with the dust, and find a lodgement in the nose, throat, mouth, air-passages or lungs; or by meat or milk from tuberculous animals infect the intestinal tract. This being the fact, as admitted by all careful observers, the practical lesson is that all cattle having tuberculosis should be killed, and their carcasses burned; that all milk, butter and meat from such source should be condemned as unfit for food; that the sputum from all consumptives should be burned or disinfected, and in no instance spit upon sidewalks, floors, carpets or any place where, by drying, it could be incorporated with the dust and inhaled. This bacillus is easily destroyed outside the body, and it is hoped that in the near future remedial agents may be discovered that will effectually destroy it in the body without injury to the body itself.

PNEUMONIA.

Until recently it was believed by physician and layman alike, that pneumonia (lung fever) was caused always by exposure—especially to cold and moisture. It is now definitely demonstrated to be occasioned by a round bacterium—the pneumo-coccus (see Nos. 1 and 2, Fig. III, Plate I). So this affection also, is clearly relegated to the list of infectious diseases. Biologists are not so well agreed as to the means by which the infection is imparted, and the best methods of destroying these germs. It is, however, more than half the battle to be able to detect the foe. A knowledge of the best means, offensive and defensive will soon follow. While cold and moisture do not produce the disease, they seem to favor the growth and development of these bacteria, or lower the protective powers of the body. It is not known, well, under what conditions they exist outside of the body, but because they are found in the mouths of healthy persons it is believed they are taken into the mouth and lungs with the dust.

There is a most fatal form of pneumonia, called croupous pneumonia, caused by the bacteria of diphtheria getting into the air passages.

TYPHOID FEVER.

The bacterium of typhoid fever is also rod-shaped—a little longer than the bacillus producing consumption. It is not known to grow

Bacteria—Our Hidden Foes.

outside of the body, but may retain its vitality in water, or in human excreta, for an indefinite length of time. It will endure freezing in ice and snow for months, and yet when taken into the body through warmth, moisture and other favoring conditions, will rapidly multiply, and by their life processes produce a poison which is absorbed and carried to different parts of the body to produce the special and characteristic signs of the disease. They reach in the intestinal tract, their highest development, and are thrown off with the discharges from the bowels in a living, virulent form. If they are not destroyed by reliable disinfectants or germicides, they may contaminate the water or food supply, or associated with dust, may be taken into the mouth or nose, and with the saliva gain access to the bowels. So far as is known, man alone is subject to typhoid fever—and he in turn is the only source of infection to others. There is no excuse whatever for the existence of this disease, since it is well known what causes it, and what will effectually prevent it.

It is doubtless often produced indirectly by sewer air, owing to defective plumbing. This usually occurs in houses that have been vacated for a time. The water used for trapping is evaporated, the dried excreta containing typhoid germs have found their way as they have been detached from the sides of the sewers, into the houses, with the dust, and gained access to milk or water, or to the mouth, and have been carried with the saliva into the stomach and bowels. Diphtheria is doubtless produced by sewer air in the same way.

ASIATIC CHOLERA.

Asiatic cholera which so lately caused such apprehension and which set everybody to reading, and many to writing and experimenting, and which is about to take a Winter's rest so as to renew with greater vigor its attacks in the Spring, has also been demonstrated to be caused by a bacillus—a spiral or comma bacillus (see Nos. 9-10, Fig. III, Plate I). This germ also, so far as has been demonstrated, has not been found except in the excreta of the human family. It is said to be very delicate, and is easily destroyed, yet the dried discharges containing it, or water contaminated by it, may be capable when introduced into the stomach and intestines of man, of reproducing itself in a wonderful manner. The body is

Bacteria—Our Hidden Foes.

overwhelmed by the poisonous material which it eliminates as it grows. It is confidently asserted that no case of Asiatic cholera can occur without the introduction into the intestinal canal of this particular spiral bacillus. The germs may remain alive for a long time, and may be transported long distances in infected and imperfectly dried clothing, and in water contaminated by it. Thorough steaming, prolonged drying, or proper disinfection, will effectually destroy the germs. As in consumption, a hereditary predisposition for the disease may exist; so in cholera, deranged digestion, and intestinal irritation predispose to choleraic attacks.

DIPHTHERIA.

Diphtheria is another fearful disease—one with which we are all too familiar. It has its special, well-defined bacillus—called the "*Lœffler*" bacillus, from its discoverer. It is a rod-shaped bacillus, a little thicker and shorter than the bacillus of consumption. This bacillus, it is said, may reproduce itself in the cat or dog, as well as in man; and so seems more domestic in its habits than any others with which we are acquainted. It is thrown off with the discharges of a diphtheria patient through the mouth or nose, and if dried and incorporated with the dust, will float in the air, be breathed and lodged upon the mucous membrane of the air passages, or falling into milk, water, or on food, find a favorable lodgment, and lead to a renewal of life. These germs have been found in the mouths of apparently healthy children, and soon thereafter the disease has been developed in them. They are readily killed by a moderately strong solution of corrosive sublimate, or carbolic acid. They may long remain alive in dwellings, and may be conveyed in clothing contaminated by the discharges of those suffering with the disease, or, as has been said, may enter the home with sewer air. The practical lesson for protection is, destroy by burning or some other equally effective method, all contaminated clothing; isolate the sick, and disinfect all persons, and everything in any way exposed to the contagion.

The bacteria producing scarlet fever, measles, yellow fever, whooping cough and small-pox are not sufficiently identified to describe fully their form, habits, and the conditions most favorable for their development or destruction. Enough, however, is known from clinical observation, to commend, as the best means of

Bacteria—Our Hidden Foes.

prevention and restriction, isolation and disinfection, with vaccination in the case of small-pox.

From the foregoing, a few general conclusions may be reached, involving some recapitulation. It has been noticed that dust has been the most frequent and greatest source of danger. There are three living elements in nearly all dust, representing three forms of vegetable life—bacteria, yeasts and molds (see plate II, Figs. 1, 2 and 3). Of these bacteria are by far the most numerous, as well as most important, especially from a sanitarian's standpoint; and of these bacteria only a few cause disease. They are found on the moist surfaces of decaying plants and vegetables; on the bodies of animals; on the solid excreta of men and animals; in human sputum and saliva; in stagnant water, and on the surface of the ground in inhabited regions; and they cannot well be detached while in a moist condition. The air sweeping over moist surfaces swarming with bacteria does not become charged with them. These micro-organisms when dried and mixed with the dust go circling and eddying with every changing breeze, and find a lodgment on food and fruits and vegetables; in homes, halls and churches; on clothing and furniture; and in the mouths of men and animals. The number of bacteria in



Fig. 1.

A—A single colony of rod-shaped bacteria (bacilli) growing in a plate of nutrient gelatine. The actual diameter of this colony is about one-fourth of an inch.
B—A cluster of the bacilli taken from the colony and highly magnified.

greatly in different localities.

Bacteria—Our Hidden Foes.

Fig. 1 shows how a single living germ falling upon a suitable culture medium, may, in a short time so grow and multiply as to make a colony visible to the naked eye.

Prof. Thomas Mitchell Prudden, M. D., the eminent bacteriologist of the College of Physicians and Surgeons of New York City, conducted a number of most interesting experiments with a view

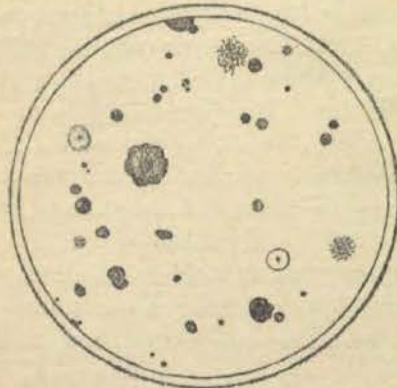


FIG. 2.

The cut shows the appearance of the flat, shallow dish, the bottom of which was covered with nutrient gelatin, and when this had cooled and solidified, was uncovered and exposed to the air in a moderately clean place, for five minutes. It was then allowed to stand in a warm place for four days. Immediately after the exposure of the gelatin nothing whatsoever was visible on its surface. But within a few hours tiny spots appeared, which grew large, some more rapidly than others. These colonies at the end of four days, when the drawing was made, vary considerable in size and appearance, because they are mostly made up of different species of germs. Each colony consists of thousands of germs which have grown on the spot where the lone ancestor fell from the air and stuck fast during the five minutes' exposure of the gelatin.

surely settle toward the ground. If now, we set one of our covered dishes in a still place, and take off the cover, the dust particles, the inorganic as well as the living, will settle onto the moist nutrient surface. With the inorganic components of the dust, the multifarious shreds and patches of one thing and another, this is

of determining the number of bacteria floating in the air, in different localities and under different circumstances. Some of the results of these experiments are given herewith.

The most of these experiments were made by what he calls the "plate method," which he describes as follows:

"This simple method consists of pouring into a series of perfectly clean, shallow glass dishes a thin layer of warm gelatinous culture-medium, and allowing it to solidify by cooling. This gives a smooth, moist, somewhat adhesive surface of equal size in each of the dishes, which are immediately protected from any chance contamination by closely fitting glass covers.

"This mode of analysis depends upon the fact which we have mentioned above, and which everybody is familiar with, namely, that all dust particles, light or heavy, in quiet places, slowly but

Bacteria—Our Hidden Foes.

the end of the matter. But as the living dust particles touch the surface, like Antæus they find their abeyant vigor quickly renewed, and forthwith begin to multiply and inherit their little new-found earth. Now, suppose we leave our dishes uncovered and exposed to the falling dust for, say five minutes; suppose further that the surface of the culture medium is three square inches in size, it will be readily seen that by the exposure of dishes of the same size for the same time to the air of different places, we can, by comparing the number of bacterial colonies which develop on the surface, get at least a proximate idea of the relative number of suspended bacteria slowly settling in the air of the different places. (See Fig. 2).

It is only in filthy localities in large cities when a given amount of dust-laden air shows a considerable number of bacteria and of those present there may be comparatively few that are

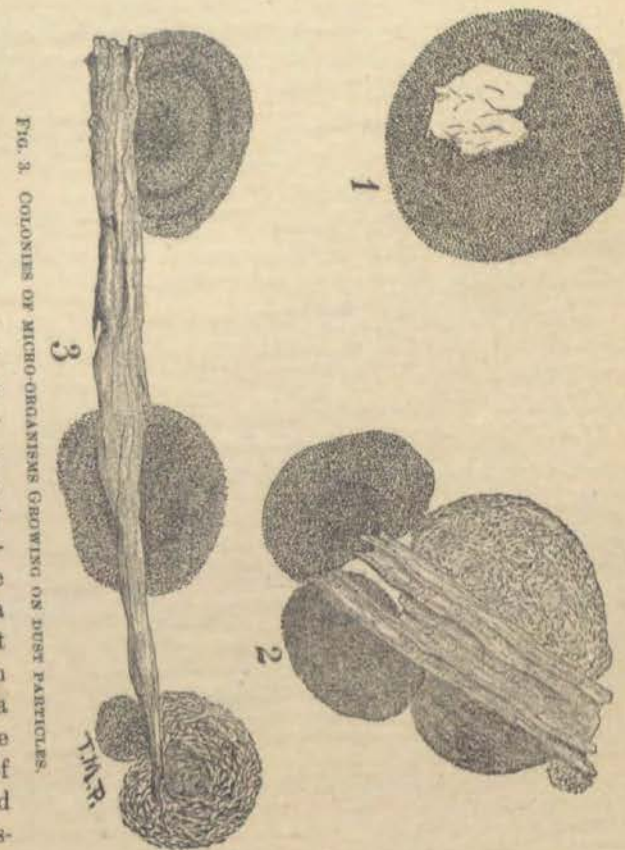


FIG. 3. COLONIES OF MICRO-ORGANISMS GROWING ON DUST PARTICLES.

This cutshows the appearances which are presented after the germs have grown by particles of sand and shreds of vegetable fibre to which single germs were clinging when they settled on to the uncovered gelatine plate. In this case the drawings were

Bacteria—Our Hidden Foes.

pathogenic—disease—producing in character. When the air is moving so as to carry any considerable quantity of dust it is generally so diluted by large quantities of pure air that the per cent of micro-organisms is very insignificant. Then when the ground is wet the proportion of germs is still less. The accompanying plate with its explanation shows how minute particles of inorganic matter floating in the air and settling to the ground, may have colonies of these bacteria attached to them like barnacles to a ship. This is strikingly illustrated in Fig. 3.

Prof. Prudden shows the result of a series of comparative analyses made in this way in various places in New York City on a clear, dry, moderately breezy day, in April, 1890. Each one of the spots represents a colony of bacteria which has grown from the single germ which settled on the moist surface during the five minutes exposure to the air:

The result as shown by No. 6 may well attract the attention of some Iowa street cleaning departments where similar methods prevail—sweeping on piles the dried dust and then carting it away.

The result of the analysis shown in No 6, needs no lengthy comment. That as many living germs as of colonies, which are here shown, should be floating in the air, and liable to be breathed in by any unfortunate passer-by within five minutes, is evidence enough of the filthiness of the present practice of so-called street cleaning in New York.

In a striking manner is also shown the difference in the number of micro-organism in the air of a room before and after sweeping. They were taken in a most carefully kept hospital ward in New York in which were about twenty-five persons. Before the sweep-

made five days after the exposure of the plate to the air of a dusty street. The largest of these colonies was barely visible to the naked eye.

1. Shows a particle of sand completely surrounded by the colony or mass of bacteria which has grown from a single germ which was clinging to the minute sand particle as it settled with the dust.

2. Shows a tiny shred of wood to which five different germs were attached as it settled on the exposed plate. We should probably have searched in vain even with a powerful microscope for the single germs clinging to it at the time this wooden dust particle planted itself on the surface of the gelatine. But now the larger colonies are visible even to the naked eye. We know that they grew from different species of germs because under a moderate magnifying power they present such markedly different appearances.

3. Shows a minute sliver to which four different forms of germs were clinging as it fell.

Bacteria—Our Hidden Foes.

ing, after an hour's quiet the number of living germs which settled onto the dish, three and three-fourth inches in diameter, was twelve as shown by Figure 5. Immediately after sweeping the number which settled on a similar surface was 226. (See Fig. 6).

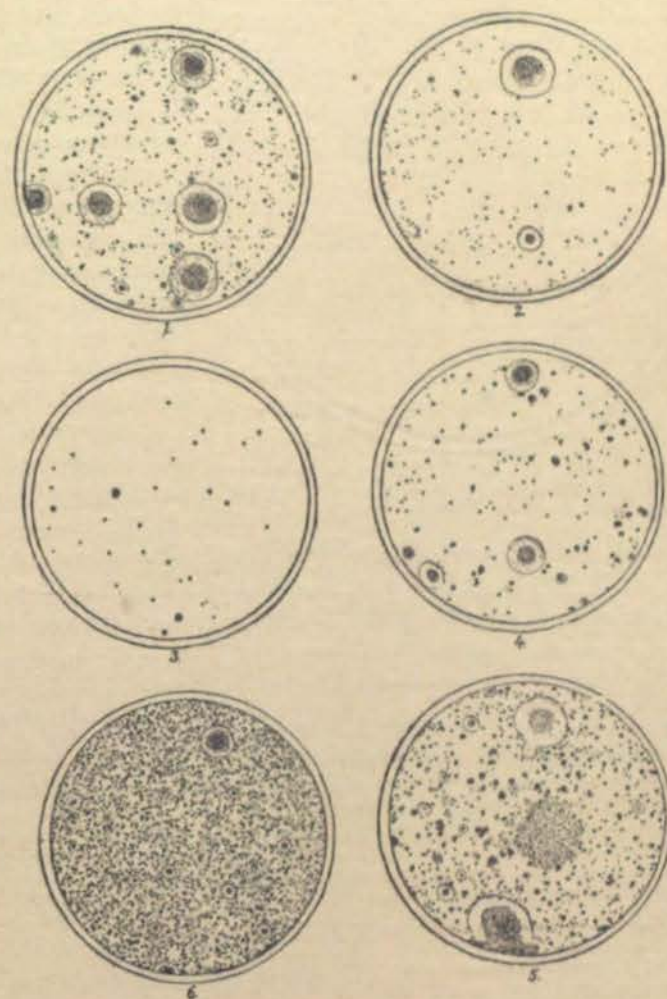


FIG. 4. SHOWING DUST OF THE AIR OF DIFFERENT PLACES IN NEW YORK CITY.

1. Ball ground, Central Park. A moderately westerly wind bringing the dust over from the Eighth Avenue and its cross streets.

2. Union Square. At the edge of the fountain basin.

Bacteria—Our Hidden Foes.

Carnelly found in hospital wards in Dundee, in the afternoons, ten to twenty bacteria in ten litres of air. Newman, after sweep-

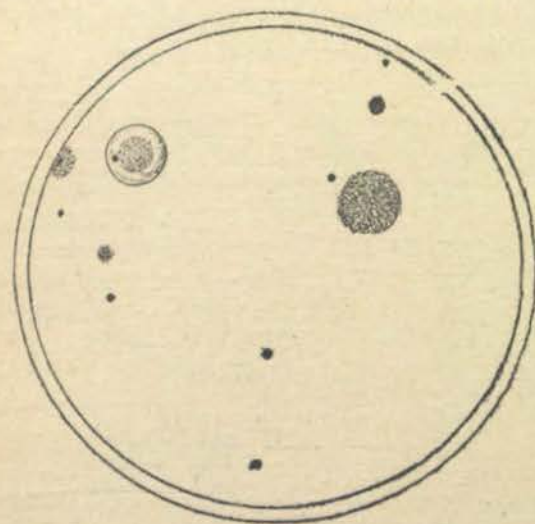


Fig. 5.

Plate analysis of the air in a hospital ward before sweeping. Five minutes exposure.

ing, found eighty to one hundred and forty bacteria, and later in the day, four to ten, in ten litres of air.

Carnelly found in what were called clean houses, one hundred and eighty bacteria, and in very dirty houses, nine hundred in ten litres of air. In dirty school rooms ventilated by natural methods, he found in the same quantity of air, nearly two thousand and living bacteria, while in scientifically

ventilated ones, there were only from thirty to three hundred.

Dr. P. H. Bryce of Toronto, Canada, by a number of analyses of the air of houses and schools, found the number of micro-organ-

3. The library of a private house not far from Thirty-Fourth street and Broadway.
4. A large retail dry-goods store on one of the uptown cross streets near Broadway, during a busy hour of the day when there was much stir and bustle.
5. Railing of the small park at Broadway and Thirty-Fifth street.
6. A cross street through which the carts of the street-cleaning department were passing, collecting the dry heaps of street dirt.

If we translate into numbers the appearance of the cultures shown in Fig 4, we find that during five minutes the number of living germs which settled from the floating dust on to the bottom of a round dish about three and three-fourths inches in diameter in different places in New York was as follows:

1. Central Park, dust blown from an adjacent street, four hundred and ninety-nine.
2. Union Square, two hundred and fourteen.
3. Private house, thirty-four.
4. Large retail dry goods store, one hundred and ninety-nine.
5. Broadway and Thirty-fifth street, nine hundred and forty-one.
6. Street in process of being cleaned, by the street-cleaning department, five thousand one hundred and eighty.

Bacteria—Our Hidden Foes.

isms in the air of a school of average cleanliness naturally ventilated, to be one hundred and twenty-five thousand per cubic metre, and in the cleanest of mechanically ventilated schools, taken from twenty-two schools thus ventilated, there were three thousand microbes per cubic metre.

Tucker made a number of experiments in the Boston City Hospital. At midnight, when the inmates were all quiet, and the dust had fairly settled, he found in a litre (a little over an American quart) of air thirteen bacteria. In the morning before any stir had taken place, and all the bacteria and dust had filtered through the air and settled on the beds, floor, etc., he found in the same quantity of air, one colony. After sweeping the number rose to seventy per litre. In another ward he found twelve bacteria before sweeping, and two hundred and twenty seven after sweeping!



Fig. 6.

Analysis of air in same ward just after sweeping. Five minutes exposure.

In a carpeted tenement room, Prof. Prudden on exposing gelatine plate for five minutes before sweeping caught seventy five bacteria; in the same room after sweeping, by a similar exposure, he caught two thousand seven hundred. From careful experiments made by analyses of air from different points in New York City, and under different conditions, allowing for a single breath by an adult person thirty cubic inches of air, it was estimated that from eleven to three hundred and seventy-six living micro-organisms were taken into the nose, mouth, air passages and lungs with every twenty breaths.

Prof. Prudden says: "The number of living germs which the New York citizen is liable to be forced to take into his body when

Bacteria—Our Hidden Foes.

the streets are dry, and the wind is blowing, or when the dried filth is being stirred up by the diabolically careless procedures of the present cleaning fiends, it would be a thankless task to tell."

He further says: "Every person suffering from consumption of the lungs may be expectorating every day myriads of living and virulent tubercle bacilli; and the life and virulence of these bacilli are not destroyed by prolonged drying."

Fortunately there is a brighter side to this otherwise dark figure. Knowing the dangers from these tiny and almost omnipotent foes, intelligent means can be employed to combat them. Nature herself is man's trustiest ally.

Myriads of these microbes floating in the air, though they enter the nose, mouth and air passages, are promptly disposed of without injury to the person. They are caught upon the moist surfaces of the nostrils, and are thrown off with its mucous discharges, or in the mouth, when they are incorporated with the saliva and spat out, or perhaps swallowed. Should they, however, pass the well-guarded portals of the lungs, and enter the windpipe and bronchial tubes, they at once are subject to an arrangement that is very

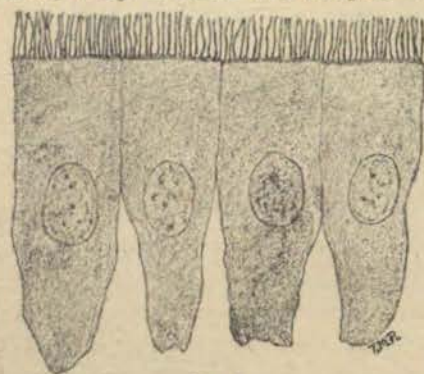


FIG. 7.

Ciliated cells from the large air-tubes of the human lungs, seen from the side. Highly magnified.

efficient in their expulsion. They encounter everywhere as the lining of these air passages, short, club-like cells, placed on end and side by side, having on their free ends very minute, hair-like projections, called *cilia*, as seen in Fig. 7. These cilia are ever swinging their free ends back and forth. If bent down they recover with a snap, throwing forward any small object that may have lodged on the walls of the larger air-tubes, and carrying them toward the mouth—away from the delicate lungs. While this ciliary movement is less active during sleep, and more vigorous as the body is active, still it never for a moment ceases while life lasts. It really continues for some time after heart and lungs have ceased to perform their functions, and after the body is said to be lifeless.

Bacteria—Our Hidden Foes.

We cannot appreciate the help these faithful, incessant cilia are in expelling micro-organisms that have entered the air passages.

In addition to the beneficent offices performed by these tireless cilia, there is a curious class of cells called *phagocytes* that supplement their efforts. These cells seem to wander about the body in an apparently listless way. They float in the blood vessels on the blood tide; they insinuate themselves into the various tissues of the body; they are found in the bronchial tubes, and in the air cells of the lungs. If a foreign body, or a piece of broken down tissue come in their way they pounce upon, wrap themselves about it, and either digest or destroy it; or carry it to some place where it can do no harm. They are the scavengers of the body, and right faithfully do they perform their work.

However, the faithful vigilance of the *phagocytes*, and the tireless energy of the cilia will not prevent some dust particles from coming in contact with the delicate lung-tissue.

Here again nature has provided another safeguard. There is no direct communication with the air-cells of the lungs. The delicate membrane or film comprising their walls serves as a filter, and performs the important function of purification of the blood. The blood having

returned to the lungs laden with poisonous and broken down elements, by a process of filtering, gives up the carbonic acid and water with which it is over-laden and exchanges for the same fresh supplies of life-giving oxygen.

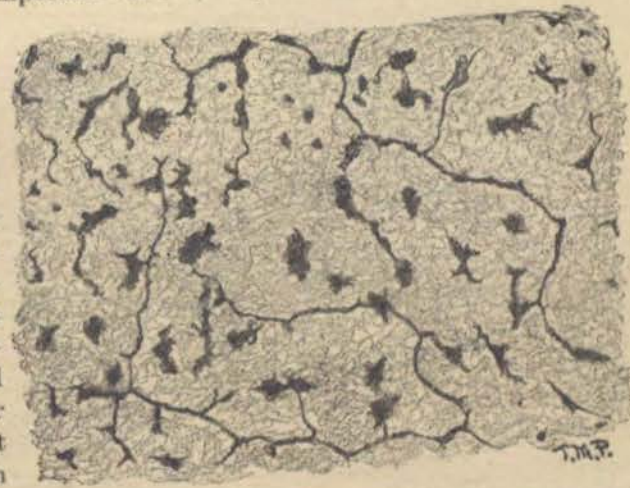


FIG. 8.

A small portion of the surface of an adult human lung which has become pigmented by the inhalation of dust. This drawing was made not from the lung of a coal miner, or one who had lived in especially smoky or dusty places, but from that of an individual exposed to the ordinary conditions of indoor city life.

Bacteria—Our Hidden Foes.

In course of time the dust and other organic matter that escaped the cilia and the phagocytes unable to pass through the filter provided by the air-cells become deposited at different points of the lungs and instead of the delicate pink color natural to lung tissue, a mottled appearance is found. The lung tissue of aged persons especially presents this evidence of pigmentation. (See Fig. 8.) This deposit remains during the remainder of life.

As if this were still not enough there is provided for us an additional safeguard against dust.

There is what is known as the lymphatic system—a series of vessels and glands.

The blood in circulating through all parts of the body deposits in its passage through the blood-vessels a nutrient fluid called lymph which, as it comes in contact with the cellular tissues of the body, bathes and nourishes them. After performing this office the

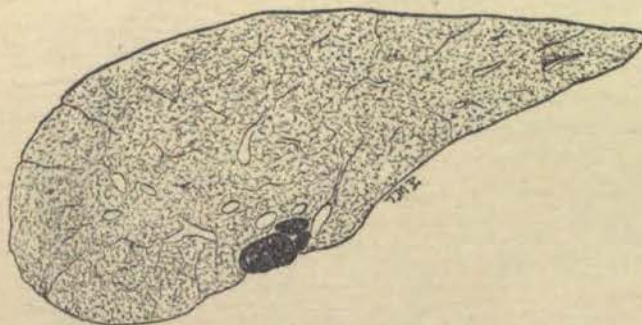


Fig. 9.

DUST FILTERS IN THE LUNG—DEEPLY PIGMENTED.

A drawing of one lobe of the human lung, showing the lymph filters (lymph glands) at one side, which have caught so much inhaled dust in their meshes—thus keeping it out of the blood—as to have become almost totally black. These glands are naturally of a light pink color.

Now, if it happened that this lymph has gathered up any organic or harmful material, and thus has become contaminated in its passage among the tissues, unless there was something to prevent it, this contaminated lymph would be thrown directly into the blood and produce serious results. Nature has very wisely and kindly provided against such an accident by providing at the root of the lungs efficient filters, lymph-glands whose office it is to arrest any such foreign or poisonous material, and this is just what takes place, until after these glands instead of appearing as little reddish white

lymphatic vessels gather up the lymph and empty it into larger and still larger vessels until finally it is dumped into the blood, and at once becomes incorporated with it.

Bacteria—Our Hidden Foes.

bodies become as black as ink, as shown in Fig. 9. Very little, if any dust or other noxious material is able to pass through these filters.

What has been said thus far about nature's means for our protection against inhaled dust refers to inorganic material, and because of the beneficent provisions named would not prove a serious menace to health.

The danger grows out of the fact that adherent to this dust are the bacteria—some of which may be disease-producing. It is true that nature has provided many ways to get rid of even these. Most of the bacteria are harmless; others do not find a congenial soil in the human body; others that might find favorable conditions in some parts of the body lodge in the nose, mouth or lung, where they perish for lack of suitable food or because of some local secretions destructive to them. But in addition to all these, unfortunately, there are some that gain access to the body, such as the bacillus of diphtheria, and the bacteria producing cholera, typhoid fever, or consumption, and finding a lodgment in a congenial place with moisture, warmth, and suitable food, they grow and multiply with great rapidity.

One of the most familiar illustrations of the mischief produced by the inhaled dust to which is adherent disease-producing germs, is seen in the case of consumption. While the deposit of dust itself, or even of dust with harmless bacteria adherent, may not be any injury to the lung, yet the *Bacillus tuberculosis* finding the conditions best adapted to its growth would soon produce such local changes, that, if not arrested spontaneously, or by other means, would result in death from that too well known disease, consumption.



Fig. 10.

Two of the lymph filters at the root of the lung which have become blackened from inhaled dust. But in addition to this, one of them, the larger shows two white spots which are caused by the lodgment here of the tubercle bacilli. These germs caught in the meshes of the filter and thus kept out of the blood have grown here for a time. But owing to their growth, or their presence the tissues about them have been so stimulated or irritated that a dense organized wall has been formed around the germs, completely shutting them off from the rest of the body. This is the way in which the cure of consumption is sometimes effected.

Bacteria—Our Hidden Foes.

When we think how, as has been shown, one single germ under suitable condition will in a short time produce millions of its kind, the danger of the inhalation of dried dust to which may be attached the specific germs producing some of our most fatal diseases is at once apparent, despite the protective provisions before referred to.

The means of contamination of soil, water and food are so abundant, and the precautions are as yet so few, that it is time that the people awakened to a realization of the importance of such sanitary measures as will most effectually lessen the number, if not entirely prevent the occurrence, of what are known as infectious and preventable diseases. The most fatal of these infectious diseases in Iowa, are consumption and diphtheria. Attention, however, can only be called to the former—believing the measures most successful in the prevention or restriction of the one will apply equally to the other.

Is it any wonder that so many die annually of consumption? It is stated that in Europe one million persons die annually from this disease—about three thousand daily! In the United States from ninety thousand to one hundred thousand die annually from the same cause. In 1887 in New York, according to the last census, ninety-six thousand, four hundred and fifty-three persons died—eleven thousand, six hundred and nine from consumption.

Let Prof. Prudden again speak and tell us why so many thus die. He says: "In a very large proportion of cases, in inhabited regions, the infection or germ of tubercle is conveyed from well to sick persons by means of material discharged from the lungs, which is allowed from carelessness or ignorance to dry and finally mingle with the floating dust." It is not the breath of consumptives that produces the disease, but the dried and floating sputa infected with the tubercle bacilli that are taken into the lungs.

Quoting the Professor once more. He says: "If, however, the streets of cities be, or are allowed to remain, filthy, so that abundant and pretty constant dust-clouds are encountered by those passing through them; if ignorant or careless street cleaners are allowed to scatter clouds of dust about them as they sweep or shovel, or transport the pulverized filth, the chances of inhalation of dangerous dust particles are proportionately increased."

The practical question in conclusion is: "What shall we do to be saved?" We cannot avoid making and encountering dust—it

Bacteria—Our Hidden Foes.

is, especially in dry times, omnipresent. It is carried into our homes on our feet, and clothing—especially by the women in their majestically trailing robes; it is blown into our faces; and into our homes through every crack and open door or window. How shall we escape its dangers and get rid of it? Carpets should be as few as possible; upholstered furniture is a menace; rugs should be carried out doors and well dusted every few days. Floors, and casings and mouldings, as well as furniture, should be daily wiped with a damp or oiled cloth and burned or washed out, and streets should be well sprinkled before sweeping, or be flushed thoroughly. Halls and churches should be sprinkled liberally with sawdust dampened with water, or by a weak solution of carbolic acid, before being swept, and the sweepings immediately burned. The ingenious housewife can find a hundred ways of getting rid of the dust without stirring it up, and setting it afloat, to re-settle and again be worked over. All discharges from persons sick with infectious diseases should be promptly disinfected, or burned. The sputum of consumptives and of those sick with diphtheria, should never be discharged upon the floors, or streets, but should always be received on cloths or in cuspidors, and burned. Inasmuch as we never can get rid of dust, we must do all we can to prevent its contamination so far as possible, by disease germs. In no other way can we ever hope to combat successfully "our hidden foes."

BIBLIOGRAPHY.

In the preparation of the foregoing, the following authors were consulted: Crookshank, MacLagan, Magnin, Sternberg, Vaughan, De Barry, Pasteur, Koch, Senn, Klein, Fraenkel, Welsh and Abbott; and especially are due to Prof. T. Mitchell Prudden, M. D., and to the publishers of his books, entitled "The Story of the Bacteria" and "Dust and Its Dangers"—G. P. Putnam's Sons, New York, for the generous use of excerpts from the books named, for the illustrations accompanying this article, and for the explanation of the plates.

Microbes of the Soil.

MICROBES OF THE SOIL.

Writing of Microbes in the soil, A. Hébert, of Paris in *La Nature*, June 6, 1891, says:

Much has been written about the microbes in the air, in water, in the human system. Less than they deserve has been said of the organisms which people another element not less important, the soil.

Does the soil contain micro-organisms? The answer is not doubtful. The smallest quantity of earth put in water, reveals, through the microscope, beside the organic and mineral matter, a mass of beings more or less complex, moving more or less rapidly. A German author, Mr. Reimers, has calculated that every cubic centimetre of earth may contain several million germs. Among these microbes some have not been studied and the part they play in the economy of life is not known to us, while certain others have functions which have been well determined. The experiments of Messrs Dehérain and Maquenne have clearly revealed butyric fermentation caused by microbes in the soil.

Beside the microbes provoking this sort of fermentation there exist also in the soil pathogenous microbes, which may be very dangerous under certain circumstances. In the first rank of these microscopic, but maleficent beings must be cited the germs of carbuncle, of septicæmia, of tetanus, and typhoid fever.

Carbuncle, the etiology of which has been studied so thoroughly by Mr. Pasteur and his co-workers, Messrs. Chamberland and Roux, is one of the most terrible maladies which can attack cattle and sometimes even men. Now-a-days, thanks to labors of the savans whom we have just named, this malady has become quite rare, and tends more and more to disappear. For a long time it has been known that carbuncle was due to a particular microbe, but it was not known how it could be propagated. Mr. Pasteur has demonstrated that this propagation was due, in part at least, to the longevity of the germs. Thus it is that if you bury the dead body of an animal which has died of carbuncle in a ditch one or two metres deep and cover it with earth, the carbuncle bacteria will be found in the neighboring soil several years after the interment. We can understand then that cattle put to graze on this land, or fed by provender from it, can contract the disease. So when the cause of this malady was unknown, superstitious country people called the places "cursed fields."

It may excite astonishment that the earth is such a powerful filter, allowing germs to rise to the surface of the soil. Mr. Pasteur has shown that this

Microbes of the Soil.

action is due to earth-worms, which are thus the vehicles of carbuncular ferment. In fact, the bacteria of carbuncle are found in the little cylinders of fine earth which the worms bring to the surface of the soil, and which rain lays flat. Great care, then, should be used not to inter animals which have died of carbuncle in a soil on which sheep are expected to graze, or from which it is intended to harvest food for cattle. In order to avoid the propagation of germs, while getting rid of the dead bodies of animals which have died of carbuncle, they should be interred in ground which is either sandy or calcareous, which has little moisture, and in which earth-worms cannot live. A better way, however, as Mr. Aimé Girard has pointed out, is to treat the dead body of the animal with sulphuric acid, which shortly turns it into a black pulp, which can be mixed with manure, as for example, with phosphates, to be spread over the surface of the soil.

Cultivated land contains beside the microbe of septicæmia of Mr. Pasteur, the bacillus of tetanus of Mr. Nicolafer. Mr. Verneuil has proved that inoculations made with this poisonous earth develop among animals the two terrible maladies of gangrenous septicæmia and tetanus. Mr. Macé has shown, in an analogous way, that earth contains the bacillus of fever.

The fact that the soil contains pathogenous microbes is utilized by the savages of the New Hebrides to poison their arrows.

As we have seen, earth contains a great number of microscopic beings, of which some are dangerous and some are imperfectly known. Now, when earth is dried and gives to the wind a great quantity of dust, it may be asked if, among this dried earth thus suspended in the atmosphere, there are not germs capable of producing maladies like those we have mentioned.

Beside the beings I have mentioned, earth contains other bacteria, of which the function is quite different, and which play a very important part, from the point of view of vegetable physiology. Mr. Berthelot has demonstrated by a great number of experiments, that earth can fix the atmospheric azote, through the intervention of certain micro-organisms. Sometime since Mr. Bréal published a study on the bacteria of the *leguminosæ* which have this property of assimilating the azote of the air. Finally the soil contains the nitre-making microbe, in regard to which some new and very interesting experiments have recently been made.

Adulterated Food.

ADULTERATED FOOD.

CANNED FOOD.

The United States Department of Agriculture, has been making extensive investigation of canned food, and the conclusion is reached that the public is in great danger from poisoning by the minerals contained therein, the greatest danger being from lead.

From the report of H. W. Wiley, chemist of the department is epitomized the result of these investigations: The preservation of food by sealing at a high temperature to prevent contact with the external air was originally looked upon as successful because of the exclusion of the oxygen of the air. It is now found, however, that the real philosophy of the preservation of fruits and vegetables when canned is that the germs or micro-organisms capable of inducing diseased food are killed by the high temperature utilized in heating the fruits in the cans and the further access of new germs is precluded by the exclusion of the air. The use of sufficient heat to kill the germs causes many vegetables and fruits to become soft, and therefore other methods of preserving the fruit from decay and retaining its natural attractiveness have been devised. Salicylic acid and sulphurous acid have been used for this purpose as well as other chemicals. This is objectionable because to a greater or less extent it proves injurious to the constitution of those eating them and also prevents digestion. The same qualities which enable these preservatives to prevent the action of micro-organisms and thus preserve the food from decay are also active in the digestive organs, and hinder the normal functions of the digestive germates.

The danger from greened goods is slight compared with lead poisoning.

In making a can three lines of solder are left—one at each end, and a third down the side of the can. More or less of this finds its way into the preserved juices. Lumps of solder are often dropped

Adulterated Food.

into the can during the process of sealing. The danger from this source can be imagined when it is considered that the solder is composed of two parts of lead and one of tin. But the tin plate of which the can is made also contains a certain amount of lead. The cheaper the tin plate the more lead there is in it, and naturally there is a tendency among canners to use the inexpensive grades. Tin plate is divided commercially into "bright" and "terne" plate, the former being covered with more or less pure tin and the latter with a varying mixture of lead and tin. Only the "bright" plate should be used for canning.

In Germany the law requires that the tins employed for holding the canned goods shall not contain more than one per cent of lead. In this country there is no restriction whatever in regard to the character of the tin employed, and as a result of this the tin of some of the cans has been found to contain as high as twelve per cent of lead. There is no question whatever among physiologists in regard to the effect of lead salts upon the human system. The continual ingestion of even minute quantities of lead into the system is followed eventually by the most serious results. Painters' colic, lead palsy, and other serious diseases well known to physicians, are the direct effects of the continual exposure of the system to the influence of minute portions of lead salts. Even tin salts are poisonous, but not to the extent of lead, so that the presence of a minute portion of tin in canned vegetables, coming from the erosion of the cans containing them, is not a matter of such serious import as the presence of lead. Perhaps it would be quite impossible to exclude tin absolutely from canned goods when they are canned in tin, but it is possible to exclude the salts of lead. This can be done by requiring that the tin shall not contain more than, say, one and one-half per cent of lead, and, in the second place, that the solder which is employed shall be as free from lead as possible. In Germany the solder employed in sealing the cans is not allowed to contain over ten per cent of lead, while in this country the analyses of numerous samples of the solder employed show that it contains fully fifty per cent of lead. In addition to this there is no care taken to prevent the solder from coming in contact with the contents of the can. It is a rare thing to carefully examine the contents of a can without finding pellets of solder somewhere therein. Often on

Adulterated Food.

examining the inside of a can it is found that large surfaces of solder on the seams are exposed to the action of the acid contents. The result of all this is, that lead is a very common constituent of canned goods.

Another great source of danger from lead has been disclosed by the analytical work, viz., in the use of glass vessels closed with lead tops or with rubber pads in which sulphate of lead is found to exist. As a sample of this may be mentioned the goods of Eugène Du Raix, of Bordeaux. All the samples of his goods examined were put up in lead-topped glass bottles. All except one contained salicylic acid, and all of them save one contained copper. In one of these samples lead existed to the enormous amount of 35 $\frac{1}{2}$ mg per kilo; in another 15 $\frac{1}{2}$ mg per kilo were found, while in one sample, viz., No. 10937, the extraordinary quantity of 46 mg per kilo was discovered.

It is not difficult to see how goods covered with lead tops can be contaminated. It may be claimed that these goods should never be turned upside down, but the shippers pay little attention to such directions and the result is that the goods may be kept for days or even weeks in such a position as to bring the contents of the can in contact with the lead tops or with the rubber pads containing lead. The constant consumer of such goods, therefore, must run some risk of being exposed to the insidious inroads of some of the diseases peculiar to the action of small quantities of lead upon the human organism.

In this connection it is astonishing to find how little digestive value this class of rather popular food contains. He says: "Many expensive articles of canned goods contain an amount of nutriment matter totally out of proportion to the price paid therefor. The conclusion is therefore forced upon us that the use of canned goods is in every sense a luxury, and a luxury which is attended with many dangers. On the whole, the less rich portions of our population should rather congratulate themselves that their incomes do not warrant them to purchase higher priced foods of so little digestive value and fraught with so many dangers to health. The quantity of dry food material in canned goods varies within wide limits. It is very low in such vegetables as string beans, asparagus, etc., and quite high in such material as canned corn, succotash, and other bodies of that description. The lowest percentage of dry

Adulterated Food.

matter in string beans of American origin was 4 $\frac{1}{2}$ %. In other words, in buying one hundred pounds of such material the consumer purchases 95 $\frac{3}{4}$ % pounds of water."

Canned vegetables are not much subject to adulteration in the restricted sense of the word, which implies the addition of foreign substances to food for the purpose of increasing its quantity. The only practice in vogue which can properly come under this head is the addition of undue amounts of water during the canning process. This often occurs. Additions of salt might be regarded in this way, but this substance is added primarily as a condiment. Of adulteration in the more modern sense, that which includes sophistication, there is a great deal, and indeed it may be said to be almost universal. There are few canners who do not use salicylic acid or other preservatives, and the trade in coppered vegetables has grown to enormous proportions. Beside these wilful additions there is a class of what may be called unintentional sophistications, such as the presence of lead, tin, or zinc in these foods. These substances are often present, but are never, except occasionally in the case of zinc, added intentionally.

Ptomaines are often said to be present in canned foods, and this may sometimes be the case, but their occurrence in canned vegetables must be extremely rare. Ptomaines are by definition the result of bacterial action, and where this action does not occur they must of necessity be absent. Vegetables are usually canned in the fresh state, and if they are in any degree spoiled at the time, the fact is usually conspicuously evident to the taste, so that the canner cannot afford to use them. Bacterial action seldom occurs in the can without bursting it or rendering it unsalable. Ptomaines may, however, develop where the canned food is allowed to stand for some time after opening, though even then this is unlikely in the case of preserved vegetables.

It may be said, therefore, that the principal risks to health which may arise from the use of canned goods are those due to the use of preservatives, or to the presence of the heavy metals, copper, tin, lead and zinc. Iron, though often taken up by the food in considerable quantities from badly tinned cans, may be disregarded in this case, since it is not only a normal constituent of food, though hardly in the forms which it assumes in canned goods, but is not

Adulterated Food.

poisonous. Its desirability as an addition to food may be questionable, but it cannot be called materially deleterious. In regard to the other substances mentioned, the case is different.

Lead is extremely poisonous, and tin is also poisonous, though in a much less degree. As to the preservatives in common use, of which salicylic acid may be taken as a type, and the salts of copper and zinc, their toxic action is not yet definitely known. This much is certain, however, that they have a marked physiological action and are all of them more or less potent medically. In large quantities they create very evident symptoms of poisoning, though this is only temporary. In the quantities in which they are liable to occur in canned foods, their action is at best uncertain. They may be innocuous—they may not be. Much evidence can be collected to prove either side of the question. It is a question which science is not yet prepared to settle. Pending that settlement, however, it may be said that their use is to be reprobated, inasmuch as any benefit which may be derived by the canner from their presence he can secure in other and less dubious ways. At the very least any food which contains them should be clearly and distinctly labeled, with the fact expressed in direct language. Where this is not done, their presence should be considered to be an adulteration and punished as such.

If there is any fact which is clearer than another, it is that no man or set of men has any right to administer surreptitiously to any other man a more or less potent drug. Every man has a right to knowledge of the fact of being drugged, unless he expressly waives this right in favor of a physician. Even here the law steps in and prescribes that this physician shall be a member of a recognized school. This the canners seldom are. Salicylic acid, which may be taken as a type of these additions, for instance, is a valued medicine in many cases, is in fact one of the best known remedies for rheumatism, and is believed never to have caused death in any dose.¹ But this is no justification for its use. It is certain that it disturbs the normal course of the bodily functions—it must of

¹ There are several cases on record of death supposed to have been due to this substance, notably the one reported in the Virginia Medical Monthly, June 1877, where death followed the taking of 3 grams, divided into several doses, within a period of forty hours after the first dose. All these cases, however, are at best doubtful, for in most instances the patient has had enough the matter with him to have killed him anyhow.

Adulterated Food.

necessity do so to have medical value—and this fact is alone enough to demand its exclusion from any food intended for general use, unless the food be so labeled.

There is another thing which may be said on this point. Were it as harmless as distilled water, there would be no excuse for its addition to food without notification to the consumer. Salicylic acid is not a normal constituent of any common food, and its addition to such foods for any purpose and in any quantity, without due notice to the consumer, is plainly adulteration. If any man desires to have salicylic acid in his food there is no doubt of his right to have it. But there is also no doubt of the fact that the canner has no right to admix it surreptitiously. In any case there can no possible harm result from labeling.

The same arguments may be repeated almost word for word in the case of copper.

Lead, tin and zinc are not usually added intentionally, but are often present, and cannot be otherwise described than as dangerous to health. Zinc is sometimes used as a substitute for copper in greening peas, but it comes into canned goods accidentally, as a rule. Lead comes from the lavish use of solder rich in lead, and from the use of low grades of tin plate. As to its dangerous nature there can be no question. Tin, in many instances, is almost unavoidably a constituent of canned goods where the common unvarnished cans are used. There are few samples of these goods in which it cannot be detected.

PRESERVATIVES.

The use of preservatives is becoming quite common in canneries. Some goods, corn for instance, are rather difficult to sterilize by short periods of heating, and with others heat exercises an influence upon the flavor or consistency, so that the addition of an antiseptic materially facilitates the canner's work.

If a can of food is heated to a temperature sufficient to kill all growing bacteria, the presence of an extremely small amount of a germicide like salicylic acid suffices to restrain all further fermentation, although the amount of antiseptic added might not have been sufficient to materially affect bacterial life if added to a solution in an active state of decomposition. Most of the bacteria commonly found will not resist a temperature of 65° to 70° when in the

Adulterated Food.

active state in a fermenting liquid, but these bacteria in the condition in which they are found in dust, or when in the shape of spores, resist this heat pretty well. If, however, the liquid in which these desiccated bacteria or spores occur contains a minimal amount of salicylic acid or other antiseptic, development into the vegetating form does not occur. Now, in exposing a can of food to the action of heat, no matter how conveyed, it is always a matter of difficulty to insure that the central portion of the contents of the can shall receive as much heat as the portions lying next the surface, and this is particularly true of solid packed goods, such as corn and baked beans. It can be done in time, of course, but time is expensive. Dosing a food with a cheap antiseptic saves time and trouble and enables the canner to be quite certain of the keeping qualities of his goods, no matter in how slovenly or sloppy a manner his work may have been conducted. For this reason antiseptics are daily growing in favor among the preservers.

One objection to the use of chemical preservatives arises from the fact that they do not confine their anti-fermentative action to the food in the can, but continue to exercise it after the food reaches the stomach, which is not desirable. Digestion is effected by the action of unorganized ferments to a large extent, and on this action most antiseptics have a greater or less restraint.

It is difficult to say how far the use of preservatives cheapens canned goods. Of course all saving of labor or time tends to lessen the cost of production, but there seems to be no material difference in point of cost to the consumer between those brands of canned goods which contain antiseptics and those which do not. Probably were the use of preservatives discontinued there would be no material change in the retail price.

In the work done on the canned vegetables but two preservatives were found, if salt be disregarded, viz, salicylic and sulphurous acids. Salt is supposed to be added primarily as a condiment, and only secondarily as an antiseptic. It was present, however, in some cases in inordinate quantities. In one case it constituted forty per cent of the dry matter. Salicylic acid was found in forty-seven per cent of the total samples examined. Sulphurous acid was also very common.

Adulterated Food.

SALICYLIC ACID.

Salicylic acid was discovered in 1838 by Piria.¹ He prepared it by oxidizing the oil of *Spiraea ulmaria*. In 1843 Proctor² discovered it in oil of wintergreen, and Cahours³ prepared it from this source in 1844. In 1852 it was synthetically made by Gerland.⁴ In 1860 Kolbe and Lautemann⁵ discovered a process for preparing it from carbolic acid, and in 1874 Kolbe⁶ so improved the method as to render the acid commercially available. It is from this time that the use of the acid as a food preservative may be dated. Shortly after discovering his improved method for its preparation, Kolbe made an extensive study of the antifermentative action of salicylic acid which extended over the space of a year or two. He came to the conclusion that the acid restrained or prevented the action of organized ferments, and likewise that of unorganized ferments, to some extent, but that it was harmless to animal life. In the course of one series of experiments he took a daily dose of salicylic acid for over a year, commencing with half a gram and gradually increasing to 1½ grams daily. He reports his health to have been the same as usual during this experiment. He also administered the acid to others, and reports the same result. He strongly advocated its use as a food preservative.

Since that time the use of salicylic acid for this purpose has steadily increased, and there are probably now few canners who did not at least occasionally use it. The aggregate of the amount used yearly by the canners and sold for home use in the form of fruit preservatives must be very large. Most of the secret preservatives sold by the druggists and others owe their activity to its presence.

The use of salicylic acid as a food preservative has been forbidden by several European governments. France prohibited it in 1881, and renewed the prohibition in 1883.

An exhaustive discussion of the propriety of the use of salicylic acid as a food preservative took place at the Nuremberg meeting of the Freie Vereinigung der bayerischen Vertreter der angewandten Chemie, August 7, and 8, 1885. The association refused, by

¹Amer. J. Pharm., August, 1843.²Ann. de chim. et de phys., 1838 69, 208.³J. prakt. Chem., 29, 197.⁴Quarterly J. Chem. Soc., 5, 133.⁵Lieb. Ann., 115, 201.⁶J. prakt. Chem., 2, 10, 93.

Adulterated Food.

a practically unanimous vote, to sanction the addition of salicylic acid to beer. A special committee of the Paris Academy of Medicine¹ reported on this subject, that, while persons in good health might suffer no injury from the ingestion of such small amounts of salicylic acid as are liable to be contained in food, this did not necessarily hold good for the aged or for those in feeble health. Persons suffering from dyspepsia or diseased kidneys it was found were especially sensitive to the action of this substance. The report closed with a recommendation that the addition to food of salicylic acid or its salts, even in small amounts, be absolutely prohibited.

Regarding the physiological effects of salicylic acid, the testimony is conflicting. There is a dearth of reliable experiments upon the human subject. As already mentioned, however, Kolbe took daily doses for the period of a year without injurious effect. Lehmann¹ administered to each of two Munich laborers half a gram of salicylic acid daily for seventy-five and ninety-one days, respectively, without a trace of injurious effect. These amounts are much larger than would ever be found in food. Administration of doses of salicylic acid, ranging between 6 and 12 grams, soon causes symptoms of cerebral poisoning. Four grams of sodium salicylate have been known to cause exceptionally severe toxic symptoms.

The minimum dose for salicylic acid as given by the dispensatory is, on the authority of Ewald, 5 grams, repeated in five hours when necessary in cases where its antipyretic action is sought. Salicylic acid is one of the best known remedies for rheumatism in all cases where it is not directly contra indicated by renal affections. As to its influence on digestion, information is lacking. It is certainly not beneficial, however.

Regarding the propriety of the use of salicylic acid by the canners, it may be said, that this use should be unhesitatingly condemned in cases where the fact is not indicated on the label of the goods. Salicylic acid may be harmless in very small doses to ninety-nine out of one hundred consumers, but the interests of the hundredth man should be guarded. Moreover, there is no safeguard against the use of inordinate quantities, for while the qualitative detection of salicylic acid is very easy, the quantitative esti-

¹Bull de l' Acad. de med. (Paris), 188, 16, 582.

Adulterated Food.

mation is a matter of very considerable difficulty. For this reason the canner who uses any at all may use almost any quantity he pleases with perfect impunity. Moderately large doses of salicylic acid are quite likely to prove detrimental to many people.

POISONOUS PTOMAINES.

The poisonous ptomaines, says Dr. R. B. Griffiths, F. R. G., Edinburgh, formed from albuminoids during the composition of food, produce symptoms of poisoning, etc., which are said to be referable to the digestive and nervous systems. These symptoms manifest themselves at periods varying from a few hours to several days after eating food. The symptoms produced by this class of ptomaines are the following, among others: Unpleasant taste in the mouth, headache, vomiting, diarrhoea, dyspnoea, paralysis and death. Several ptomaines render the heartbeats slow and weak, and in some cases of poisoning by unwholesome fish the symptoms resemble those of poisoning by atropine.

Poisoning by unwholesome foods too frequently escape notice; nevertheless every analyst or medical man who is careful of his scientific dignity, should possess a thorough knowledge of the properties of the ptomaines, which have now quite a literature of their own.

Numerous deaths have occurred in England, on the Continent, and in America, from eating unwholesome foods; and it has been shown that the poisonous properties of such foods are due to the action of microbes on the proteids contained in the foods. It may be stated that these poisonous properties are due to certain ptomaines or animal alkaloids. The ptomaines are produced during the putrefaction, or decomposition of animal substances. By the direct action of microbes, the proteids are disintegrated, with the formation of ptomaines among other products. The ptomaines are not secreted or excreted by microbes, for they are the *residua* after microbial action.

It should be borne in mind that the idea of ptomaines *without* microbes is inconsistent with an impartial study of facts. It is true that a suitable filtration (*e. g.*, through porous porcelain), will separate a ptomaine from its microbe; but when this microbe is separated from the original liquid and transferred successively to nourishing media, so as to purify it from every foreign element, it

Adulterated Food.

continues to produce its characteristic ptomaine (or ptomaines), which is produced at the expense of the culture fluid. There is no true ptomaine without microbes, any more than there is ergotine without *Claviceps purpurea*, vinegar without *Bacteria aceti*, or alcohol without certain species of the *Sacromycetes*. Ten ptomaines have been extracted from putrid fish of different kinds. A new one from sardines has been named *sardinine*, which is poisonous—producing vomiting, diarrhoea and death.

There is good reason to believe the twenty cases of poisoning in America, which resulted from eating canned beef, in 1892, were due to neuridine ($C_5 H_{11} N_2$) and the poisoning which sometimes results from eating unwholesome cheese, ice cream, etc., has been proved to be due to a ptomaine which is named *tyrosinicon*, ($C_8 H_8 N_2$) by Vaughan.

POISONED FOOD.

June 8, 1893, three persons were taken suddenly ill with severe choleraic symptoms, at the Dallas county farm, which yielded to medical treatment after several hours. The cause was traced to canned salmon, which had begun to decompose, the can having been punctured several days prior to the eating of the contents.

In December, 1892, Dr. C. O. Eigler, health officer at Defiance, Shelby county, reports that he was called to see a woman and her five children, who were suffering with severe choleraic symptoms. Poisoning was suspected. It was found that the family had partaken of only such food as had been their habit, except some sugar, which had been purchased of a traveling agent, and of which the mother and children had eaten quite freely. The father had eaten none and he was not sick. Another family who had purchased a quantity of the same sugar were similarly affected. The sugar was suspected as the cause, and a sample of it was submitted to Prof. Davis, chemist of the board, for analysis, and the following is his report:

I have made a very careful and searching examination for poisons in the second sample of sugar sent to me by Dr. C. O. Eigler, of Defiance. By a carefully conducted duplicate analysis only a trace of iron, lime, soda and potash could be found among the metallic elements, amounts entirely too small to be of any significance. There was not a trace of lead, zinc, copper or various substances which are found in improperly purified sugars, introduced either in process of refining or subsequently.

Adulterated Food.

A searching examination for alkaloids was also made by both the Stas and the Drazendorff methods, but not a trace could be found. I duplicated this work by making special tests for all the alkaloids which give poisoning symptoms allied to those mentioned by Dr. Eigler, but none could be found.

I also made special tests for all the leading irritant and narcotico-irritant poisons mentioned in Heburn's Pharmacy and the National Dispensatory, and negative results were also obtained.

The sugar was not clean. Under the microscope particles of sand can be seen. By dissolving considerable of the sugar and examining the residue chemically it was shown to be silica. The microscope also reveals particles of vegetable matter which perhaps comes from imperfect clarification; but I am convinced by my chemical tests that these are entirely harmless.

So certain was I of the accuracy of my work that to-day I ate a piece of the sugar fully as large as a hen's egg, and no poisonous symptoms whatever were manifested. An hour or so later I ate about twice as much as before and no unpleasant feeling can be detected from it.

I am therefore *chemically* and *practically* satisfied that no poison existed in the sample of sugar sent to me for analysis. It was not a nice and desirable sugar for use, on account of the foreign matter in it and its having caked, but I cannot see why it should have given symptoms of poison.

So far as I can learn, the symptoms described by Dr. English were quite nearly those of phosphorous, or lead or zinc, substances not existing in the sugar. If the family was poisoned as described I am of opinion that it was through the agency of other articles eaten, and not from the sugar.

Very truly yours,

FLOYD DAVIS.

Under the microscope this sugar disclosed the presence of a large amount of foreign substance, and compared with pure sugar was positively filthy.

Early in October of the present year, Dr. J. S. Ormiston, health officer at New Sharon, reported a severe attack of poisoning of a family immediately after eating a meal, of which bread made from a sack of flour just purchased was a part. As those of the family who ate none of the bread were sick, the flour was suspected. The symptoms were severe and indicated a mineral poison. Thorough investigation of all the circumstances and surroundings was ordered. It was also found that nearly the entire neighborhood was using the same flour, some of it purchased at the same time and place, with no injurious effect. It was also found that arsenic had been placed loosely about cupboards and other places where the sickness occurred for the purpose of killing mice. Although the mother of the family stated that there was no way the arsenic could have got into the flour, the evidence of this means of poisoning the flour was deemed so direct that no analysis of the flour was made.

Milk.

On the 4th of September, 1893, Dr. L. P. Atkins, health officer at Rochester, Cedar county, reported that he was hastily called to a family in the country, where he found a man, his wife, a school teacher, and a young man, prostrate on the floor, vomiting and purging, and cramping severely, which gradually subsided under treatment. There were four children present who were not sick. On inquiry as to what the family had eaten at supper, of which the children had not, it was found to be tea. The tea was examined by the Dr. who reported the presence of copper. It was an ordinary green tea. A sample was given to Prof. Macy for an analysis, who reported that he had made thorough test for copper and zinc, and found no trace of either, but that there was an excessive amount of Prussian Blue, probably used for coloring.

October 12, 1893 was reported a case of severe poisoning of a wedding party at Waterloo from ice cream flavored with lemon extract. The poison was the ptomaine, known as tyrotoxin. Although the sickness was severe, and included a large number of persons there were no fatal results.

MILK.

It will be admitted that milk is an universal food. So being, it may be asserted, with abundant reason, that it is the cause of more disease and death from its adulteration, than from all other food combined.

In 1892 the city of New Orleans was startled by the report of the chemist of the local board of health of the city, that the milk consumers of that city were actually paying to the milk men three hundred thousand dollars for water put in the milk. When the quality of the water of that city is considered, the sensation created readily becomes apparent. A rigid inspection service was inaugurated by which it is estimated the lives of one thousand infants will be saved.

The infant mortality in Chicago reached so startling proportions in 1892, that investigation was made, resulting in such a disclosure

Milk.

of swill milk, milk from diseased cows, and watered milk as to lead to extreme measures for protection, and the hundreds of "country dairys," with stables reeking in filth and nastiness, and crowded with diseased and swill-fed cows were driven out of the city.

In New York City a vigorous milk inspection in one year after its inauguration reduced the mortality among infant children three thousand, six hundred and seventy-three.

In Philadelphia in 1891, one thousand children under one year of age, died from cholera-infantum, a disease most prevalent among hand-fed infants.

Dr. Arnestein declares as the result of extensive investigation, that cholera-infantum is due to fermentation and decomposition of milk.

Booker has found a special bacillus nearly constantly in cholera-infantum, and not found in the dejecta of healthy infants.

The "Br. Medical Journal" for September, 1892, gives a description of a scarlet fever epidemic in Glasgow directly traceable to the milk supply. Between August 4th and 12th of 1892, two hundred and twenty-four persons were attacked by the disease, and all cases were traced by the milk inspectors to diseased cows. Their teats were found to be studded with vesicula-papula eruptions. A case of scarlet fever had also occurred among the dairymen.

Dr. Klein, the great bacteriologist in London, is satisfied that cows suffer from scarlet fever, and that they may communicate the disease to the consumers of milk.

Vol. I, p. 474, in the "Br. Medical Journal" for 1890, contains a description of a diphtheria epidemic in Eton College, England, traced also to infected milk.

The "Pharm. Journal Trans," Vol. XIX, p. 541, of 1892, contains proof of the transmissibility of typhoid fever by contaminated milk.

Milk.

Chemical Composition of Milk.—One hundred parts of milk contain:

	Water.	Butter.	Caseine.	Sugar.	Salts.
Woman	87.71	4.37	1.54	5.75	0.58
Cow.....	87.00	4.60	4.00	3.80	0.60
Goat.....	86.80	3.32	4.08	5.20	0.58
Sheep.....	85.20	4.20	4.50	5.00	0.68
Mare.....	88.00	1.00	1.60	8.90	0.50
Ass.....	90.00	1.40	1.70	6.40	0.50
Sow.....	82.60	5.70	6.20	5.00	0.50
Milk of cow without cream.....	90.00	0.80	3.90	4.70	0.60
Buttermilk.....	90.00	1.00	3.00	5.40	0.60
Colostrum.....	75.10	3.50	16.18	4.60	0.60
Thick cream.....	55.00	34.50	8.50	2.00	0.60
Butter.....	10.00	87.80	1.00	1.20	0.60
Rich cheese.....	40.00	30.00	25.00	5.00	0.60

—*Annali di chimica e di farm.*

In this State cow's milk must contain not less than three per cent of butter fat, by weight, otherwise it is deemed to be adulterated and not pure milk. The fat should be three and one-half to six by weight.

In the casein of cow's milk there is one-half to one per cent of *serum albumen*, which it is important to consider in feeding infants, and which is usually entirely overlooked.

Dr. Winslow Anderson, an eminent physician and chemist of London, in a recent address in San Francisco upon milk and its relation to disease, before the State Sanitary convention said: The *practical points* to be observed from our chemical analyses of milk, in relation to infant feeding are these: That as cow's milk contains less water *when pure* than human milk, water should be added for infant feeding. Do not let your milk man do this for you, for that is how infection and epidemics so often occur. As the salts of lime are less in the cow's milk, I have found it an excellent practice to add from five to ten per cent of freshly prepared lime water (calcium hydrate) containing, as it does, about one grain of lime to the ounce of distilled water, and twenty-five per cent of boiled water, more or less, according to the age of the child. Lime water has also the advantage of rendering the acid milk alkaline or neutral, as is the human lacteal secretion. My invariable rule is

Milk.

to *boil* the milk as soon as it enters the house, because (a), though the cow be healthy, its transportation endangers its purity; (b), bacilli from the cow, or those germs absorbed, can be destroyed by boiling, and (c), a very important consideration, the skin or scum formed upon the top of boiled cow's milk, Prof. Austin Flint's observations to the contrary, notwithstanding, is *serum albumen*, and the most indigestible part of the whole milk, and should be *removed*.

Cow's milk also contains less sugar than human milk, hence this must be added, but do not use cane sugar, for that is a foreign substance to milk; use one-half a teaspoonful, or thirty grains of lactose to the ounce of milk. By these simple means you have sterilized the milk, rendered it free from *serum albumen*, and almost transformed cow's milk into human, and made it just as digestible.

To recapitulate :

First—Boil your milk as soon as it enters the house.

Second—Skim off the film of digestible serum albumen.

Third—Place the milk in earthen-ware vessels in a cool place, and cover it so as to exclude dust and germs.

Fourth—For infant feeding. Add five to ten per cent of freshly prepared lime water and twenty-five per cent of boiled water. This reduces the relative amount of caseine and adds the needed lime salts and water.

Fifth—Add thirty grains of *lactose*, or sugar of milk, to each ounce, and you will have a wholesome, neutral or alkaline, sterilized food for infants, easily digestible, and one which does not allow the *bacterium lactis*, present in all milk, to turn it sour by fermentation, converting the milk sugar into lactic acid.

Supplying pure milk, of necessity means that it must be obtained from healthy animals. More than this, to produce good milk, a dairyman must not fail to supply his cows with proper and sufficient food. Too many cows are being fed on the slops and swill of breweries and distilleries, with the result that "swill milk" is unfit for human consumption. In order that cows may furnish pure, rich milk, they should be kept under the best hygienic conditions; they should have pure water to drink, a pasture to exercise in, good grass in the Summer, and good, clean bright hay in the Winter, with a small quantity of meal—salted—every day. They should have a good, clean, well ventilated barn to remain in at

Milk.

night. Cows should not be too old, nor should they be allowed to be "swilled" for two or three years without having a calf. The cow's teats should be washed with warm water before milking, and not, as I have seen it done, wash them in the milk that is used for sale. Every precaution should be taken to keep them free from pimples and sores. All this means scrupulous and intelligent care and cleanliness in all the details that enter into the process to which the milk is subjected from the moment it is obtained from the cow until it is delivered to the consumer. It requires more care and cleanliness, it is feared, than can be obtained from the spontaneous volition of dairymen, but it is of vital importance to have pure milk, and the milk inspector should cooperate in this matter by insisting upon cleanliness in every detail. If the price of milk is not sufficient, then have it raised. Milk should be kept in a dark, cool place, and in *earthenware* vessels. Tin pans affect the milk unpleasantly; they increase its fermentative changes, the salts acting on the tin. All milk should be delivered to the consumer as rapidly as possible after it is taken from the cow.

Recent bacteriological investigations by the New York Board of Health have demonstrated that the tuberculous cows may spread the disease through the medium of milk. Experiments were made on guinea-pigs, with some of the "gilt-edge" milk from Adams' farm at Scarsdale. The animals rapidly developed tuberculosis and died. Twelve of the suspected cows were killed, and every one of them was found to be tuberculous.

It has further been shown that about three per cent of cows are tuberculous.* When a patient gets ill, his resisting powers are below normal. One of the first things he is given is milk. Now, it appears to me that with consumptives flocking to our balmy shores, and with five per cent of our cows tuberculous, we can easily understand why tuberculosis spreads so rapidly, and why the disease is on the increase. M. Miguel gives a very interesting resume of his observations of the number of microbes present in milk. He found that one cubic centimetre of milk—about sixteen drops—on arriving at his laboratory only two hours after it had been taken from the cow, contained nine thousand bacteria. In one hour more the number had increased to thirty-one thousand seven

*Sternberg.

Milk.

hundred and fifty, whilst in twenty-five hours' time the number had reached five million in each cubic centimetre.*

Prof. Bang, of Copenhagen, in his experiments on bacilli of tuberculosis, reports that the bacilli found in milk, cream and butter, are not destroyed by "scalding" at a temperature of 150° F., nor even at 176° F.

I therefore strongly recommend boiling of all milk as soon as it enters the consumer's house. The idea that it becomes more indigestible from decomposition of its salts, or from changes in its caseine, or changes in its cream, is *fallacious*; it is from the *serum albumen*, which if skimmed off, renders the milk just as digestible as before boiling, beside having the surety that all disease-breeding germs and accidental pollution have been rendered inert.

Aside from the grave diseases which result directly from the transmissibility of germs from the cow, milk is deplorably and dangerously adulterated. The most frequent adulterant found in milk is water, and here lies a danger of considerable magnitude. Water in cow yards and about dairies is not always of the purest kind; it is often well water or pond water, and is frequently contaminated. Many epidemics of infectious diseases that I could name have been caused by water contaminating the milk, either by the washing of the cans in impure water, or by willful adulteration for the purpose of increasing the "stock in trade."

The diseases from which cows suffer, that are communicable to man, are: Tuberculosis, splenic fever (anthrax), scarlet fever, foot and mouth disease (eczema epizootica), the "trembles," and other diseases of cows fed upon poisonous weeds, wild onions or poison oak. This latter produces great gastro-intestinal irritation, swollen tongue and fauces, great prostration, and frequent deaths. All cows suspected of having any of these diseases should be isolated at once, and examined by a veterinary surgeon, and if found to be suffering from disease the cows should be instantly killed and their carcasses buried. Milk is so universal and so essential an article of food that no means should be spared to insure and maintain its purity. Next to water it is undoubtedly one of the most common carriers of contagium. Countless are the epidemics of disease that owe their origin to infection transmitted by milk; and who can estimate the thousands upon thousands of lives that have been sacrificed?

*Journal of the Royal Microscopical Society.

Milk.

I look upon the cow as the direct agent in spreading of consumption, and milk as one of the most potent agencies in spreading most infectious diseases.

At the meeting of the Iowa Public Health Association, held in Des Moines in August, 1893, a paper was presented by State Dairy Commissioner A. C. Tupper upon "The New Milk Law and its Operation," from which extracts are here made:

"The new milk law should interest every practitioner in medicine the world over. Thousands of infants die annually in our large cities simply because they are fed on milk procured from milk dealers—milk lacking the life-sustaining qualities it had when drawn from the cow. The cream, or part of it, is skimmed from the milk before delivery to the customer. So long as cream is worth five or six times as much as new milk unprincipled dealers will skim the milk unless watched.

"Medical authority relates that two-thirds of the infant population is raised on cow's milk, and that all children drink more or less of it. We can raise a good calf on skimmed milk by adding enough oil meal to make up the loss of the butter fat. A baby cannot be raised that way. When the fat is taken from the cow's milk it loses its similarity to the child's mother's milk.

"While the loss of life traced to milk has been frightful and appalling, it is only of recent date that laws have been enacted to protect the consumers of milk from the wiles of the enemy.

"So far as the milk supply of cities is concerned, it makes no difference whether a part of the cream is taken off by the milk men or the cow gives thin milk. A babe will not thrive on milk containing only three per cent butter fat. The proportion is wrong in the constituent parts of the milk.

The Twenty-fourth General Assembly enacted a law fixing a standard of milk and defining the duties and powers of the State Dairy Commissioner. Under this statute milk is required to contain not less than three per cent butter fat. It also provides for the appointment of inspectors whose duty it should be to inspect all milk sold for food purposes, and in cities of not less than ten thousand population milk sold by milk peddlers is to be regularly inspected. The law applies to creameries as well. It is the duty of the Commissioner to see that milk is clean; that cans used shall be absolutely free from all dirt or impurities. Cans not properly

Milk.

clean breed bacteria which quickly cause the milk to ferment and become rancid. The efficiency of the law depends upon the honesty and competency of the agents employed by the Commissioner. The difficult thing for them is to obtain a fair sample of milk from the dealer, as most of them prefer to have tested their richest milk instead of allowing the agent to make his own selection.

Milkmen neglect to stir their milk, which, if done thoroughly, would prevent the cream from rising. If the cream is thick and the can full, only a thorough stirring will avoid the giving to the first customer served the cream.

The people in the cities where the law operates, have rendered valuable assistance in securing competent agents, and under operation of the service the quality of the milk sold has greatly improved, and in every city the milk now sold rarely falls below three and one-half per cent, and I am satisfied the babies are being fed on pure milk.

Prior to this law, milk was purchased by creameries by weight. The cow giving the most milk was the premium cow. Scientific investigation having demonstrated that the value of milk was in the butter fat it contained, the rule has been changed, and milk is now purchased according to relative value in butter fat.

The milk tests made in cities are kept of record and published in the city papers, which is an incentive to dealers to sustain the quality of the milk they sell."

The Iowa milk inspection has not been in operation a sufficient length of time to furnish facts warranting a conclusion as to its effect upon infant mortality. In Cincinnati in 1892, a vigorous crusade was carried on against milk dealers, and every possible effort made to secure pure milk. The result was that the mortality among children under five years of age from gastro-intestinal diseases was fifty-eight per cent less than the previous year, though the climatic conditions were more unfavorable.

The standard of milk in this State is too low. The cow that will not produce milk containing more than three and one half per cent butter fat is a poor machine, and not worth a place in a dairy.

Fraud in Butter Making.

FRAUD IN BUTTER MAKING.

In spite of warnings by the public press, dairy commissions and agricultural experiment stations, the country is being flooded with nostrums for making butter which is not butter, but a mixture of butter fat with water, casein, milk, sugar and other constituents of milk. Such a product soon suffers a separation of its constituents, and is exposed to the decay of its nitrogenous components, and a speedy rancidity of its fatty ingredients. The magnitude of these fraudulent practices, and the extent to which they have spread throughout the country, have been revealed in quite a startling manner by replies to a circular asking for information on this subject sent to boards of health, members of dairy and pharmaceutical associations, and city officers throughout the country.

The numerous replies to this circular were referred to Mr. A. J. Wedderburn, special agent of the department of agriculture, chemical division, at Washington, for the investigation of the general aspects of food adulteration. As a result of his study Mr. Wedderburn prepared the following report.

REPORT OF A. J. WEDDERBURN ON BLACK PEPSIN IN BUTTER-MAKING.

The investigation recently undertaken of the extent and character of food and drug adulteration has revealed two new and extensive frauds, and feeling that I have secured evidence enough from reliable sources to justify the publication of the results of the inquiry, I submit the accompanying advance report and take the liberty of suggesting that the same be at once given to the public to offset so far as possible the ill effects of the proposed expenditure of one hundred and twenty-five thousand dollars in advertising the articles prepared by the firm offering these goods for consumption by the people.

Circulars issued by the Division of Chemistry of the United States Department of Agriculture, April 20th, making inquiries as to the "extent and character of food and drug adulteration," have already

Fraud in Butter Making.

brought replies from nearly every section of the country, many of which give trustworthy information concerning the various adulterations practiced and evincing a strong interest in the subject on the part of the writers.

The query as to what was known about "black pepsin in (so-called) butter-making," has brought forth more replies than any other, and the information obtained is so reliable in its character and of such importance that it is deemed proper to present without delay the following statement:

- (1). Of over two thousand five hundred letters received from all parts of the United States only two endorse the use of black pepsin.
- (2). While many of the replies state that nothing is known of the article, numerous correspondents say they have had inquiries for it. A large number have it in stock and are selling it. A majority unite in pronouncing it a fraud, and one writer says he has written to the manufacturer that if any more of his printed matter is sent to him he will forward it to the postal authorities to ascertain whether the sender is not liable for prosecution for using the mails for fraudulent purposes.

A reputable chemist sends an analysis of the butter made with this solidifying adjunct, and it shows only sixty-three per cent of butter fat. Butter should not contain less than eighty-five per cent.

The advertisement above alluded to is printed on a postal card, and states that one hundred and twenty-five thousand dollars will be spent this season in advertising black pepsin and two other articles, one of which is a preservative powder for fruits and vegetables, and, as the correspondent states, nothing more or less than salicylic acid, an article which in unskilled hands is most dangerous to health and life. The black pepsin is retailed at two dollars and fifty cents a box of two ounces and wholesaled at two dollars. The preservative powder is sold at retail for one dollar and twenty-five cents a box and wholesaled for ten dollars per dozen. For obvious reasons the name and address of the vender are withheld.

An analysis of the so-called "black pepsin" made for the *Evening News*, Detroit, Mich., and published in that paper April 1, 1893, shows the following result:

	Per cent.
Salt.....	83
Annatto.....	15
Rennet and organic matter.....	2

Fraud in Butter Making.

The value of the two ounce box sold at retail for two dollars and fifty cents is about three cents.

Extensive advertising is undoubtedly creating a large inquiry for these products, though their sale and use are fraudulent. The milk solids are curdled and the sugar and casein "turned to butter," as the advertiser expresses it. The use of black pepsin certainly violates the spirit if not the letter of the oleomargarine law, and dairy-men who insist that oleomargarine and other imitations of butter shall be properly branded, of necessity must oppose the use of any chemical that certainly perpetrates as great a fraud on honest butter as any other imitation.

There are several other preparations sold in this country and Canada, which have not yet been fully investigated. Believing that these products are being advertised by the press, sold and used from ignorance of their true character and value, it is deemed proper to submit this statement in advance of the regular bulletin, which is now in process of preparation and can not be completed for some months to come.

It seems strange that such a palpable fraud should continue to be practiced after its repeated exposures by this department, and by leading agricultural papers.

METHODS OF ADVERTISING BLACK PEPSIN.

In respect of the method of advertising black pepsin, the direct way of sending postal cards and circulars to the farmers seems to be the one chiefly followed.

A vigorous attempt has also been made to interest the druggists of the country in the sale of this article, as well as others of similar character. Following is a copy of a postal card which has presumably been sent to the drug trade in general. It was addressed to Otto Bauchfuss & Co., Cincinnati, Ohio. The card was mailed at New Concord, Ohio, April, 1893:

PRICES FOR 1893.

We will expend in 1893 \$125,000 advertising these three specialties. Place these on your lists, as you will certainly receive orders.

Black Pepsin.—A powder prepared expressly for increasing the yield of butter and cheese. Each box will make five hundred pounds of butter. Retail \$2.50 per box, \$24 per dozen. Ten per cent off to wholesale and jobbing trade. Three per cent off for cash in ten days.

Fraud in Butter Making.

Electrofied Silver.—A metal for plating articles usually plated with silver. Can be used without any battery and requires no experience to apply it. You can plate a dozen spoons in fifteen minutes, and guarantee them for ten years. Each package will do \$350 worth of plating. Retail price, \$7.50 per package, \$75 per dozen. Ten per cent off to wholesale and jobbing trade. Three per cent off for cash in ten days.

Compound Extract of Salyx.—A powder for preserving fruits and vegetables. Each box preserves twenty-five gallons of fruit. Retail at \$1.25 per box; \$10 per dozen. Ten per cent off to the wholesale and jobbing trade. Three off for cash in ten days.

U. S. SALYX CO.
Sole Proprietors.

New Concord, Ohio.

The electrofied silver mentioned in the above card is some mercurial amalgam, and is a striking example of how freely in this country the vender of poisonous articles is allowed to bring them to the notice of the trade. "The compound extract of Salyx" is the gorgeous title under which the modest salicylic acid is made to masquerade.

The "Gilt Edge Butter Compound" sent out by the Planet Manufacturing Co. of Wachita, Kansas, is also a pepsin compound.

WHAT IS BLACK PEPSIN?

So complete is the fraudulent nature of this material that it has been doubted by some eminent chemists whether the supposed active material in it is of any value whatever. This phase of the case is thoroughly set forth in the following extract from a letter received from Prof. H. A. Weber, of Columbus, Ohio:

* * * Black pepsin is made and sold by a man named Bane, under the style of "U. S. Salyx Co., New Concord, Ohio." According to Prof. Kedzie, it consists of salt and coloring matter. It is sold for making two pounds of butter out of one pound of milk. It is also claimed to be patented, and county rights are being sold in this State. But as the assignments which have come to my notice do not even contain the number of a patent, it is reasonable to assume that this claim is not true. Many people have been induced to buy the fraud, in hope of making money out of it. Numerous inquiries have come to the office of our dairy and food commission as to whether this butter could be sold under our laws as unadulterated. But as it is one-half butter and one-half milk, it could of course not be allowed to be sold.

Fraud in Butter Making.

It is true that a pound of soft butter and a pound of milk slightly warmed, churned, or shaken together will unite to a solid mass weighing two pounds. But the black pepsin plays no part in this operation, as it can be accomplished just as well without it as with it.

About three years ago a party in Marion, Ohio, sold a preparation of this kind for the same purpose for \$1 a box, containing about an ounce of a powder. He sent the powder through the mail to purchasers all over the country. A postal detective sent me a box for analysis. It consisted of alum, bicarbonate of soda, and tumeric. The circular accompanying the box gave instructions for making butter out of equal parts of butter and milk, and for two pounds it was only necessary to add of the powder what would be held on the point of a penknife. I told the detective that the powder was a fraud, as the same thing could be accomplished without the addition of the powder. The party was arrested, tried before the United States court at Toledo, Ohio, convicted and sent to the penitentiary for using the mail for fraudulent purposes. This black pepsin is just as great a fraud.

If you wish to make an experiment, put a pound of soft butter into a wide-necked bottle, add a pint of luke warm milk and shake for a moment, and you will see how readily the milk and butter will emulsify. * * *

From our correspondents we learn that many other nostrums are in use beside those which we have mentioned in this report, and the analyses of which follow. All of these preparations make the same claim for increasing the yield of butter. Among others, one correspondent says that a mixture of alum, pepsin, and yolk of egg has been employed, which with one pound of butter and one quart of milk will make two pounds of richly colored butter.

BUTTER MADE WITH THE COMPOUND.

It is not probable that butter made in any of the ways mentioned or by any of the means employed can secure a permanent hold in the market. Its tendency to separation, decomposition, and rancidity would be so great as to condemn it for general use. Nevertheless such butters are found in our markets, as the following letters from Dr. Henry Leffmann, 715 Walnut street, Philadelphia, will show:

I send you by this mail a small sample of butter, such as is

Fraud in Butter Making.

occasionally sold in this city, principally in the district most occupied by very poor people; in fact, the "slum" district. This butter, when first bought, is pale and spongy. The sample has dried somewhat, but when I first got it it contained approximately forty per cent of water. Several samples were brought in, and I am not sure that the portion I send you is from that which I analyzed, but they are evidently of the same general origin. I do not know how the butter is prepared, but it is sold at about half the price per pound lump that ordinary butter brings. In samples purchased about a year ago I failed to find any fat other than butter fat, but I have not tested the recent samples for this determination. I send the sample to you, because it may be of some interest as one of the adulterations of dairy products, and I will be pleased to learn of safe arrival.

The sample of butter gave on analysis the following data:

	<i>Per Cent.</i>
Water.....	31.93
Fat.....	67.30
Curd.....	.63
Ash (salt).....	.15

The butter fat contained 4.5% per cent volatile acids and gave a Reichert number of 27.5%. It was, therefore, pure butter fat. The remarkable features of this butter are its excessive water content and its extremely low percentage of curd and salt. It appears to have been made originally by emulsifying a fair quality of butter with a large quantity of water. It could not have been emulsified with milk on account of the low content of curd.

Mr. H. J. Fish, superintendent of the Producers' Dairy Company, 324 B street, southwest, Washington, D. C., brought to me a sample of genuine butter, together with a sample of artificial butter, prepared by taking equal parts, by weight, of the genuine butter and milk and churning them together with the addition of a small quantity of the substance known as "gilt edge butter compound," from the Planet Manufacturing Company, of Wichita, Kansas. The directions for the use of this compound are to take a pint of fresh, unskimmed milk and as much of the compound as you can heap on a silver ten-cent piece, and thoroughly mix the compound and milk together in the churn with as much salt as is necessary to salt one pound of butter. Add to this one pound of

Fraud in Butter Making.

soft butter, and churn until the whole mass has come to butter, when you will have two pounds of butter and no milk. It is directed that the genuine butter should not be melted but made very soft and pliable, so that the churn-dasher will easily go through it. The milk should be warmed to the temperature at which it is taken from the cow. The churn should always be scalded or warmed sufficiently to prevent chilling the milk, plenty of salt added, and butter color, if used, before churning. It is particularly enjoined that the butter should not be worked, but should be made into rolls and put into jars and set away in a cool place to harden.

The sample of genuine dairy butter which was furnished with the compound was found to contain:

	<i>Per cent.</i>
Water.....	15.92
Butter fat.....	80.53
Ash.....	.38
Curd and undetermined.....	3.17

This represents a fair sample of butter, with the exception that the water and curd are a little higher than the average. In the premium butters obtained at the Chicago Dairy Show in 1889, the percentage of moisture varied in ten samples from 8½% per cent to 11½% per cent.

The artificial butter prepared from the above by the Producers' Dairy Company was subjected to analysis, and the following numbers were obtained:

	<i>Per cent.</i>
Water.....	49.55
Butter fat.....	45.45
Ash.....	1.34
Curd and undetermined.....	3.66

It would appear from the above that the artificial butter had been made by churning the pure butter with a very dilute milk.

The compound was also submitted to a practical test in the laboratory of this department, and it was found that with one pound of butter, one pint of milk, and about one gram of the butter compound, two pounds of material could easily be made which resembled very closely a first-class article of butter, except that it was considerably softer.

Fraud in Butter Making.

It was at once suspected that the compound contained some emulsifying substance, either of a mineral nature or some organic ferment. On subjecting the butter compound to analysis it was found to contain 70½% per cent of anhydrous sodium sulphate and 29½% per cent of organic matter. This organic matter responded perfectly to the test for pepsin, and part of it was undoubtedly pepsin; whether a pure pepsin or a crude form was not determined.

A simple test can be easily applied by anyone to distinguish one of these so-called butters from the genuine article. On melting a genuine article of butter the amount of water which will separate on the top of the melted mass is very small and should not exceed twelve per cent in volume of the whole material. By placing a little of the suspected butter in an ordinary test tube and melting it at a gentle temperature and comparing the same with a sample of genuine butter the difference in the amount of the material not butter fat will at once be noticed. In the adulterated article almost half of the whole volume will be a mixture of water, curd and other materials, while with the genuine article of butter the fat will separate in a clear, limpid mass, and a small amount of water and a little curd only will appear at the top. It is not difficult for any person, no matter how unskilled in manipulation, to distinguish the fraudulent from the genuine butter by the test described.

From numerous inquiries which have come to the State Board of Health, regarding the use of "Salix Compound" for preserving fruit, it is evident such a compound of which salicylic acid is the base is being sold throughout this State. Of this preparation mention is made in another place in this report.

Water and Ice.

WATER AND ICE.

When it is considered that the body of a man weighing one hundred and fifty-four pounds contains ninety-six pounds of water; or in other words, that nearly three-fourths of the human body is composed of water the necessity and importance of pure water to secure good health becomes apparent. To protect against the use of polluted and impure water is one of the great objects of sanitary science. It may safely be asserted that bad water kills more people than are killed by whiskey.

Water is easily and very widely polluted by contaminated soil. Springs and wells may be supplied with water pure in the source, from streams and hillsides, but they readily become contaminated from habitations, stables and animals through the surrounding soil. The falling rain carries the pollution into the soil to percolate into the spring or well, even for a long distance. The deeper the well, the more liable it is to contamination. Nearly all wells in Iowa are what is known as surface wells—that is, they are supplied with water that comes from the surface of the soil. They are, therefore, all of them more or less suspicious, and especially in seasons of extended drouth. Even artesian, or deep wells, are not exempt from contamination. In New York, in 1891, all artesian wells were ordered closed because of contamination.

One of the most notable examples of the result of impure water is found in typhoid fever, which prevails more or less wherever the water is polluted.

There are those who, for the drainage of barnyards, cellars, etc., bore holes into the earth, not realizing that they may thus contaminate not only their own wells but of the entire community. An instance is known where a man bored a hole down through the clay, in which to drain the house slops. The result was the pollution of his well and surrounding soil, so that he was compelled to go a long distance to get water. It has been demonstrated almost

Water and Ice.

to a certainty that the water supply of the city of Jacksonville, Florida, has its source in the State of Georgia.

A valuable and pertinent brochure upon drinking water, and its relation to health and disease, is that written by the eminent sanitarian, Dr. T. Mitchell Prudden, of New York, and published by G. P. Putnam's Sons, by whose generous courtesy the illustrations and liberal quotations are here given:

"We have to consider the earth as having 1. A rock surface, for the most part impervious to water, save here and there where it finds its way into caverns or fissures;

2. Outside of this, a soil surface which corresponds in a general way with the rock surface. This porous envelope of loam, sand or gravel, is frequently interrupted by layers of clay also impervious to water, and which often forms bowl-like shelves. Layers of rock are frequently interspersed with porous-soil layers, and all often slope in varying directions. These form the great land reservoirs of water. The soil layers over the earth's surface were largely deposited under the influence of water which formed in great seas and lakes, and we can get little idea of the hollows and jagged projections and uneven surfaces of the rock below.

Some idea may be obtained of what is known as ground water, from Fig. 1 which represents a section of the ground and underlying rock. The water is indicated by the blue color. Here is the primitive rock into which water does not soak. The rock has been eroded or torn away above leaving various depressions. The whole region has at some time been under water, for it is covered with rock detritus deposited in layers of gravel, sand and loam. In the central portion is a thin, basin-like clay bed over the gravel. Through the valley runs a river away from the observer. Water falling in rain, on the hills at the right will, after filling the hollows and subterranean lakes there, run down the sloping rock surface, as slowly flowing ground water into the gravel beds in the valley. Rain in the region of the village, may be in part carried off by the river, and part soak into the sand and gather in a body on the impervious clay bed forming a reservoir of ground water above the larger water mass below.

In the little valley at the right, at one point the water comes to the surface, thus forming a spring, the overflow from which runs on to the lower level. Inhabitants of the village have three sources of

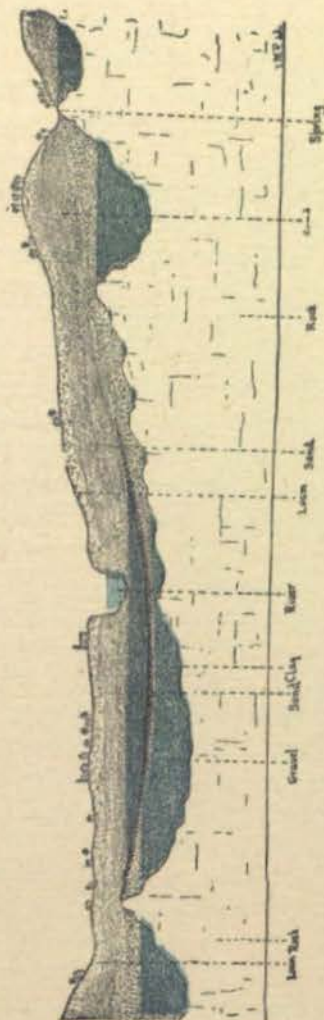
Water and Ice.

FIG. 1. A SECTION OF ROCK AND SOIL, SHOWING GROUND WATER. THE WATER IS INDICATED BY THE BLUE COLOR. THREE SOURCES OF WATER SUPPLY ARE SHOWN.

Water and Ice.

water supply: the spring, wells, and by piping from the spring. Each could get water by digging a well, except he who lived over the mass of rock which rises sharply above the water line to the left of the middle of the picture. Though some would have to dig deeper than others, all could reach the large reservoir fed from the adjacent hills. Those living over the clay bed would have shallow wells, into which drainage from the house and stables could readily pass.

In so-called artesian wells from which water gushes out, the ground is held between two impervious strata, under pressure from water on the sides as shown in Fig. 2. Sometimes the water comes into this reservoir from miles away. This is the case in the city of Memphis where the supply for an artesian well is forty to sixty miles distant. It can be readily seen from this description that even deep wells may be contaminated by surface drainage a long distance away.

The movement of ground water is an average of one foot an hour, depending on the porosity of the soil.

It frequently happens where a river bed and its banks have been so packed with silt as to prevent soaking, the ground water

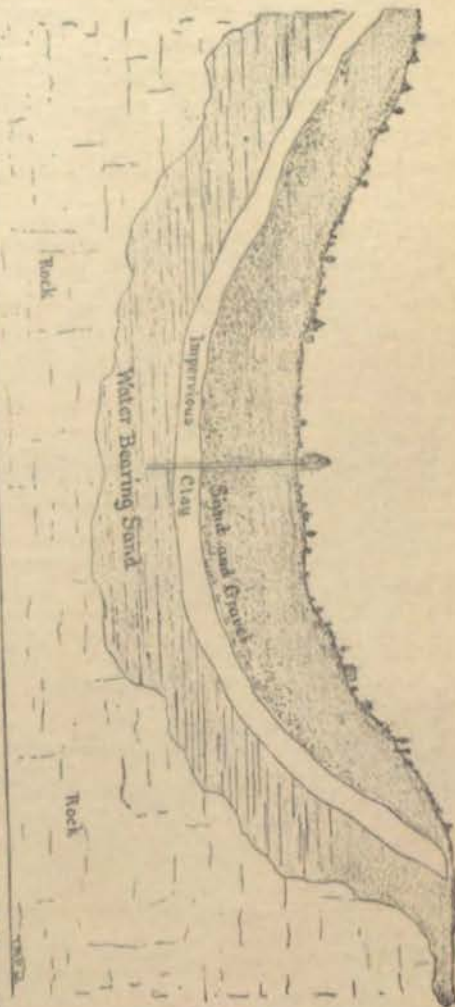


Fig 2. AN ARTESIAN WELL.

Water and Ice.

underneath may be flowing in an opposite direction to the course of the river.

Spring water is exposed to the same contaminating and purifying agencies as other ground water.

Wherever there are human habitations with their multitudinous forms of waste, all pouring filth into the soil, the ground water becomes contaminated not only with organic matter, but often with

bacteria. Such contaminated ground water may and sometimes does gush out in springs. Hence, a careful inspection of the surroundings of a spring, and the probable source of the water supply should be had. Springs are also exposed to surface contaminations.

The universal source of water supply for habitations is the well. A hole is dug in the ground, most convenient to the house, barn and other out-houses. When water is reached the sides of the hole are walled with brick or stone, a platform is laid and a curb with some sort of hoisting apparatus is placed around the opening. A more modern method is to drive an iron tube with a solid point into the earth until water is reached. The lower portion of the tube is perforated to admit the

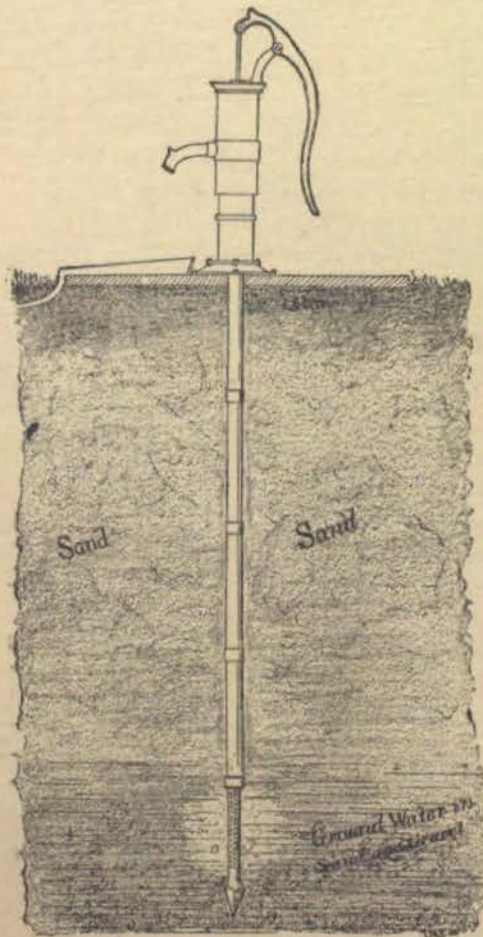


Fig. 3. A DRIVEN WELL.

ground water. These are called driven wells. (See Fig. 3.)

Water and Ice.

All forms of wells are simply means of draining the ground water into open spaces from which it may be raised. The purity of the water depends upon several things:

First. If the cesspools, out-houses, barns are so situated that a proper filtration of the polluted surface water from them is not secured before reaching the ground-water reservoir the water will not be wholesome.

Second. The ground water at the bottom of the well may be pure, but there may be in course of time channels of communication between the surface of the ground, so that instead of being filtered at all, it flows in at the sides between the stones at the upper part of the well.

Third. Soiled water is also poured on the ground near the mouth of the well, and in rainy weather the soil for some distance from the well becomes permeated with filth which may be carried into the well.

In digging a well a few precautions are suggested:

1. Wells should not be dug where there is an unusual contamination of the soil with human or animal waste.

2. The surface of the ground for a few feet about the top of the well should be raised some inches above the general level, and should slope away from the well, and be covered with water-tight cement, or brick or stone laid in cement, so that water from the surface cannot pass directly into the well at or near its mouth. There should be a separate drain to carry off the waste water.

3. The lining of the well, whether brick or stone, should be cemented water-tight on all sides from top to bottom, so

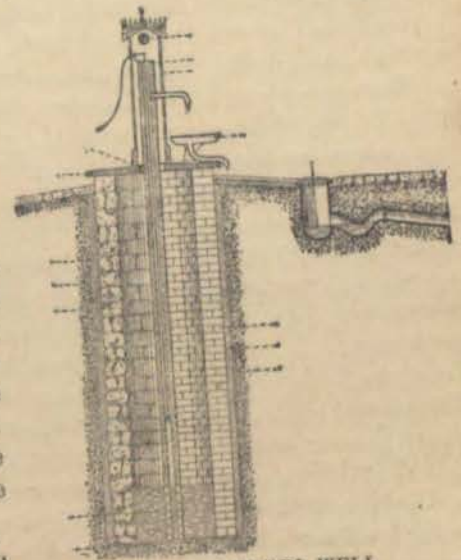


Fig. 4. A MODEL WELL.

Water and Ice.

that all water entering the well shall pass through the soil. A well should not be curbed or lined with wood.

4. The mouth of the well should be covered tight, to prevent contaminating substances falling in the water, and for this reason it is better, when possible, to use a pump, than a bucket for drawing water. (See Fig. 4.)

5. The throwing of dirty water or foul material on the earth or into pits near the well should call for such discipline, or censure, as will prevent a repetition.

Whatever may be the concensus of opinion of investigators, relative to the germs of other diseases, it is admitted and accepted, that two can cause disease, and principally through water. These are the bacteria of Asiatic cholera and typhoid fever. Of the first there is little fear in this State. As it has been thoroughly demonstrated that there can be no typhoid fever without this typhoid germ, and as typhoid fever is largely prevalent throughout the State the purity of water for potable use becomes an important matter with all people. So far as is known the typhoid bacillus is found nowhere in nature except in the bodies of persons ill with typhoid fever, or in the waste material from such persons, which may get on articles of food or into water.

The supply of water from a well is dependent on the extent and permanence of the ground-water supply of the region. Some wells reach a point where water is always abundant, while others are dependent on the underground stream slowly working its way through the soil to a lower level. Such wells are simply deep-lying cisterns, which catch the ground water flowing over them, and dry up when this ceases. Such a well is shown in Fig. 5. The ground-water here does not form a collection, but flows slowly along the rock surface from right to left through the gravel, and a portion of it is caught in the pit dug in the rock at the bottom of the well. The picture shows also, that the well-curb, which is at a higher level than the near sources of contamination, does not necessarily indicate that the water is pure. There are in Iowa many such wells.

Continued drawing water from a well lowers the surrounding water level for a long distance, varying according to the geological formation of the soil.

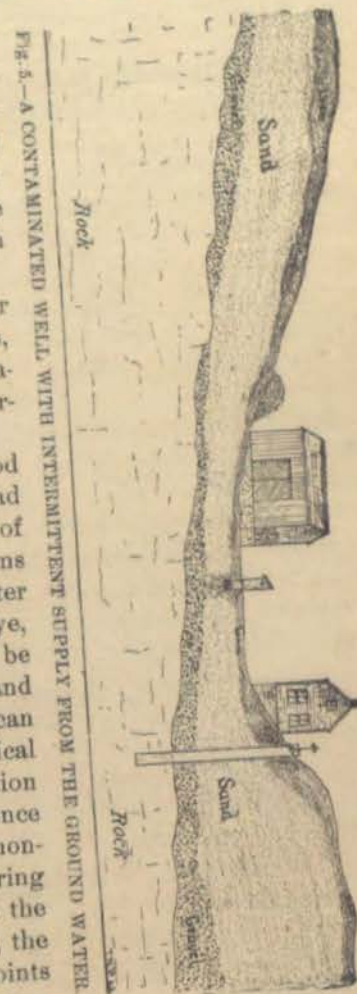
It will be seen that the direction of the flow of the ground water is an important matter in the location of a well. If cesspools,

Water and Ice.

barn-yards, and outbuildings are so near the well that fluids from them flow into the well without proper filtration through the soil; or if the waste and slops from the house are thrown near the opening of the well without proper protection, you may thank an overruling Providence that among all the myriads of filthy and filth-breeding germs which have been swarming into the well for years, none of the particular form have come which cause typhoid fever.

It is impossible to decide how far distant a well should be from stables, etc., as will be seen by the illustrations given. Each case must be determined upon the conditions present.

It should be distinctly understood that clearness and absence of bad taste do not signify the purity of water. Millions of harmless germs may be present in a glass of water without detection to the naked eye, and the most palatable water may be the most dangerous. The purity and safety of water for potable use can only be determined by a chemical analysis. The intimate connection between bad water and the prevalence of typhoid fever has been demonstrated in a most striking way during the past two years in Chicago. In the year ending September 30, 1892, the water supply came largely from points in the lake not far from the shore, where it was liable to sewerage pollution, and there were one thousand seven hundred and ninety deaths from typhoid fever. During most of the year ending September 30, 1893, the water used came through a tunnel extending four miles into the lake, and the deaths from typhoid fever sank to only seven hundred and



Water and Ice.

twelve In 1890, prior to the completion of the outer crib, the death rate from typhoid fever was 18.6 per one thousand. In Detroit for 1890, the death rate from typhoid fever was but 1.6. There the city sewer is poured into a swift moving river, and is carried away, while at Chicago it is diluted, with the water supply and pumped back into the city.

The frequent recurrence of cases of typhoid fever in a family residing in Boone, suggested an investigation of the water in the well used. The well was thirty-one feet deep, walled with loose brick and fitted with an oaken bucket. It was comparatively new, had been frequently cleaned, and the surroundings were favorable. But thorough investigation disclosed the fact that several years ago an old stable, all traces of which had disappeared, stood on the site of the well. A sample of the water was sent to Prof. Davis, chemist of the State Board, who found it greatly polluted with animal matter. Subsequent examination of the water with the microscope, disclosed typhoid bacillus, spirillum, animal matter and fungi, thus confirming the analysis, and establishing pollution of the well by soil saturation from the old stable.

The fearful scourge at Plymouth, Pennsylvania, whereby several hundred lives were lost, and over one thousand persons were prostrated with typhoid fever, originated in this way: A man during February, or the latter part of the Winter, had typhoid fever. The discharges, without being disinfected, were thrown out upon the ground on the hill-side. In March there came a thaw and showers of rain, and the snow melting and carrying with it these discharges laden with typhoid disease germs, found its way into one of two or three reservoirs that supplied the town with water. As a result in a short time many of those using the water from this particular reservoir were smitten down with typhoid fever. The disease was so malignant and so general in the portion of the city supplied by this water source that a panic arose, and the most rigid and painstaking measures were resorted to to find the cause of the disease. It was traced conclusively to water contamination, and generally conceded, if not demonstrated, to have its origin in the case of typhoid fever referred to.

Water and Ice.

Mr. Childs, health officer for a certain district in Oxfordshire, England, reports a striking instance of contaminating wells from a source above their level. He says:

"In consequence of the escape of the contents of a barrel of kerosene, which had been buried in an orchard, a circuit of wells two hundred and fifty and three hundred yards distant became so affected the occupiers of fifteen houses, containing eighty-two inhabitants, were for ten days unable to use the water for drinking or cooking. Cattle refused to drink at the spring where they were accustomed to drink. Had this soakage been sewage instead of kerosene who can doubt the result might have been wholesale water-poisoning and an outbreak of typhoid fever."

In Kalamazoo county, Michigan, a site was selected for a cemetery. A neighboring lot owner objected on the ground that soakage from it would contaminate his well, thirty rods distant. To test the matter a chemist deposited lithium in the soil at the proposed cemetery site. Eighteen days after lithium was found in the water of the well, thus proving beyond question that the well would have been polluted by the poisons from decaying bodies in the cemetery.

In the city of Adrian, Michigan, was a school on the grounds of which was a well. There was also a basin, into which was thrown the slops, and which connected with a long drain. A pupil was sick with typhoid fever; some of the slops from this patient was thrown into the basin. Soon after fifty pupils were attacked with typhoid fever, and the cause was traced to typhoid germs in the water in the well, which had percolated through the soil from this drain pipe.

A well known citizen of Le Mars writes that prior to putting in water works in that city, he paid many dollars to physicians who treated his wife and family for malarial diseases, caused by using contaminated well water. His water rent is now forty-four cents per month, and his doctor's bills *nil*.

At Hartford, Conn., in November and December occurred a serious outbreak of typhoid fever in a section of the city supplied with water from the river. The cause was traced to typhoid germs carried down the river from Springfield, twenty-five miles above.

One of the most serious menaces to the health of a community is a cemetery contiguous thereto, especially if the soil be light and porous. No cemetery should be located within a mile of inhabited

Water and Ice.

dwelling. Bodies dead from contagious diseases of the most malignant kinds are interred therein. Typhoid fever germs may percolate through the soil a long distance. They have been thus traced more than one mile.

That there are temperature conditions favorable to the development of typhoid bacilli, is conclusively demonstrated by the history of what are called *typhoid wells*, which at certain seasons cause local outbreaks of typhoid. These are invariably shallow wells, twenty-five feet or less deep. The water temperature increases; the water gets low, the dilution of filth is lessened; there is therefore increased pollution, and temperature, absence of light, the necessary elements for the development of germs which have lain dormant, and typhoid appears.

The common belief that in freezing water purifies itself from all kinds of contamination, has been demonstrated to be untrue.

A good many of the bacteria which are found in all natural surface waters are expelled or killed when the water freezes, but as many as ten per cent, and often more, may remain alive. A large number of studies on this subject have shown that the bubbly and snowy ice is apt to contain many more bacteria than the clear ice does. These bacteria in ice have, as a rule, no influence whatsoever upon the health of the ice consumer, if the ice has been formed on bodies of water which are clear and pure. But ice which is formed on sewage-polluted or otherwise filthy water may contain disease-producing bacteria, and hence be very dangerous for domestic use.

It has thus come to be firmly established as a primary principle in sanitary science, that sewage-polluted water should not be used for domestic purposes, either in its natural state, nor in its condition as ice. No water which is unfit to drink as water is fit to use for a similar purpose as ice. Its coldness may benumb the sense of taste, so that no warning of its nature comes to the consumer. Its intrinsic clearness and beauty may put him off his guard, but all ice cut from sewage-polluted water is dangerous, and should by law be kept from the domestic market.

Ice manufactured from distilled water should, it would seem, be germ free. In fact, however, it is extremely difficult to prepare absolutely germ-free water on a large scale, and almost impossible to keep it so if once prepared, because every exposure to the

Water and Ice.

air or contact with utensils in common use brings to it varying and often large numbers of germs which can live and grow in the water. But these small numbers of common bacteria are not of the slightest importance to the salubrity of the water.

Every one should understand that of all the myriads of bacteria about us in earth and air and water, the great majority are harmless. With very few exceptions, the bacteria which can do us harm are those, and those alone, which come from the bodies of men and animals afflicted with disease. So far as water is concerned—and the same applies to ice—it is only sewage pollution or stagnant filth which we have to fear and shun. Good, pure, uncontaminated water, and ice made from such water either by nature or by man, are entirely wholesome, and they are not made more wholesome by distillation or other purifying procedure—they are not more wholesome when germ free.

In point of fact, most of the artificial ice which the writer has examined—and there have been many and abundant samples from various sources collected, and for a period of many months—do contain bacteria in varying numbers. The preliminary distillation, if carefully done, destroys any disease-producing germ forms which might be present in the water used. But a certain number of the more hardy harmless forms may be carried bodily with the steam into the condensers.

In most of the ice manufactories the distilled water is filtered through charcoal before it is run into the freezing cans, for the purpose of removing certain organic compounds which have come into the process of distillation. But these charcoal beds afford breeding places for such germs as may have escaped the ordeal of the heat. The writer has repeatedly found that while the distilled water before passing on to the filter beds, was very nearly germ free, the number was increased a thousandfold on leaving them.

So far as the salubrity of the natural as compared with the artificial ice is concerned, we may rest assured that, as regards bacteria, one is just as wholesome as the other, provided the water used is pure. If the water is impure from sewage or other unwholesome thing, then the natural ice is never fit for domestic use. If water is impure, the processes of artificial ice making, if carefully performed, are capable of furnishing even from it a product which

Water and Ice.

is harmless and wholesome, whether it be absolutely germ free or not; for absolute freedom from germs—if these are not disease-producing forms—is neither necessary nor especially desirable. It is not bacteria, but disease-producing bacteria, which make of practical significance the invisible flora of either water or ice.

Innumerable analyses have shown that water does not purge itself wholly in the act of freezing, as was formerly believed, from disease germs which may have come into it from human waste. This has been specifically and repeatedly shown to be true for that most dreaded and fatal sewage-germ, the bacillus of typhoid fever.

The processes of oxidation and sedimentation, which aforesaid was demonstrated by most exact chemical analyses to be capable of freeing water in lakes and running streams from organic compounds abundant in sewage, is still urged by belated scientists and frantic tradesmen here and there, in justification of the use of ice cut on sewage-polluted waters.

Sedimentation does remove many harmful germs from sewage-polluted waters. Dilution does diminish the chances to incur disease for every consumer. Many individuals are, at favored times, practically invulnerable to the incursions of these tiny foes. But, after all, it is safe to say that in thickly inhabited regions sewage-polluted water is not fit for men to drink without purification, no matter how fast and far the river runs, nor how wide the lake into which the sewage drains. With the size of the lake and volume of the river, the chances of harm decrease, of course, but they stay chances still where none need to be. As our country becomes more thickly settled and our cities larger, the problems involved in pure water and ice supplies are becoming more and more urgent and difficult.

The manufacture of ice and its marketing at prices which in many regions easily compete with those of the natural product have simplified this phase of the water question in the most marked way. Other things being equal, whether the householder decides to use the natural or the artificial ice will depend much upon the climate of his home and the market price of the ice. The natural ice is just as good as the artificial when it comes from pure sources. It is claimed by some that the natural ice melts more slowly than the artificial, and is in this way, other things being equal, cheaper. But similar claims are made for the artificial ice. The writer has

Water and Ice.

tested the relative rapidity of melting of the natural and the artificial ice in New York, under the greatest variety of conditions; in small pieces and in large, in the dark and in the light, in diffused light and in the sunshine, in hot places and in cool, and can find no absolute constant difference in the rapidity of melting. One seems to be just about as durable as the other.

The State Board has, for sanitary purposes, fixed the following standard of potable water:

	MAXIMUM LIMIT OF IMPURITY.	
	Parts per 1,000,000.	Grains per U. S. Gallon.
Total solids.....	600.000	35.000
Loss on ignition.....	Qualitative.	
Chlorine.....	25.000	1.4579
Free ammonia.....	.080	.0046
Albuminoid ammonia.....	.150	.0087
Nitrogen in nitrites.....	Trace.	Trace.
Nitrogen in nitrates.....	4.000	.2332

The topography of the drainage area is also to be considered.

The following is to be considered in interpreting the result of an analysis:

The total solids consist of the organic and inorganic residue of the water. Though the amount should be low there is no resulting significance of the quality of the water unless the amount be excessively high. The value of the determination of loss on ignition consists chiefly in the change of color of residue and the odor evolved in heating the solids. A deep charring indicates much organic matter, while an offensive odor is evolved from animal pollution. A large amount of chlorine is generally found in deep well waters, but where surface waters contain it in large proportions they are suspicious, as the chlorine may be derived from sewage. Water should not be condemned on account of its chlorine, unless the ammonia, nitrites and nitrates are high, and the history of the surroundings is unfavorable. Ammonia is a product of the decomposition of animal substances, and an excess of albuminoid ammonia suggests animal matter, or the mixing of sewage with the water at its source, or through soil percolation. Nitrites are the partially oxidized products of animal matter, or the partially reduced product of nitrates by decaying organic matter or by bacteria, and they should never be in potable water beyond a mere trace. Nitrates are the final products of oxidation of animal matter, and they are a measure of the past pollution of water.

Water and Ice.

WATER SUPPLIES FOR CITIES AND TOWNS.*

All natural waters contain mineral salts, some of which may be deleterious to health, but the most injurious foreign substances found in ordinary drinking water are decaying organic matter, and sometimes infectious micro-organisms.

All water that is used for domestic purposes has at some recent or remote period been atmospheric vapor, and as it fell in rains, carried with it the impurities of the air. These impurities are gases that arise from combustion, fermentation and decay, and particles of dust and decomposing organic matter. Bacteria are also removed from the air in great numbers, nearly all of which are in the stage of spores, instead of adults. The spores of fungi and other microscopic plants and the pollen of flowers and grasses are also found in rain water. So numerous are these impurities in the air, that a litre of water which falls at the beginning of a storm, often contains more than two hundred thousand micro-organisms. Half a pint of water frequently condenses out of three or four thousand cubic feet of air, and its condensation removes nearly all of the atmospheric impurities, concentrating them in the water. So in drinking a glass of rain water, that falls at the beginning of a storm, we swallow as much filth as we breathe from the air in more than a week.

If rain water is stored in cisterns without purification, these substances soon render it so foul that it cannot be used for drinking. But when rain is collected near the end of a storm, and is properly filtered and aerated, it is one of our most wholesome natural water supplies. As rain falls upon the earth it washes away the accumulation of debris from the surface of the ground, and as it passes into the soil, extracts from it a large amount of impurities, like the products of decaying vegetation and the filth and excrement of animals. These substances are carried lower into the circulating currents, and it is not infrequent that the drainage from cesspools and privies also finds a direct entrance into surface wells.

In rural districts, and in small towns, surface wells are most frequently used as a source of drinking water. These wells depend for their main supply of water upon the area immediately surrounding them. Their drainage section is similar to the contents of an

*By Prof. Floyd Davis, Ph. D., Chemist of the State Board of Health.

Water and Ice.

inverted cone, the bottom of which is the surface of the ground and the apex the bottom of the well. In porous soil the drainage area is large and the water is consequently often very impure. In compact soil the course of the ground water may be influenced by frequent pumping for several hundred feet around the well, while in loose, gravelly soil the area of inflow has been shown to have a radius of several thousand feet. By extracting enough water from such soil, currents circulate toward the center of inflow, and wash the accumulated impurities into the well. In our northern latitudes surface wells are generally situated in drift gravel, which offers but little obstruction to the passage of filth. We have sometimes seen such wells filled with water of a most disgusting nature; they were little less than receptacles for diluted excrementitious matter. Surface wells are frequently too close to dwellings, stables, cesspools, privies, and other filth accumulations. These agencies of contamination should never be within the drainage area of a well.

The abundance of filth in cities renders the soil unfit for the filtration and storage of drinking water, and surface wells in such places generally furnish the most polluted and dangerous supply. The practice of sinking wells and privy-vaults side by side on the same lot, in our smaller towns, and even in some cities, is not uncommon. They are sometimes within a rod of each other, or even closer. In one case where I examined water that produced typhoid fever, the well was within ten feet of the privy, and yet the inmates of the house had not suspected any contamination of the water. Into the shallow privy or cesspool are generally deposited all the filthy liquids from the house, while from a deeper pit, called the well, sunk below the water line, is drawn all the water that is used for drinking and domestic purposes. In such cases the contents of the privy and cesspool gradually soak away and mingle with the ground water that flows to the well, and it is not strange that such wells rarely become dry. As water is pumped from these wells it is immediately replenished from the surrounding disgusting ground water. We have had occasion to examine surface well water so polluted that under the microscope hair, epithelial cells and an abundance of excreta were observed, and yet people with pallid faces and weak constitutions were using it as if it were of crystalline purity. Our attention is frequently called to this class of wells on account of their waters being such

Water and Ice.

important factors in promoting disease. Excrementitious liquids at first are disgusting to the senses of taste and smell, but unfortunately they acquire palatability after soaking through a few feet of soil, so they are often used year after year without suspicion of their nature, until an outbreak of fever attracts public attention.

Cemeteries in some localities are also dangerous agencies for polluting water. It is well known that soil which contains decaying animal matter may contaminate ground water for a great distance, in the direction of the flowing currents. Under no circumstances then, should a cemetery be located among the dwellings of the living, nor should the drainage from it be permitted to enter a stream of water that is used for domestic purposes. The location of a cemetery should always receive careful consideration from sanitary authority, and it should not be chosen merely because it is a gift or cheap. The topography of the adjacent country, and the nature of the soil should be carefully examined with reference to drainage and water supply, that the health of the living may not be sacrificed to furnish a resting place for the dead.

Running water, on account of its agitation and exposure to air and sunlight, loses much of its organic matter or pabulum that accompanies zymotic infection; but it is doubtful whether these agencies of purification have any marked effect in removing micro-organisms. Polluted natural soil has also but little effect in removing organic matter from water, on account of the insufficiency of active oxygen in it. The investigations instituted by the National Board of Health, and by other sanitary organizations, also show that average soil has but little, if any, power to remove bacteria from water. So the contagion that may enter ground water from cesspools and privies often passes uninterrupted to water supplies, there to gain admission into the systems of unsuspecting victims.

Many contagious and infectious zymotic diseases are now known to be produced by water polluted with such decomposing animal matter as that above described, and it is highly probable that certain diseases are seldom produced in any other way. But the public are generally slow to appreciate the relation that exists between some of our most malignant diseases and the filthy surroundings, habits, food or water of the people subjected to them. Cholera and typhoid fever are typical filth diseases that are communicated

Water and Ice.

through air, food and water, and their origin is generally the result of ignorance, carelessness or superstition.

The object which should be sought in thorough purification of city water supplies is softening and clarification of the water for manufacturing and boiler use, and removal of such organic and infectious matter as may produce or even promote disease. The substances to be removed may be in suspension, such as finely divided clay, silicious and colearious matter; soluble salts of lime and magnesia, that harden water; and decaying organic matter and micro-organism. The latter are the most important substances to be removed from drinking water, since many zymotic diseases are produced by infectious germs that sometimes gain admission to it through sewage contamination.

Now will be presented some of the ways by which nature removes most of these substances from water, but a few of the chemical principles involved in artificial purification of water for city supplies are also briefly discussed.

The natural method for purifying ground water, and which we imitate in our artificial systems, is filtration. In this nature removes infectious organic matter by biological agencies, but there are certain mechanical and chemical changes which are effected by filtration alone. It may be laid down as a general rule, that nearly all natural waters may be improved by filtration, while none can be injured by the process; but whenever an artificial filter is used it should be so constructed as to be easily and frequently cleansed and aerated, that none of the impurities removed at one time may be washed into the water at another. It is estimated that the surface areas of the particles of a cubic foot of fine sand amount to many thousand square feet, and the larger the surface area the more perfect the filtration. Mechanical filtration, whether natural or artificial, assists in purification in at least three distinct ways. First, by straining, in which the efficiency of the operation depends on the fineness and nature of the sand, and the rapidity in flow of the water. White, angular, quartz sand is generally used for artificial filter-beds on account of the ease with which it can be cleansed. Owing to the rapidity in flow of water no pressure filter can strain water as thoroughly as it is done on the gravity systems. Straining is the principal way by which the solid, coagulated and entrapped impurities are removed in any filter-bed used for city supplies.

Water and Ice.

Second, by sedimentation and adhesion within the pores of the filter, and the efficiency here depends upon the size of the sand particles and the rate of filtration. Third, by oxidation and other chemical action. The accumulations on the extensive surface areas of the sand particles furnishes great opportunity for the ground air to destroy the organic accumulations; and it is evident that this is done as the oxygenated water flows slowly through the film-coated sand particles. On the other hand charcoal condenses oxygen in its pores, and destroys the organic matter of water as it passes through it, and it absorbs foul gases from the water, but it soon gives up its oxygen and loses its power of condensation unless frequently cleansed and refilled. According to Salmon and Matthews, coke owes its power of removing organic matter from water to the iron contained in it. Any filtering medium, whether natural or artificial, should be thoroughly supplied with oxygen, which element is always present in all perfect filter-beds. Without it there can be only a temporary oxidizing action in the water.

The surface soil of the earth is the great natural purifier of ground water. Here nature provides for the changing of noxious to harmless compounds in water as it passes through the first few feet of soil. When sterilized soil or sand is used for a filter medium, the water passing through for the first few days may be thoroughly clarified, but it will be only slightly improved by removal of organic matter; at first the water retains all its micro-organisms, or their number may be increased as the water passes through the filter. After a few days all this changes. The sand spaces near the surface become filled with a light bacterial slime, that not only forms a nidus for the germs to accumulate and breed in, but it soon acts as an almost perfect filter for entrapping other bacteria that are on their way through the filter—so water that passes through will under favorable conditions be almost sterilized. Some bacteria that are caught in the slime in large numbers soon die; but the great majority of the water bacteria produce this slime and in it find a paradise for their work. They live in these surroundings with the decaying organic food flowing by that they require to thrive on. They have an upward movement in the soil and tend to accumulate near the surface or in the four or five feet of surface soil. Here they slowly tear asunder the organic matter that flows downward, appropriating a portion to their own econ-

Water and Ice.

omy, while the remainder is set free for other classes to work over into new and harmless compounds. One class of bacteria transforms the nitrogen into ammonia, another class oxidizes the ammonia into nitrous and nitric acids, while another class converts the carbon into carbonic acid; and much of the organic matter is so modified as it passes into the soil that the roots of living plants absorb and assimilate it. These changes of nitrification are among the most important chemical changes in nature. The removal of harmful impurities from water in the soil therefore is primarily more of a biological than a chemical question, and in considering the natural purification of water we must ascribe to micro-organisms the rank of first importance, although some of them may be infectious. The changes which they effect in the purification of ground water are more perfect than can be effected in artificial systems of purification, and hence we must expect to find our purest water in the soil, where nature has oxidized and removed the impurities from it. For this reason we believe there is generally no source of water of sufficient extent so pure and desirable as properly selected ground-water, and no system for city supplies deserving our consideration so much as the ground-water system when the water can be secured out of range of contaminating influence. The slow and intermittent nature of filtration through the soil is an important element in the efficiency of the work. In seasons between rains the soil becomes thoroughly stored with ground-air and carbonic acid. These are sufficient to act as natural agents of aeration after the bacteria have done their work near the surface of the ground. In imitation of this, artificial aeration is frequently resorted to in water works to complete the destruction of some of the organic matter that cannot be coagulated and removed on filter-beds. So we have learned to follow nature in various ways in the great work of purifying water, and the most perfect artificial systems are those that imitate her best in this work.

In the artificial purification of water, various methods have been adopted for the removal of soluble organic matter and germs. Ferric chloral, potassium permanganate, and some other oxidizing agents have been used to destroy this organic matter, but the substances now most successfully used are coagulants for the organic matter. These entrap and remove most of the germs as they are separated from the water by proper filtration, and the water is then

Water and Ice.

improved by aëration. Alum has been in use for centuries and it and aluminum sulphate are the commonest agents now used. It is very probable that salts of alumina contained in the soil have a marked influence in coagulating organic matter and therefore in purifying water. With waters that contain considerable salts of lime, these agents act in a beautiful way. The lime is precipitated with the sulphuric acid of the alum or aluminum sulphate or gypsum, while the alumina is converted into a flocculent hydrate that coagulates and removes with it both the soluble organic matter and the bacteria. From laboratory experiments we have found it an easy matter to remove with alum more than sixty per cent of the organic matter and at least ninety-nine per cent of the bacteria from water. The amount of these coagulating substances required is generally very small, depending somewhat on the lime in solution, and ranges generally from one and one-tenth to two or three grains per gallon of water. When the amount is properly regulated, the alumina is so perfectly removed from the water that the most delicate chemical tests fail to reveal even a trace of it. Under proper management alum and aluminum sulphate can never be injurious in water, and they are the agents generally used by such leading filter companies as the American, National, Hyatt, Jewell and some others.

The removal of organic matter and germs by agitation with metallic iron, as practiced in Anderson's revolving purifiers, is also a very successful method of purification. The iron is here converted into a bicarbonate, which, when exposed to the air, oxidizes and precipitates as hydrated ferric oxide, carrying with it both the organic matter and the bacteria, which are finally removed by filtration. It should not be understood, however, that any artificial method for purifying city water supplies has ever completely removed the organic matter or all the germs. This can only be done by the slow process of distillation and sanitary filtration; and no contaminated water should be used for drinking without first being boiled or passed through a sanitary filter, to remove the infectious germs. But the processes for city supplies aim at coagulation as a primary means of removing infectious matter from water. The balance of the work depends upon filtration, which in any artificial system is little more than a mechanical process. Its

Water and Ice.

efficiency depends largely upon the filtering medium, rapidity of filtration, and the care exercised in keeping the filter thoroughly clean.

Pure water supplies is one of the most important problems with which sanitarians now have to deal, and cities and towns that have a deep sanitary and progressive public spirit at this age and day generally have water works, but some cities and many towns, especially in the East, derive their entire water supply from cisterns and wells. These private sources of water command our attention, especially on account of the possible excellence of the former, and the disease that is often produced by the latter through sewage contamination. Nearly all wells in the northern Mississippi valley are situated in drift gravel, and necessarily receive a portion of their water from the surface drainage. Such wells should not generally be used in cities and towns, for it is much easier to guard against impurities in our general water supply than against the ill effects that may arise from many hundred or thousand polluted wells. Even under the most favorable conditions, cisterns and wells do not usually furnish the convenience and comforts of modern civilization, and proper protection against fire. Water supply systems only can do this, and to meet the popular clamor for public water works, supplying an abundance of pure water, is one of the most important sanitary and engineering problems with which municipal authorities have to deal.

Aside from all sentiment and duty, the importance of pure water to a city or town may be considered from a pecuniary standpoint. All sanitarians agree that the great majority of typhoid fever cases owe their existence to polluted water, while some eminent authorities claim that this disease is transmitted only by this agent. A conservative estimate of the value of an average individual to the state is at least one thousand dollars, so when we consider that about forty thousand persons die annually in the United States from this disease, we must attribute to the typhoid infection of polluted water a loss of more than forty million dollars each year to the nation in the sacrifice of human life. Beside this there are about ten cases of typhoid fever for every death produced by it, and the four hundred thousand cases of this disease each year in our own country costs the people many million dollars more. Add to this the expense attached to the other diseases that are

Water and Ice.

transmitted by impure water, and the estimate will be swelled to enormous proportions. Every city and town having impure water should consider well these facts, and hasten the day when nearly all of its citizens can be supplied with pure water from public works.

Many towns are thoroughly awake to the importance of pure water supply, and the urgent demands for water works are shown by the large number of them recently constructed. Over one-half of the water works in New England have been constructed within the last eight years, while about thirty per cent of them have been built within three years. Nearly all the water works of the smaller western cities and towns have been constructed since 1880. While the earlier works were built only for large cities and supplied only a small proportion of the people with water, it is very gratifying to know that many towns in the West of less than one thousand inhabitants have water works, and a large proportion of our people drink pure water.

The cost of constructing water works should not be a barrier against them, even in small towns, for under good management the revenue from water tax will always pay a good rate of interest on the money invested. The recently (completed January 1, 1891) constructed works for the town of Humboldt, Iowa, will illustrate the necessary expense for one of its kind. Humboldt has a population of about one thousand and is located on the rolling prairie on the east bank of the Des Moines river. The amount of water used by the town is about sixteen thousand gallons daily, and the railroad company will eventually be furnished some twenty-five thousand gallons more. The water is taken from two springs on the bank of the river, having a combined flow of one hundred and fifty thousand gallons per minute, and is conveyed to a well sunk two feet below the river, so as to use the river water when necessary in case of fire. To furnish the required pressure, the water is pumped from this well into a reservoir of one hundred and twelve thousand gallons capacity situated in the bluff west of the town, and from this the water is distributed through the mains, which are now one hundred and sixty-five rods long. The cost of this plant, including boiler-house, engine, pumps, mains, valves, hydrants, trenching and laying pipe, reservoir, conduits, well and spring houses, engineering and contingencies was about eight thousand

Water and Ice.

dollars. The works would be a good investment for Humboldt had it cost several thousand more. Water works using spring and ground water that requires no filtering are the cheapest and generally best systems that can be used. When the required pressure can be secured directly from the springs, or from reservoirs below them, the necessary expense is very small; while purifying plants suitable for treating impure river water are generally too expensive for small towns, and the expense of purification in small plants is also frequently unsatisfactory.

There is certainly no sanitary nor industrial enterprise that insures a more rapid and solid growth of a city than an abundant public supply of pure water. In consequence of this, water supply companies are now expected to furnish thoroughly clarified and wholesome water, suitable for most manufacturing and all domestic purposes, as well as ample protection against fire. And it should be the policy of these companies to endeavor on all occasions to meet every emergency in the way of supplying pure water to their customers; and thus we find that progressive cities and towns are generally provided with excellent water works that derive their supply from the ground reservoirs, springs, rivers, lakes and ponds. As some of the sources of this water are often hard and impure, the problem of purification is sometimes well-nigh insurmountable; but by the use of chemical agents, efficient filtering systems and aerating plants, satisfactory results are generally achieved.

Having now briefly considered the impurities of water and the necessity for public water works, let us notice in conclusion the real nature of zymotic infection and the precautions that should be observed to prevent filth diseases. It is now almost universally admitted that bacteria or microbes are the indirect agents of all zymotic diseases. Such diseases as cholera, typhoid fever, diphtheria, scarlet fever, erysipelas and tubercular consumption belong to this class. These germs belong to the domain of botany and are the simplest and minutest organisms of which we have any knowledge. They inhabit nearly all kinds of matter; they are always around in the air we breathe, the food we eat, and even the purest natural waters are never free from them. The purest spring and deep-well waters generally contain from a few to several hundred per c. c. River and surface well waters generally contain from several hundred to many thousand per c. c.; while some of

Water and Ice.

communities are supplied with pure water, they not only enjoy decrease in the disease and death rate, but they also often enjoy a most surprisingly rapid increase in thrift, morality and degree of civilization.

WATER SUPPLY OF DAVENPORT MECHANICALLY FILTERED.*

The source of supply is the Mississippi river. The water is delivered into our pump-wells, through a tunnel built under the bed of the river and extending to or nearly to the channel of the river, about a mile above the government bridge, and above all contaminating sewage of the city. The water here with its current seldom less than five miles an hour, rushing swiftly over the Rock Island Rapids, evidences practically complete aëration and as mentioned before, oxidation, dilution, etc., which all tend to purification.

From our pump-wells, where the water has been carefully screened, our pumps at pumping station No. 1 deliver the water through the filters under direct pressure to the city mains, and our reservoir.

The filter plant consists of ten double filter-shells, each seven and a half feet in diameter by thirty-two feet long, built of mild homogeneous steel of sixty thousand pounds tensile strength, of seven-eighths of an inch in thickness, which stood tight under a steady proof test of two hundred pounds per square inch. The size of the filters are such that while nominally of a capacity of six million gallons per twenty-four hours, their actual capacity is over seven million five hundred thousand gallons for that time, over fifty per cent larger than any filter plant in use, and without fear of contradiction can it be said that the city of Davenport has the largest and most expensive "mechanical filter plant" on the face of the globe. There may be larger settling basins, but nowhere a larger pressure filter.

The filters are so arranged that any one of them can be operated separately or the whole battery collectively. The filters are about three-quarters full of white sand, amounting to about thirty car loads, brought from Horn Island, in the Gulf of Mexico, the peculiar nature of this sand being that each grain is of almost even texture

*From a paper read by J. P. Donahue, superintendent of the water works, before the Iowa Public Health Association, Jan. 28, 1892.

Water and Ice.

and a perfect crystal. Ordinary river or building sand being porous, would tend to make it unfit for filtering purposes. When water contains microbes, sometimes so infinitesimally small that it would require our most powerful magnifying glasses to detect them, these little disturbers might have a tendency to lodge themselves in the pores of the porous sand, there die and rot, and in a very short time the sand would become a bed productive of a variety of diseases, rather than a purity of water. For this good, sufficient, and all important reason then, is the sharp, solid and anti-porous, crystal sea sand of Horn Island necessary, and an all important factor for good filtration. This sea sand, however, is found on Long Island, and other sea islands and shores.

The water is forced by the pumps through twenty-inch feed mains into the filters, passes downward through five feet of sand, thence through a peculiar shaped screen, made of extremely fine slits sawed through cylinders of heavy, seamless tubing, made of composition metal, thence out into the mains to the city and the reservoir to the hills.

The process renders the water when taken from the river even at the highest floods, as bright, clear and sparkling as spring water.

The sediment and other matter which is removed from the water is retained for the time in the filter on the top of the sand, and to remove this quickly, and thoroughly with the highest economy and the greatest certainty, is the chief feature of the excellence in a filter plant.

The method followed by our system, during the progress of washing is in the shape of thousands of fine powerful jets, and to apply them directly at the place where the dirt accumulates, and to wash at the same time by reversing the current of water, from the bottom of the sand-bed, some five feet below the surface.

This is accomplished by supplying the water to the filter through horizontal perforated arms attached to a central vertical pipe attached to a piston, and in such a manner that by admitting the water pressure from the mains to this piston, the arms are forced downward and back through the filtering material, applying the washing jets, each three-sixteenths of an inch in diameter and under eighty pounds pressure to every grain of sand in the whole mass, throw the whole into a violent agitation, thus scouring the sand completely clean, and washing the dirt and sediment accumulating off through

Water and Ice.

a drain into the river again below the works. The thoroughness of the work, and the rapidity of the operation, are such that it requires less than five minutes to wash a filter, and the mechanism is so simple that there is scarcely any liability of it getting out of order.

Another feature, and by no means an unimportant one, is a process of sterilizing the filter sand-bed of any possible contamination from microbes, fungus or mossy growth, microscopic algæ, or of microscopic organisms belonging to that class called infusoria, albuminoids and impurities of that nature, should they be contained in our river water, but which we believe and with good reason, when taken at proper distances from its shores, is as free from these impurities as is most waters; still in the construction of this plant it was our aim to guard against any of these possibilities. Now should the water contain any of the impurities just named, and should the vicious little microbe even show resistance to our ordinary method of washing, and should it be possible for him, not finding a hiding place in the anti-porous sand, condescend to cling to the surface of our filtering sand with sufficient strength to resist the powerful water pressure when washing, then we can rid ourselves of his disagreeable presence, first by draining our filters frequently, then turning into them through pipes connected to a double battery of steam boilers, built for the purpose, powerful jets of super-heated steam, which in a remarkably short space of time render the sand-bed and our filters a very hot resting place for him. So hot do the filters become, that it will blister the painting on them, and beyond any doubt whatever, kill all animal or vegetable life therein.

One more all important thing, and the one that by its use makes mechanical filtration possible, is the coagulation and use of coagulants in the process of filtration.

By coagulation is meant the addition to the water of certain astringents (notably alum), sulphate of aluminum, or per-chloride of iron, in sufficient quantities to deprive all the sediment, no matter how great in amount, of its sticky nature, and change it into a lighter flocculent condition, whereby the same can be easily arrested by the sand-beds in the filters. Coagulation is accomplished when necessary, at Davenport, by using about three-eighths of a grain of

Water and Ice.

sulphate of aluminum per gallon of water. This ratio can be better illustrated by saying that a pound of sulphate of aluminum contains seven thousand grains. A gallon of water weighs about eight pounds. Then, if one grain was used to a gallon of water, which seldom occurs, the ratio quantity would be one and one fifty-six-thousandths part of aluminum to one part of water, and I am of the firm belief, after careful and practical tests, that from seventy to ninety per cent of the aluminum in solution, injected into the water before filtration, is absorbed by the matter in suspension forming a coagulated mass on the sand-bed, and washed out with the cleansing of the filters. Therefore I will assume that when three-eighths of a grain of aluminum is used to a gallon of water, probably less than thirty per cent of the three-eighths of one and one fifty-six-thousandths part of the same leaves the filters in the filtered water, and so small is that amount, I doubt if the ablest chemist that ever existed had instruments or contra-agents with which he could detect its presence in water filtered by this process. The only objection that has ever reached my ears to the use of alum, and then only when used in excess, and certainly so large a quantity as from five to ten grains per gallon would be allowable, was the presence of free sulphuric acid, contained therein, which objection, if it be an objection, is entirely overcome by the use of pure sulphate of aluminum, which is not alum, and which to my best belief contains practically no free sulphuric acid.

Mechanical filtration is nothing more than natural filtration reproduced, and it would not be a difficult thing to illustrate that most of our pure spring waters are nothing more or less than waters which have percolated through the sand and gravel beds in our soil, and after having come in contact with the natural aluminum of the earth, have been rendered bright, clear and pure, exactly the same as it is now being done by our process of "natural filtration reproduced."

WATER SUPPLY OF CEDAR RAPIDS.

In July, 1893, a request was made by the mayor of Cedar Rapids, for an investigation of the water supply of that city. The appearance of various species of animalculæ, worms, and small fish which had passed through hydrants into water pitchers, was suggestive of serious contamination, and decidedly emotional to

Water and Ice.

sensitive diaphragms. Several samples of water taken from different points of the water supply were sent to the State chemist, and a carefully prepared drawing of the topography of the surrounding area sent to the office of the secretary.

Upon receiving the report of the chemical analysis and comparing it with the topographical chart, there was disclosed a contradiction as to a sample taken from the mouth of a culvert, emptying into the river from a slough adjacent to the Burlington, Cedar Rapids & Northern railroad shops. The topography indicated a greatly polluted water, whereas the chemist had reported it to be excellent. He was directed to make a personal examination of the sources. The following is his report:

July 9, 1893, I received from Health Officer Carl Wells, of Cedar Rapids, a letter stating that five different samples of water, four of them from different points in the river, and No. 1 from the artesian well, had been forwarded to me by express, and that I should make an analysis of them.

Later in the same day I received the water from Cedar Rapids, I immediately determined the area and albuminoid ammonia, which was present in quantities within the limits fixed by the State Board of Health. Then I examined for nitrates and nitrites, which were present in traces only. The analysis was then carried to completion and the report taken to the secretary's office for comparison with the topography of the surrounding drainage area as reported to the central office.

The conditions given by the Cedar Rapids board of health were practically as follows:

The water works, with intake, is located on the east bank of the river. The intake opening into what is known as the supply well, which also receives the flow from the the artesian well, while from this supply well is taken the city water. Above the water works, and a little to the east, is a slough flowing into the river, and along the east bank until it reaches the intake. Upon the bank of this slough, and emptying into it their filth, was reported the Burlington, Cedar Rapids & Northern shops, a brewery and a number of dwellings, special stress being put upon the fact that the water closets of the railway shops emptied directly into the slough, and could be traced by the oil floating on the water directly to the intake of the water works.

With the above conditions and the fact that samples containing animalculæ were constantly being brought before the mayor, they concluded that the city water was being contaminated by the output of the aforesaid slough.

The samples for analysis were numbered as follows: No. 1 from artesian well, the only one of which I knew the source at the time of analysis; No. 2 from mouth of intake; No. 3 from channel of river; No. 4 from mouth of slough; No. 5 from supply well.

Water and Ice.

The results of the analysis showing Nos. 2, 3 and 4 to be the same, excepting in the case of No. 4, which gave (slightly) less animal pollution, than Nos. 2 and 3. No. 5 from the supply well gave results between the artesian and river water. In no sample did the impurities reach the maximum fixed by the State Board as the standard of potable water. The nearest being in the case of No. 1 from the artesian well, in which the chlorine was high, from saline origin common in deep wells. The ammonia, nitrates and nitrites being very low; reasons hereafter explained.

Upon comparison of the above results with the topography of the surroundings of the water supply, it was at once seen that the conditions at Cedar Rapids were not understood. The chemical results were inconsistent with the topographical history. In view of this fact, the secretary thought best for the chemist to visit the city, and learn personally of the surroundings before making his report to the Cedar Rapids board of health. This I did about July 16th, and with the aid of Mayor Daniels gained the following information: I found the supply well without cover, and connected directly with the river, without filter, to prevent the entrance of animalculæ, bugs and worms visible to the unaided eye. I next visited with Mayor Daniels the mouth of the slough, and there saw a very decided current flowing into the river, carrying what they supposed to be oil, but what I recognized as the film of iron oxide floating upon the surface of the water, and coming from the cinders thrown daily along the banks of the slough, both to the right and left of the mouth. There was but a trace of oil. I also noticed that numerous small fish were playing in and out at this point, which seemed to indicate no great contamination.

We next visited Superintendent Bushnell, of the Burlington, Cedar Rapids & Northern shops, and received the following information: That the ground upon which the shops were erected is a pure sand fill, placed there by the road; that when water falls upon the ground it immediately sinks into the sand; that there is a sewer connected with the engine pits, sinks, and some of the closets, and that it is made of vitrified tile, is placed in sand, and empties into the slough. I found upon investigation that the discharge of the sewer was very small when compared with the daily consumption of water in and about the shops. This is easily explained: *First*, only a very small part enters the sewer for return, and, *second*, a part of that sinks into the sand at joints which are always more or less open when such pipe is placed in sand. I also found some of the water closets with pits in the sand, and not discharging into the slough as reported.

The mouth of the sewer was protected from currents to some extent by the sand fill being extended from north of it east into the slough. Directly beyond the mouth of the sewer, and in the slough, is placed the intake, or crib, from which the car works daily pump their water. This crib, at the time of inspection, was surrounded with a thick, healthy growth of vegetation, which extended north and east into the slough. I made a note of the fact that there was no decaying vegetation present. To the north and east of this vegetation, flowing around another fill that extended into the slough,

Water and Ice.

was a pure, swiftly flowing stream of water, carrying a larger amount than that flowing from the slough into the river. The portion of the slough receiving the sewage from the brewery was entirely cut off from that flowing into the river by a high sand fill used by another road.

From the crib between the vegetation and the mouth of the sewer is pumped daily about one hundred and ninety-two thousand gallons of water, of which seventy-five thousand gallons are taken away in the engine tanks, twenty-five thousand are disposed of by sinking into the sand, passing away in the form of steam, and in other ways too numerous to mention, thus leaving less than one-half to enter the sewer, and some undoubtedly passing into the sand through the faults in the pipe.

Now, when this sewage enters the slough, it is held back by that thick growth of healthy vegetation, while the water comes in from that pure stream to mix with it and to furnish the next one hundred and ninety-two thousand gallons. By this it is plainly to be seen that the Burlington, Cedar Rapids & Northern shops were carrying away their own pollution in their engine tanks, and if, perchance, some of that sewage should reach beyond the crib, the ammonia, nitrates and nitrites would have been removed by the growth of that healthy vegetation. Hence, the water from the mouth of the slough, where the sample was taken for analysis, was nothing more nor less than the remainder of the pure water from the stream entering above the shops. This accounts for its purity as compared with the river water, and serves as an excellent example, showing that things are not always what they seem.

At first, the Cedar Rapids board of health, as well as the people of that city, refused to accept the final report, and in a letter stated that another analysis had been ordered. In due time the report from the last analysis was received, and in a letter the mayor states that the correctness of my work is confirmed, and is now in every way considered satisfactory.

Too much stress cannot be put upon the surroundings of a water supply, and yet grave errors are often made by a careless examination.

S. R. MACY,
State Chemist.

The presence of animalculæ in the water mains is explained by the fact that the filters at the intake had been removed, thus giving free access.

This case fairly emphasizes the fact that water may be apparently grossly contaminated yet chemically pure and wholesome.

It is becoming a serious question whether or not the rivers, streams and lakes of the State shall be abandoned to sewage pollution, or preserved for water supplies. It is demonstrable that a large percentage of deaths is due to impure water. The evidence of this is increasing year by year. It is the duty of the legislature to take cognizance of this subject, and provide ample protection

Water and Ice.

and supervision of water supplies, and for such experimental work that will settle some, at least, of the questions yet unsolved regarding pure water. Cities and towns which have at great expense provided water works only to find the supply deteriorating and finally destroyed by the pollution and sewage from other cities, should have ample protection by statute.

Cities whose water supply is contaminated and polluted by their own filth should have no consideration; they deserve none.

WATER PURIFICATION.*

The intimate relation between drinking water and disease has been very forcibly brought to the attention of the American public in the last two or three years by the epidemics of typhoid fever at Chicago, Lowell and Lawrence, St. Louis and other localities known to have sewage-polluted water supplies, and by the comparative immunity from the disease at Boston, New York and other cities, whose water supplies are known to have relatively little sewage contamination. The cholera danger of 1892, widely disseminated the generally accepted belief that drinking water is the main carrier of cholera and typhoid fever and naturally increased in a marked degree the newly awakened interest in methods of securing pure water supplies.

As some definition of the term water purification seems desirable it may be stated in rather a broad way, for present purposes, that it includes all attempts to improve the quality of a water supply, and more especially positive attempts in the way of actual purification of a supply of unsatisfactory character, rather than what may be termed negative purification, or the prevention of pollution.

The simple settlement of turbid waters, the storage of surface waters, and the natural filtration which, to a greater or less extent, all underground waters receive, as well as artificial filtration, aëration and chemical treatment, single or combined, may properly be classed among the water-purification processes of which advantage is sometimes taken or which have been or may be attempted.

There are numerous instances where the quality of water has been improved by sedimentation and storage, but sedimentation alone is seldom wholly satisfactory, and storage has generally been

*Reprinted from *Engineering News*, Aug. 3, 1893.

Water and Ice.

employed to secure quantity and not quality of water, any degree of purification secured being incidental, in most cases, to storage pure and simple. Probably St. Louis, Mo., has employed sedimentation on a larger scale than any other American city, while New York, Boston, Baltimore, San Francisco and hundreds of other cities have derived such incidental advantage as accompanies storage. It should be added that storage has some grave disadvantages, as is generally well known, principal among which are the tastes and odors imparted to stored waters at different seasons by algæ and other forms of life and by stagnation.

Natural filtration is also an incidental advantage arising from a certain mode of developing a water supply. Although man has little to do with it save to make its results available, some of the methods employed to this end are worthy of consideration, but with one exception they need not be discussed here. The exception noted is infiltration galleries or wells located near, and designed to draw water from a stream or lake, by means of percolation through the intervening sand or gravel. In general it may be said that such infiltration galleries and wells have eventually proved inadequate, owing to the gradual silting up of the interstices through which the water passes. When this silting up is caused by organic matter the water is liable to actual deterioration in quality. These observations regarding inadequacy and deterioration are not intended to apply either to driven wells or to galleries in water-bearing strata having a flow independent of surface streams. For in such cases the water percolates for a long distance through filtering material, so that if the supply be not too heavily drawn upon or directly polluted, as from surface sources, it is likely to remain of a satisfactory character.

Although Richmond, Va., tried filtration as early as 1831, it soon abandoned it, and while many other cities also tried it during the next forty years, it does not appear that any thoroughly satisfactory results, or, at least any which would be considered satisfactory in the light of modern knowledge of the subject, were obtained until the filter beds of sand and gravel, at Poughkeepsie, N. Y., were built in 1870. These beds were designed by Mr. Jas. P. Kirkwood, who, as chief engineer of the St. Louis water-works during their enlargement, begun in 1865, visited Europe and studied purification processes there in vogue. His report to the

Water and Ice.

St. Louis water commissioners was published in 1869, with illustrations, under the title of "Filtration of River Waters," and is still a valuable treatise on the subject, in fact the only American work wholly devoted to water filtration, we believe, except Prof. Wm. Ripley Nichol's report "On the Filtration of Potable Water," reprinted from the ninth report of the Massachusetts State Board of Health (1874). Mr. Kirkwood recommended the filtration of the Mississippi River water for St. Louis, but sedimentation was adopted instead, as mentioned above, and the city of Poughkeepsie received the benefits of his studies abroad.

Following more or less closely the example set by Poughkeepsie, a few other American cities have constructed filter beds, but none have improved on the Poughkeepsie plant, and most have fallen far behind it. Many of the attempts at filtration have been useless or worse than useless through lack of capacity or provisions for cleaning. The actual results obtained by the various filter boxes and cribs that have been employed might often have been surpassed by the use of properly constructed screens at gate houses or the mouths of intake or supply pipes.

The cost of land sufficient for sand filter beds of proper size and the cost of constructing and operating them, together with the reluctance of Americans to spend money to improve the quality of their water supplies, and, most important of all, the belief for some time current here that sand filtration alone is only a straining process, explain in part why more cities have not followed the example of Poughkeepsie and constructed sand filter beds of ample area.

This leads to the development and adoption of the mechanical or commercial filter which has taken place practically in the last ten years. The causes given in the preceding paragraph, coupled with the fact that to make their water supplies tolerable to sight many cities must purify them, and the desire to carry the purification process further than it was thought possible to do with old methods, set the American mind to work on the development of some simple, cheap and effective process of water purification. The result was a filter of sand, or sand and coke, generally inclosed and operating under heavy pressure, and thus at a rapid rate, with mechanical appliances for washing the filtering material without removing it, and, in the case of the most widely adopted filters,

Water and Ice.

with the addition of a precipitant to the water before filtration, when needed, to enable the filtering material to do more effective work. In some cases aëration was combined with filtration. Thus the filters could be compressed within a small area, operated readily, and cleaned often and with comparatively little labor.

Some sixty of these mechanical filters are now in use in connection with American water supplies, to the vast improvement of the water which passes through them. They may be so operated as to remove color, matter in suspension and some portion of that in solution, together with bacteria, the extent to which they do these things being largely determined by the rate of filtration, the amount of precipitant used, the care with which they are operated, and, obviously, the condition of the water before treatment. The only other method of filtration at all comparable with them is downward filtration through sand filter beds, the filter boxes, cribs and similar devices heretofore employed, whether filled with sand, coke, charcoal, sponge or other material, being altogether too limited in size to give comparative results. It will be understood that household or domestic filters are not in mind in this connection.

Looking at water purification abroad, especially in England and Germany, it is seen that ordinary sand filtration has long been very widely and almost exclusively employed for water supplies liable to animal pollution, and with a very favorable effect upon the healthfulness of the communities concerned. In this country the sanitary importance of pure water is only beginning to be appreciated by the people at large, and is thoroughly understood by only a few of those directly in charge of our water supplies, or, if understood, financial and political considerations keep the subject in the background. But a change is imminent. The joint use of our streams and lakes for sources of water supply and receptacles for sewage cannot be tolerated always, especially with our rapidly growing populations. Unpolluted water supplies are becoming more and more scarce, and the demands for pure water are increasing in urgency. Naturally we have been looking abroad to see what densely populated European countries do for pure water and we find sand filtration in use for water of doubtful purity, and that foreign sanitary experts claim that simple filtration removes bacteria as well as inert organic matter. We find at home a well

Water and Ice.

developed system of mechanical filtration, combined at times with chemical treatment as an aid to filtration and with aëration. Naturally we ask which is the best, for we are beginning to see that in sanitary matters the best is none too good for us.

Years ago the people of Massachusetts began to realize that steps must be taken to prevent the pollution of their water supplies, and through their State Board of Health began to study stream pollution and later water and sewage purification. The experts found that while European cities were purifying both sewage and water there was a great lack of the data needed to enable engineers to decide what methods to adopt to secure the most satisfactory results at the least expense. Finally the Massachusetts State Board of Health received authority to begin extensive experiments on the purification of sewage and water. The start was made at Lawrence six years ago, and the work has been continued ever since. The experiments have been conducted from the chemical and biological sides, under the direction of eminent experts, as has been often set forth in these columns, and as will be given more fully in a later issue.

For the present it is sufficient to state that the work at Lawrence has completely and satisfactorily demonstrated that the purification of both water and sewage by filtration through sand, when carried to its limits, is not a mechanical or straining process, but is a process of nitrification, dependent upon the presence in the sand of oxygen and bacteria, the bacteria always accompanying oxygen when organic matter is available as a food supply, and disappearing when the food supply is exhausted. How to secure the most perfect nitrification of the organic matter in sewage, and how most completely to remove the bacteria or other objectionable contaminations from water has been the aim of the Lawrence studies, and as a result many new facts have been developed.

Mr. Hiram F. Mills, C. E., a member of the Massachusetts State Board of Health, has designed a water filtration plant for the city of Lawrence in which he has made use of some of the principles evolved at the experiment station.

The Lawrence water purification plant is of especial interest because, unlike all other American plants, it has been built more to remove disease germs from the water than to improve its appear-

Water and Ice.

ance. The Lawrence water supply is taken from the Merrimac river, only a few miles below the outlet sewers of Lowell. Lowell and other cities on the river above it have had excessive typhoid fever mortalities for some years, and Lawrence has suffered accordingly.

The Lawrence experiments have shown that intermittent sand filtration, under proper conditions, will remove practically all the bacteria from water when filtering at the rate of from one million to three million gallons per acre per day. The new Lawrence filter bed has an area of two and one-half acres, and is designed to filter five million gallons per day, or two million gallons per acre, as fully described elsewhere in this issue.

With this filter bed in operation we may hope to have a practical test of the principles evolved in the experimental work. The advocates of the intermittent sand filtration of water claim all the sanitary results that are claimed for mechanical filtration, if not more. The Massachusetts board has not seen fit to experiment with mechanical processes, and no systematic and continued chemical and bacteriological studies of the results of mechanical filtration have ever been made, so far as we can learn. For the present, therefore, the two processes cannot be compared in detail, but they are bound to be compared by every one who goes carefully into the subject of water purification, and for this reason it is to be hoped that ample data regarding mechanical filtration will speedily be made available.

The future of water purification in America is full of promise, both as to results which may be expected from the two prominent methods in vogue, and also as to the rapid extension of the practice. Wherever a good system is adopted the results cannot fail to be beneficial, if the plant is properly managed.

Disposal of Rural Sewage.

DISPOSAL OF RURAL SEWAGE.*

A serious and all-important problem presents itself to all builders or occupiers of suburban and country residences, not located within reach of sewers. I refer to the question: What method should be adopted by architects or householders to get rid of the liquid wastes from the household in a manner calculated to avoid at once all nuisance to sight or smell; all danger to health arising from the pollution of the soil, the water and the air; and all causes of contamination of water-courses, whether flowing streams, or ponds, lakes, estuaries and harbors? The problem is not at all a novel one, for nearly two thousand years ago Hippocrates discussed the same subject of the relation existing between health and soil, air and water, yet, if we contemplate, for a moment, the numberless filth-reeking and disease-breeding privies and barbarous leaching cesspools which we still encounter everywhere, and which apparently are accepted as necessary adjuncts to farm houses, summer residences, mechanics' dwellings, etc., we hope to be considered justified in again calling attention to the evil results of improper methods of sewage disposal, and in discussing briefly the proper remedies.

Let us begin with a consideration of the smaller farm houses, mechanics' cottages and laborers' dwellings. The crude methods usually adopted to get rid of all filth from these are the discharge of the liquids into some open ditch, or into some neighboring water-course, brook or pond, and the accumulation of the excreta in privy vaults. In other cases, slops are retained on the premises by pouring them directly in front of the kitchen window on the surface of the ground, which is thus kept continuously wet, and quickly becomes saturated with filth, or else the liquid sewage is

*Copyright by William Paul Gerhard, 1886. All rights reserved.

NOTE.—The cuts illustrating this paper have been kindly loaned by Mr. W. T. Comstock and the D. Van Nostrand Co., who publish Mr. Gerhard's books on drainage and plumbing.

Disposal of Rural Sewage.

stored in leaching cesspools or poured into disused wells. It seems unnecessary to explain at length the disadvantages and dangers of privies, vaults and stagnant pools of slop from a health point of view. The objections against them are well recognized, and hence such devices are now utterly condemned by all sanitarians as relics of primitive stages of civilization.

The proper disposal of the slop-water of such small houses is so easily accomplished wherever, as is almost always the case, a small vegetable garden, or lawn, or grapevine trellis, or an apple orchard adjoin the house, as to make us wonder why better methods than those indicated above are adopted as yet in comparatively rare instances. In all such cases the sewage may, with advantage, be used to feed plants and fruit trees, or to irrigate the soil. The ruling principle should be to keep solid and liquid waste matters, as much as possible, apart, for this will facilitate the disposal of both. The kitchen-water, soap suds from washing, chamber-slops, urine, and other fouled water, are easily disposed of by a daily distribution in the garden, either by irrigation, or by sub-surface irrigation. The slop-water should be collected every day in a tight tank and carried by hand, or carted in a wheelbarrow, to the garden, and there it should be used for watering plants, shrubbery and fruit trees, or for the cultivation of garden vegetables. Instead of by irrigation on the surface, the slop-water may be discharged into one or more lines of absorption drains, laid with open joints under the surface. For the smallest cottage fifty feet of absorption tiles are sufficient, and in proportion as the quantity of household sewage increases the amount of tiles should be increased. The principal points of importance are that the sewage be applied to the soil while *fresh* and before decomposition sets in; that it should be applied in moderate quantities only, to prevent over saturation of



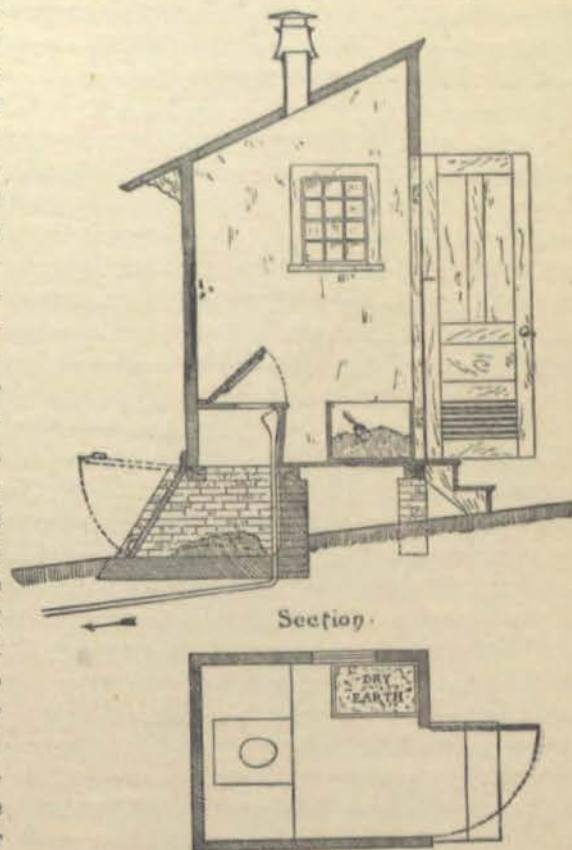
Fig. 1.

the soil; that the sewage be applied on or near the surface of the soil, within reach of the oxidizing influence of the air and of the bacteria in the soil, and, finally, that the application be made intermittent, so as to give the soil, after

Disposal of Rural Sewage.

each discharge, a chance to breathe, as it were, and to allow the finer solid particles to be oxidized and destroyed. An easy method

of accomplishing the disposal of slop-water, where the house contains no plumbing fixtures, is to have near the house a hopper or receiver of wood or rustless iron, or, better, of earthenware, and provided with a strainer and a proper cover. From this a pipe may be carried underground to the absorption tiles, while the house sewage may be carried into the hopper by means of a pail, thus sending rapidly a full volume of slops at proper intervals into the absorption tiles. (See Fig. 1.)



P[an]

Fig. 2.

The solid excrements are taken care of in the case of small cottages quite as readily and inoffensively by adopting either an earth-closet, in place of the usual privy, still so much *en vogue*, although long ago unanimously condemned by practical sanitarians. In the application of the dry-earth system, sufficient dried earth, garden loam, or sometimes coal ashes are mixed with the excreta

Disposal of Rural Sewage.

to absorb all foulness, to keep down all odor, and to prevent putrefaction. Such earth-closets work quite satisfactorily with very little attention, and form a simple and cleanly substitute for the privy nuisance. They are manufactured in various grades, and with more or less complicated mechanism. As a rule, the simpler the arrangement, the better. (See Fig. 2.) If placed out of doors, the earth-closet should not be located too far from the house. The outer structure should be strong and substantial, with a good roof to protect it against rain or dampness. It should be well-lighted, well ventilated, not too much exposed to the rays of the sun, and preferably plastered on the inside as a protection in cold weather. A carefully kept dry walk should lead to it from the house, and it is better to have the walk and closet shed screened from view and from the prevailing winds. The excreta should be received in a movable, well tarred wooden box, or else in a galvanized iron pail, not too large, and of such shape and construction that it can be easily handled. The box or pail should fit close up under the seat, and each time the closet is used, ashes or dry earth should be used as deodorizers, being thrown down either by a hand scoop or by mechanical apparatus. There can be scarcely any doubt about the economy, efficiency and convenience of such apparatus in the case of small houses. The property of dry earth, of not only deodorizing, but also of absorbing and rendering harmless excreta of animals has long been well known. Some difficulty has been experienced in cases where the earth was kept too damp. According to recent observations a much smaller quantity of earth is required for earth-closets, if the separation of the liquids and solids is at once effected. This may be accomplished by intercepting the urine under the seat, and removing it by a waste pipe. The closet is thereby more easily kept free from smell, and if properly used and well taken care of, it can be located in an extension of a dwelling without becoming a nuisance. The dry-earth manure ought to be removed at frequent intervals, and in summer time it can be used and dug under the soil in the garden attached to the cottage. In winter time it may be dried in an out-house and can then be applied over and over again. Ashes are sometimes used in place of earth, or else finely powdered charcoal, which latter is a well known deodorizer. The latter can be applied with a mechanism similar to the one used in earth-closets, and it is claimed that only

Disposal of Rural Sewage.

about one-fourth the quantity will be needed. As charcoal is rather expensive, this is an important consideration. Some also claim that removal need not be so frequent in the case of charcoal closets, but this is, at best, a doubtful advantage.

In cottages, or suburban residences of somewhat more pretension, the earth-closet is sometimes located, for convenience's sake, in an extension of the cottage, and it then usually becomes desirable to have also a somewhat more convenient method of disposal of the slop-water, which would avoid exposure to the housewife or servant to the inclemencies of the weather. This may be secured by arranging a properly ventilated and trapped waste-pipe—a pipe two inches in diameter is plenty large enough—to carry the waste from the kitchen sink, the laundry-tub, and—wherever this is provided for—from the bath-tub, into a small receiving tank, located outside of the house, and placed below the depth to which frost usually penetrates. This tank may be a plain wooden box, or an earthen or iron tank, or finally a tank built of brick work. (Fig. 3.) It may be emptied in the plainest kind of an arrangement by hand, or else it may be discharged by an automatic device, such as a siphon, a tumbler tank, or other mechanical appliance. It may become useful, even in the case of small houses, to build some sort of a grease-trap to prevent the grease from being discharged and finally clogging the small absorption pipes. It is, of course, assumed that the general topography of the lot is favorable to such an arrangement, in other words, that there is not a slope from the garden, or absorption field, toward the house, in which case disposal by gravity would become impossible. If the earth-closet is placed inside of a dwelling the same precautions should be observed which are taken in the case

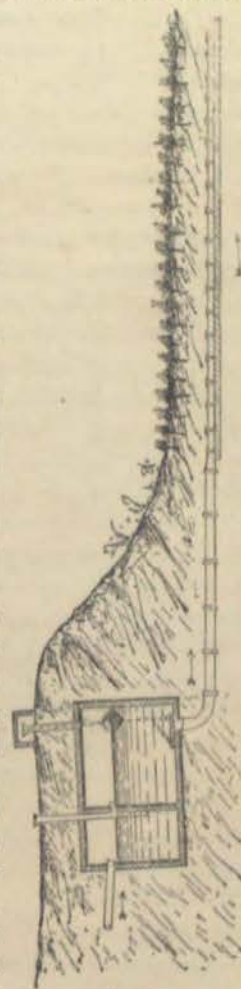


Fig. 3.

the same precautions should be observed which are taken in the case

Disposal of Rural Sewage.

of water-closets. The ventilation of the department is an important matter, and should receive careful attention. As a rule, it is better to locate an earth-closet in an isolated or detached part of the cottage. While an earth-closet is inferior to the best water-closet, I have no hesitation in pronouncing it, if well taken care of, superior to many water-closets as *usually arranged and kept*.

The question whether a farm house or laborer's small cottage should be provided at all with plumbing work, and above all, whether it is wise to have a water-closet indoors, which in turn requires a more or less complicated system of service pipes and a service cistern, is, more than anything else, one of convenience and comfort. The annoyance and cost of frequent repairs, and the difficulty in country districts of getting a mechanic to fix such apparatus when out of order, the danger of exposed pipes and traps freezing in mid-winter, or sometimes the lack of an abundance of water for flushing, or the necessity of raising it by hand pumping—all these are considerations which may deter many from putting any plumbing work into their homes. It is undoubtedly much easier and less troublesome to deal with the sewage problem of cottages, if the strict separation of solids and liquids is adhered to. A water-closet in a house not only requires a larger discharge pipe than the two-inch waste pipe for slop-water, but it complicates at once the whole arrangement. That it can be made quite safe, perfectly inodorous and inoffensive, it is not necessary for me here to assert. Those who have followed the recent improvements in house drainage and plumbing work will know that it is possible to select a good water-closet and fit it up in such a way as to be in all respects satisfactory.* In points of cleanliness I think it certainly stands ahead of any other device. Its advantages are many, but its disadvantages, under certain conditions, ought to be overlooked. If a water-closet is used in a cottage, the solids should not enter the outside tank for slop-water, for they would soon clog the siphon or the absorption tiles, but they should be intercepted in a settling chamber and frequently removed. How this may be done will be explained later on, when detailed reference is made to larger country houses.

The proper disposal of the sewage of larger country or suburban residences, fitted up with all the usual plumbing appliances, is

*See the author's various books on Plumbing and House Drainage.

Disposal of Rural Sewage.

often, indeed, in most cases, a much more puzzling problem. What shall be done with the more or less large daily volume of sewage of detached and isolated country houses, without creating a nuisance either on one's own premises or on those of the neighbors? This is a question of much interest to thousands of householders who live in the better class of country or suburban houses, and who are often compelled to meet the difficulties as best they can. The problem has long engaged the attention of civil engineers, who make a specialty of sanitary drainage, and while it is possible that the best solution has not yet been discovered, there are several methods which are in more or less successful use. Whatever method of disposal of the sewage may be adopted, it is obvious that one must decide about it before arranging the house drainage system inside of a house, for the best arrangement of the main drain and its branches in the cellar or basement of a house will depend upon the direction in which the sewage tank will be erected, or upon the location of the final outlet. Generally speaking, an isolated country house, not in reach of sewers, may dispose of its sewage by one or the other of the following methods:

1. It may discharge its sewage into an open surface ditch or gutter, removing everything from the house, and carrying the water into a more or less distant sink-hole, or to some low spot where the sewage is allowed to soak away and to evaporate slowly. This method, based on the principle of "out of sight, out of mind," is a very primitive one, and one that has not a single feature of merit. As a rule, such a system becomes highly offensive to the immediate vicinity of the house.

2. The house drain may empty the sewage into a large open or leaching cesspool, allowing the liquids to ooze away through underground porous strata, or by fissures and cracks in the rock. This, although a very common method of disposal, is in reality one very dangerous to health, particularly so where the water supply is local, being derived from a well, a cistern, or a spring on the premises. It is a method utterly to be condemned as both unsafe and nasty.

The most primitive form of cesspool is a hole dug in the ground, into which all the sewage is continually poured, the result expected being that at least the liquids will soak away through unknown

Disposal of Rural Sewage.

underground recesses and disappear. Occasionally the sides of such a cesspool are lined with loose stones, laid dry, the liquid sewage escaping at the numerous open joints into the surrounding soil, while more or less of the solid matter and grease are retained in the cesspool, undergoing at once a very dangerous process of decomposition, in the presence of moisture, heat and darkness—all conditions known to be particularly favorable to the growth of dangerous bacteria or germs of disease. In dealing with sewage, a cardinal principle always to be observed is to avoid all stagnation. In the leaching cesspool we have the worst possible example of stagnation and of accumulation of putrefying filth on our premises. The great objection to a leaching cesspool is not only that it constitutes in itself an abominable nuisance, comparable to a powder magazine, which merely needs a single spark to create destruction, but that it unavoidably and invariably pollutes the sub-soil in the neighborhood of dwellings, contaminates the water supply, and renders the air which we breathe obnoxious by its exhalations. If we consider for a moment that such isolated country dwellings and farm houses, which are not in reach of sewers, also do not usually enjoy the privilege of a public water supply, but must derive their potable water from wells, cisterns or springs on the premises, the full extent of the evil and force of our objections become more apparent. It is, indeed, of the utmost importance that the local water supply of isolated dwellings be kept as clear and free from contamination as possible; but even supposing that water is introduced from a street or public supply, the enormous evils of soil pollution and air contamination remain. Two thousand years ago an old philosopher, Hippocrates, preached a sanitary formula, which has not been improved up to the present day. Recognizing the dangers to health resulting from neglect of sanitary precautions, he expressed his advice in the words: "Pure air, pure water and pure soil." What, then, shall we say if some of our best architects of the present day persist in suggesting as the most convenient and ready means of getting rid of the sewage of a country house the adoption of a leaching cesspool?

I admit that in sparsely populated country districts, a leaching cesspool, located at a great distance from, and at a lower level than the house, may sometimes be used without causing any harm

Disposal of Rural Sewage.

to the occupants of the house. As a matter of principle, however, sanitary science must condemn such devices in every case. If the principle is true that we should speedily return all organic dirt and filth to the earth, it should be carried out in such manner that the soil may accomplish the complete destruction of organic filth. We shall see, further on, that this can be done only near the surface of the soil, and by application of the sewage before it becomes putrid.

In pouring our sewage into leaching cesspools, on the contrary, we bury all matter deep in the ground, remote from the cleansing, oxidizing effects of the atmosphere, of the purifying action of plant life, and of the help which is rendered by some of the low organisms, or so-called bacteria, in the process of nitrification and destruction of organic matter.

Then, again, another important consideration should not be lost sight of, namely: that often where a leaching cesspool can not work any danger to our own house, our own well, or spring, it may pollute shallow or deep wells belonging to adjoining estates. It is, therefore, evident that as habitations are grouped closely together, leaching cesspools become more and more inadmissible. If we are selfish enough to locate such a cesspool in the remotest and lowest corner of our own garden, entirely forgetful of its immediate proximity to our neighbor's drinking-water well, it is but perfectly proper that our health authorities should remind us that we have some obligations to fulfill toward our neighbors.

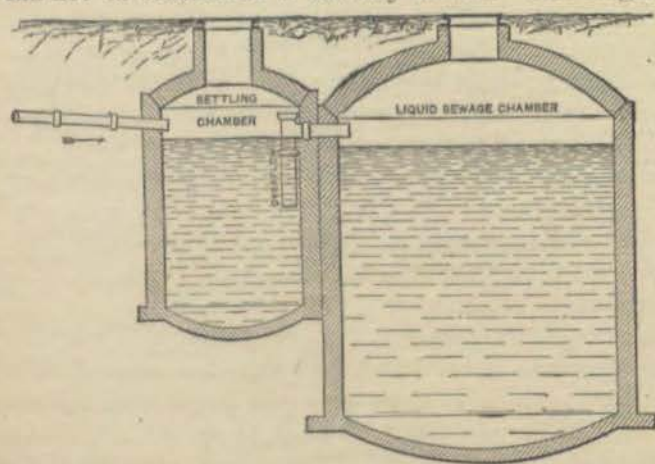
Occasionally such cesspools are built with sides cemented up, leaving only the bottom loose for the escape of sewage, or in cases where they are originally open on the sides, the pores soon clog, and the removal of the liquid then takes place in a still more imperfect manner.

3. The house drain may deliver the sewage into a tightly built cesspool, provided with an overflow pipe carried into some ditch or water-course. Such an arrangement may be considered a direct outcome of the leaching cesspool. Desiring to avoid the pollution of the soil, the architect or owner built the cesspool with tight sides and bottom, but finding that it would rapidly fill up, and that frequent pumping out would be expensive, an overflow was taken from the cesspools and the surplus of liquid sewage carried away. While such a tight cesspool with overflow located far away from the house,

Disposal of Rural Sewage.

and with the overflow carried into some large volume of rapidly flowing water, may be unobjectionable where but little water is used in a house, the arrangement constitutes in the case of larger houses a fearful nuisance, for the sewage is already putrid when removed.

4. The alternative is to empty the sewage into a cesspool built absolutely tight and without overflow. Such a cesspool avoids the pollution of the water supply, and also the contamination of the sub-soil. It is, therefore, an arrangement much to be preferred to a leaching cesspool, and one which is permissible under certain circumstances. Perhaps I should rather call it a sometimes necessary evil, for it should be borne in mind that it involves a long temporary storage of sewage, and does not effect its immediate or nearly immediate disposal. Hence it can not be approved from a sanitary point of view, and its objections are many and serious ones. Since it is the object of all good drainage to get rid of filth from the premises at once, or else to dispose of it on the premises while *fresh*, so as to be completely taken up by vegetation and purified by the soil, it is evident that a vast receptacle of accumulated filth can not be considered a sanitary device. The stagnated sewage



TIGHT CESSPOOL

Fig 4.

within the walls of the cesspool undergoes a process of decomposition, and the gases generated are extremely unwholesome, often causing, by improper escape, or by entrance

into houses through the sewer pipes, a nuisance. To ventilate such a cesspool successfully is rather a difficult, and often an impossible matter.

Disposal of Rural Sewage.

To overcome some of these objections, it is the habit of some architects to use two cesspools for a single house, delivering into the one all water-closet wastes, while the other is intended for the reception of kitchen and laundry water. I do not approve of such an arrangement. Practically, it is found that after awhile both cesspools do not differ materially as regards the degree of putrefaction and offensiveness of their contents; nor can I see any sense in duplicating or multiplying the dangers which adhere to all cesspool arrangements.

There are, however, some cases where no good feasible way of dealing with sewage may be devised other than to run it into a tight cesspool. In that case, the following precautions are to be observed: The cesspool should be located as far away from the house as possible, and there should be proper disconnection between the house and the cesspool. The larger chamber will receive the liquids. Both chambers should be built thoroughly tight, of hard burned brick, laid in hydraulic cement, preferably of a circular shape, and the walls should be well rendered inside and outside with Portland cement. Each chamber should be arched over and topped with a manhole, covered with a tight iron cover. (See Fig. 4.) The cesspool should be as well ventilated as it is possible to do, and it should be emptied, cleaned and disinfected at frequent intervals. The separation of the liquid from the solid matter facilitates much the disposal of both. The liquids may be bailed, or better, pumped out, and used to sprinkle and irrigate the lawn, or kitchen garden, shrubbery, vine trellis or apple orchard. The solids should be removed and dug as fertilizers under the soil. The oftener this is done the better, and the less offense will be caused by the application of sewage to land.

Some objections to the cesspool always remain. If it is built, as it should be, *absolutely* tight, and of moderate size only, to avoid the retention of too large a volume of sewage, then the necessity of frequent pumping arises, and with it the annoyance of constant attention and of manual labor. If we enlarge the dimensions of the cesspool to avoid the frequency of pumping out, we increase the dangers always resulting from stagnant sewage, and create, as it were, a large gasometer for noxious gases.

5. If a stream of running water, either a brook, river, canal or tidal estuary is available, at not too great a distance, a single house

Disposal of Rural Sewage.

may sometimes discharge its sewage into it, trusting to the dilution of the sewage and to the self-purification of the stream to render the sewage innocuous. This method, simple and convenient as it may appear, can not be regarded as permissible in all cases. It is a method which, especially if the current is not rapid, and the volume of water in the stream not large, may cause serious annoyance and offense, and hence must be condemned as crude and imperfect; for, by pouring the filth into the nearest water-course, we simply remove the evil from one place to another, without attempting to abate the nuisance. Again, it should be remembered, that what may be feasible and unobjectionable for a single house, is not practicable in the case of a number of adjoining isolated country houses. The pollution of creeks, rivers and streams must be avoided, especially of those water-courses serving as a source of supply of potable water for villages and towns located along the banks of these streams, and from which canal boats or river craft draw their drinking and cooking water. Riparian dwellers always suffer by direct discharge of unpurified sewage into water-courses. The watering of cattle, and washing and bathing in the river are thereby often rendered impossible; while more or less damage is done to fish culture, particularly where the sewage is discharged in a putrid condition. While it is a well known fact that some kinds of fish feed on *fresh* sewage matter, others, particularly salmon and trout, appear to be very delicate, and usually suffer from pollution of streams.

Channels with tidal flow, finally, should not receive sewage, for much of the solid matter discharged into them will repeatedly float up and down with the ebb and flow of the tide, instead of being at once and forever removed. Offensive odors pervade the air, particularly in the vicinity of the sewer outfall, the banks will become defiled, the river beds silt up, and the channels gradually become obstructed.

6. Houses located at or near the seashore have, sometimes, no other available outlet for the discharge of their sewage than the ocean; but, although at first blush a ready means of getting rid of sewage, such a discharge is seldom permissible. Experience has demonstrated the unpleasant fact that floating sewage matter, discharged into the sea, may return to the shore with the tide, or

Disposal of Rural Sewage.

through the action of eddies, currents, winds and waves. The sandy beaches become polluted, and the damage inflicted may seriously interfere with the use of the beach for bathing or recreation purposes. The direct discharge into the sea is only practicable where the sewage outfall from houses on the cliffs or near the beach is carried far out into deep water, and all sewage matter carried away by some strong currents setting in at right angles to the sewage outfall, or about parallel to the line of the beach.

7. It is obvious, therefore, that in the majority of instances, house sewage can not be directly admitted into water-courses or streams of any kind, nor into the sea, without creating a nuisance to sight, smell, or danger to health. So far as practicable it should first be *purified* by removing the suspended impurities, and at least a part of the matters in solution. The purification may be effected by various methods, such as artificial filtration, chemical treatment, or by the application of sewage to land. After being purified by mechanical or chemical processes, sewage can sometimes be admitted directly into streams, in other cases, however, it becomes desirable that it be further purified or utilized on land.

I shall not stop to consider the question of artificial filter-beds, for, to my knowledge, such a system has never been used in the United States, in connection with the sewage from houses. I desire only to refer to a very ingenious mechanical filter, invented in England, and recently introduced into this country. It is known as the Farquhar-Oldham filter. The chief characteristic of this machine is the revolving cutter, which is so arranged that whenever the surface of the filtering medium clogs up with sewage sludge, it can be removed by said cutter in a few moments, whereby practically a new filter is established. This operation may be repeated as often as found necessary. While I have not personally made use of this filter for purifying the sewage from isolated country houses, I understand that it is, or has been, in successful use at a country house at Seabright, New Jersey, and elsewhere. Wherever no system of sewage purification by application to land is possible, I believe this method will form a successful solution of the problem, although many will hesitate to adopt it, owing to its cost. The best filtering material for such apparatus is saw-dust, which, when removed and dried, can be readily utilized to fire up the boilers used for the sewage pumps.

Disposal of Rural Sewage.

8. Sewage from isolated country houses may be purified on the premises by chemical treatment. By this method the suspended, and a part of the dissolved impurities, are precipitated by means of chemicals. Quite a large number of chemical processes have been invented, but none of them have attained any very extensive use. One of the most common processes consists in the addition of milk of lime to sewage. Much more effective than this are solutions of sulphate of alumina, or of perchloride of iron. Such chemical precipitation, while not accomplishing a very thorough purification removes the impurities to such an extent as to permit a discharge into a tidal river, or large stream. Occasionally, however, as stated above, the clarified liquid is applied to land for further purification.

In selecting a precipitant, preference should be given to one which accomplishes the process of subsidence with rapidity; at the same time it should be remembered that the precipitant used should produce a sludge of minimum bulk with maximum amount of solid impurities. In both respects, milk of lime is inferior to the other chemicals mentioned above.

A difficulty adhering to all chemical precipitation processes is the disposal of the sewage sludge. It usually contains, after precipitation, from ninety to ninety-five per cent of water, and unless the latter is removed it soon decomposes and becomes offensive. It has been suggested to evaporate this water by artificial heat, but such a process is expensive. Others have proposed the separation of the liquid matter from the solid in centrifugal machines. In some instances sludge is pumped directly from the precipitation tanks to land, where it is left exposed to the air, and when comparatively dry is dug into the ground. In some patented processes, such chemicals are added as enable the manufacture of brick or cement from the sludge. More recently, powerful filter-presses have been used, which offer great advantages. By means of these the sludge is quickly pressed into cakes, which may be sold as manure to farmers, and not being bulky, enables a better transportation for long distances.

Chemical treatment must sometime be adopted where land is not available for purification purposes, or where its high price precludes any effort to obtain an area sufficiently large for irrigation. It may, at times, become necessary to resort to it, where the soil is

Disposal of Rural Sewage.

underlaid with rocks. Again, chemical precipitation may be combined with the application of sewage to land, in which case a much smaller irrigation or filtration area is sufficient. But all this refers more to the sewage from large institutions, or from villages or towns.

Chemical treatment is not well adapted to single or isolated dwellings. The process implies the construction of tanks, the provision of suitable chemicals, all of which calls for considerable expense. Apart from this consideration, such a manipulation of sewage is not desirable on the premises, or in the vicinity of dwelling houses.

It may be stated in general, that whatever the chemical treatment may be, it will be wise not to have too much faith in the realization of a large commercial profit from the sewage treatment. Far better to make the ultimate purification of the sewage the chief end in view. It is also well to remember that in certain chemical processes the effluent water is of such a character that, if discharged into brooks or rivers, it may kill fish and cause an injury to fish culture. Chloride of lime is particularly objectionable. Sulphuric and hydro-chloric acids are also said to be very hurtful.

9. Whenever a sufficient area of land is available, and where the layout of the land and the character of the soil are favorable, sewage may be disposed of and purified on the premises by applying it to the land. Generally speaking, the application of sewage to land forms the best solution of the problem of sewage disposal. Not that it enables us to derive much profit from its utilization—this should always be a secondary consideration, in the case of larger institutions or towns not less than in the case of single houses—but by applying sewage to land it is always possible to effect its purification to such an extent as to avoid the usual fouling of surface or subterranean water-courses. While chemical precipitation and mechanical filtration may be considered *artificial* processes, the purification of sewage by the soil is a natural process, completing one of the constant rounds or circulations going on in nature. The water on the globe furnishes an example of such a circulation going on forever. Arising as a vapor from the ocean, and from large exposed surfaces of flowing water, it is carried along in the upper strata of the atmosphere by currents of air, and

Disposal of Rural Sewage.

forms clouds, from which it is again precipitated upon the surface of the earth in the form of rain, snow, hail or dew. A part of this storm-water is immediately evaporated and returns to the clouds, another part flows off on the surface, forming successfully springs, brooks, rivers, streams—all flowing toward the great ocean, while a third part soaks into the ground, and is partially absorbed by vegetation, and partly forms underground streams of water with an inclination toward some stream, or else forms springs, which finally come out at the surface.

Another example of a constant round of nature is afforded by the circulation going on between animal and vegetable life. Plants are nourished, and grow upon decomposed animal matter, effecting a change of those substances which might become dangerous to animal life, into harmless food substances for the roots of plants. The same plants, perhaps, form the nourishment for man and animals, and are again discarded to feed vegetation.

The whole process of water circulation has never been better described than in the words of Mr. F. O. Ward, at the General Congress of Hygiene, at Brussels, in 1856. These words, quoted by Mr. Edwin Chadwick, the Nestor of sanitary science in England, in an address on "Circulation or Stagnation," are as follows:

"The water which falls on the hills in a state of purity undergoes a natural process of filtration through sand, enters the rural collecting pipes, and passing through the aqueduct to the metropolitan distribution pipes, finds its way to every story of every house in the town; whence again, after having supplied the wants of the inhabitants, it runs off, enriched with fertilizing matter, which it carries away before allowing it time to ferment. This manure, driven along irrigation pipes, is deposited in the soil, leaving the water to pass into drainage pipes, and flow on to the rivers. The rivers conduct it to the ocean, where it rises as vapor under the heat of the sun, to redescend as rain on the hills, enter again the collection pipes, and recommence its vast and useful course of circulation."

Let us return now to the consideration of the application of sewage from isolated country houses to land. The conditions of successful application are a sufficiently large area of suitable, absorbent, well aerated, properly prepared and thoroughly underdrained

Disposal of Rural Sewage.

soil. I should, perhaps, add to these a few other conditions, namely, the proper and judicious management, careful and equal distribution, and, before all, the *intermittent* application of sewage to the soil, which latter is so needed to insure its aëration.

The land selected for the purification of the sewage should not be located too near a dwelling. In particular, if wells are used, it should be kept at a safe distance from them, the exact distance depending not so much on the configuration or slope of the surface as upon the inclination of the underground geological formation and strata.

We may distinguish several systems, namely, broad sewage irrigation, intermittent downward filtration, and sub-surface irrigation. The Report of the Royal Commission on Metropolitan Sewage Discharge, published in 1884, defines broad irrigation as "the distribution of sewage over a large surface of ordinary agricultural ground, having in view a maximum growth of vegetation, consistent with due purification, for the amount of sewage supplied." The same report speaks of intermittent downward filtration as "the concentration of sewage at short intervals on an area of especially chosen porous ground, as small as will absorb and retain it, not excluding vegetation, but making the produce of secondary importance." In the first system, the sewage flows principally *over* the land, in the latter system it passes *through* the land. Sub-surface irrigation is a modification of the filtration system, in which sewage is distributed in a network of tile pipes, close under the surface of the ground, whereby all offense to sight or smell is at once overcome. It is obvious that this is an important consideration wherever sewage irrigation is to be practiced close to a dwelling house.

Broad irrigation requires very large areas of land. The land must not be continuously flooded, so that in order to manage an irrigation farm successfully it is at least advisable to have pieces of fallow land, and to distribute the sewage on different portions on alternating days. By passing sewage through a properly prepared filtration we are enabled to effect the purification of a much larger volume, provided we maintain an intermittent discharge, so as to secure thorough aëration.

In all methods of application of sewage to land, it is advisable to intercept at least the coarser suspended organic matters contained

Disposal of Rural Sewage.

in sewage, which should be dealt with separately. The irrigation field must in all cases be properly and thoroughly underdrained. The preparation of the surface of the land should be simple and inexpensive, and must depend somewhat on the general topography of the field, as well as upon the kind of vegetation which it is intended to raise from sewage. It is important that the sewage be distributed evenly and in as fresh condition as possible. Much the best plan to secure an intermittent discharge and to avoid an irregular and trickling flow, is to collect the sewage from the house in a self-acting flush-tank. Wherever possible the sewage should be conveyed to the latter by gravitation and the location of the irrigation field should be selected accordingly. Occasionally, however, pumping becomes a necessity, and this may be accomplished either by some form of steam pump, or by a gas or hot-air engine, or by a windmill.

I shall, hereafter, dwell more at length upon the sub-surface irrigation system, and shall explain some of its details, because I regard it as the best available system for the disposal of liquid and semi-liquid wastes of isolated country houses. Before doing so it may be well to sum up what I have said about the methods available for disposing of sewage of isolated country houses.

Such houses as are not in reach of sewers can dispose of their liquid sewage in some cases by direct discharge into a stream (taking this word in its widest significance), or into the sea. As a rule, however, it is absolutely necessary, and vastly better, to adopt some system of purification on the premises. Of systems of sewage purification, application to the soil is preferable to mechanical filtration, or to chemical precipitation. The latter methods should only be resorted to where no land suitable for disposal is obtainable. Of the methods of applying sewage to land, broad irrigation is least favorable, as it requires a large area of land, and in cases where the field is located close to the house, it becomes objectionable. Intermittent downward filtration, while requiring a much smaller surface, is yet open to the second objection made to surface irrigation. Far preferable, for single houses and isolated institutions, is the sub-surface irrigation system. Leaching cesspools are absolutely inadmissible, and the same is generally true of tight cesspools with overflows into a ditch or water-course. In

Disposal of Rural Sewage.

a few cases it may be necessary to adopt a perfectly tight cesspool without overflow, and to pump the liquid out at frequent intervals, distributing it on the land. This alternative should be resorted to only where all other methods prove objectionable or impracticable.

In the following I shall dwell more at length upon the *disposal of sewage by sub-surface irrigation*, for in my judgment, this is the most available system for the disposal of liquid and semi-liquid wastes of isolated country houses. The system has long ago attracted public attention, and has, in recent years, been taken up by the foremost sanitary engineers, for more than any other method, it promises the entirely successful solution of the problem of sewage disposal for isolated houses. It certainly recommends itself, owing to the peculiar facilities for disposing of sewage *without creating an offense to sight or smell*; for it is only too well known that open or surface irrigation becomes, in many cases, exceedingly objectionable in close contiguity to mansions or dwellings.

The origin of the sub-surface irrigation system is usually attributed to the Rev. Henry Moule, Vicar of Gordington, the inventor of the earth-closet. He looked upon it as the best solution of the

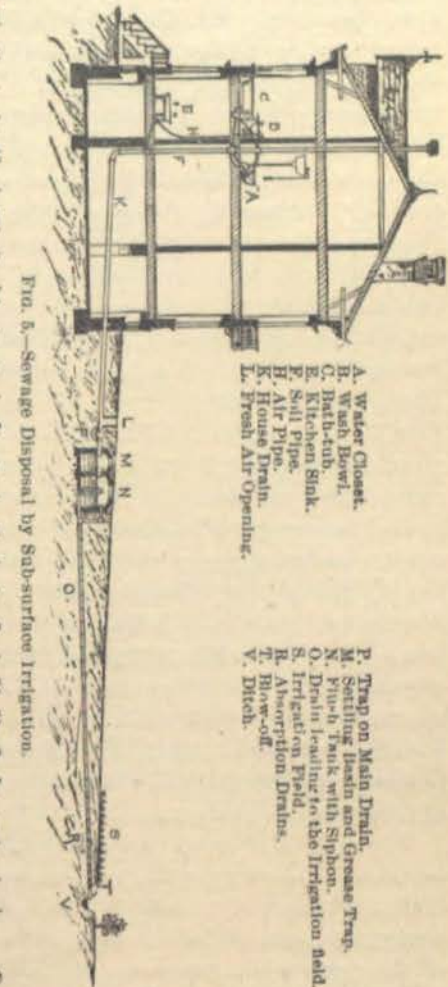


FIG. 8.—Sewage Disposal by Sub-surface Irrigation.

A. Water Closet.
B. Wash Basin.
C. Bath-tub.
D. Kitchen Sink.
E. Kitchen Sink.
F. Soil Pipe.
G. Air Pipe.
H. House Drain.
I. Fresh Air Opening.

P. Trap on Main Drain.
M. Settling Basin and Grease Trap.
N. Flush Tank with Siphon.
O. Drain leading to the Irrigation field.
S. Irrigation Field.
R. Absorption Drains.
T. Flow-off.
V. Ditch.

Disposal of Rural Sewage.

slop-water disposal question for cottages which adopted the earth-closet system. But according to Mr. Edwin Chadwick, sub-surface irrigation had previously been tried, independently and systematically, on a large scale, by M. Charpentier, a French vine grower, near Bordeaux. Mr. Chadwick states that the results which the latter obtained with vines and fruits, as well as with market-garden produce, were most satisfactory. The system would probably never have grown to its present popularity had it not been for Mr. Rogers Field, Mem. Inst. C. E., who, recognizing the desirability of intermittent action, invented his automatic flush-tank, which he applied successfully to the disposal of liquid household wastes. His first experiments were made at some laborers' cottages, belonging to his own estate at Sheffield, in Essex. Since then the system has been adapted to all possible conditions, and has given such satisfaction that it is now considered admirably suited to isolated houses not in reach of a sewer, but having sufficient porous or well drained ground about them, with favorable lay of the land. Col. Geo. E. Waring, Jr., was the first to try the system in this country, about fifteen years ago. Finding that it worked satisfactorily in the case of his own residence at Newport, R. I., then not in reach of a sewer, he adopted it afterward with success for the disposal of sewage of cottages and suburban residences, and on a larger scale for the purification of sewage at the women's reformatory prison at Sherburne, Mass., the Keystone Hotel, at Bryn Mawr, Pa., and at Lenox, Mass., for the sewage of the whole village. For a number of years the system has been extensively applied by many sanitary and landscape engineers, and by a few progressive architects, for the disposal of sewage from isolated country houses or institutions not within reach of sewers, but liberally supplied with water and plumbing appliances.

The system is based upon the well known fact that the aerated layers of soil *next to the surface*, the sub-surface as it were, possess in a high degree the power of destroying organic substances buried in them, by nitrification and oxidation, aided during a part of the year by vegetation, and assisted at all times by minute organisms or bacteria. The latter play an important part in the round of changes in nature. "They are," says Tyndall, "by no means purely useless or purely mischievous in the economy of nature. They are only noxious when out of their proper place.

Disposal of Rural Sewage.

They exercise a useful and valuable function as the burners and consumers of dead matter, animal and vegetable, reducing such matter with a rapidity otherwise unattainable to innocent carbonic acid and water. Furthermore, they are not all alike, and it is only restricted classes of them that are really dangerous to man. One difference in their habits is worthy of special reference here. Air, or rather the bacteria of putrefaction, is, according to Pasteur, absolutely deadly to the vibrios who provoke butyric acid fermentation."

I lay particular stress upon the importance of distributing the sewage close to the surface of the soil, at depth not exceeding ten or twelve inches. Aëration is a *conditio sine qua non* of the whole system. At greater depths oxidation and purification become very much slower until they cease altogether. The *sub-soil* is not able to effect a complete purification of sewage, as the oxidizing influence of the atmosphere does not so freely reach it. It is the layer of earth next to the surface, the *sub-surface*, which acts on the sewage. Hence the name of the system is derived, and it is an error, committed quite frequently, and to which I have more than once called attention, to call the system "sub-soil" irrigation.

We see, then, that only where sewage is distributed close to the surface, where sufficient oxygen attaches to the particles of the soil, are the organic matters in it taken up as nourishment by the roots of plants, and reduced or destroyed by the bacteria in the soil. The liquid fluid, freed of its coarser impurities, soaks away into the porous ground, and thus becomes still more clarified by filtration, so that when removed by deep under-drains, it is generally found to be quite clear, colorless, free of taste or smell. By arranging an *intermittent* discharge, the upper layers of the soil are enabled to take up oxygen during intervals between discharges, and to prepare for the next volume of sewage, while the ground is prevented from being saturated, wet and swampy.

There is a radical difference between such a system and a loose, or leaching cesspool. With the latter the area of soil used for purification is quite small as compared with the former, where the surface can be chosen in proportion to the amount of sewage to be disposed of, which is not a feasible thing to do with a cesspool. We all know that even in the case of a leaching cesspool, newly built and first put in use, some purification of the sewage which oozes out at its pores is accomplished by straining and filtration.

Disposal of Rural Sewage.

After some use, however, its pores clog up, and the soil around the cesspool becomes saturated with sewage matter, undergoing, in the absence of oxygen, a very slow process of decomposition. The sewage soaks away unpurified, polluting springs and wells, and

the unwholesome gases generated taint the ground-air, and, being given off at the surface, frequently enter our houses. It is for these reasons that all sanitarians look upon a leaching cesspool as a nuisance and a standing danger to health.

Briefly described, the sub-surface irrigation system consists of two parts: *First*—An absolutely tight receptacle, or sewage-tank for liquid household wastes, including the contents of water-closets. *Second*—A net work of common distribution drain tiles, laid a few inches below the surface of the ground, with *open joints*, so as to permit the liquid to ooze out at numerous points. This net work of pipes, buried in the ground, constitute the irrigation field. (See Figs. 5 and 6.)

As stated heretofore, it is an important condition to insure the successful working of the system, that the discharge of sewage from the sewage-tank to the irrigation field be *intermittent*, and that, instead of a constant, dribbling stream from the tank there be a powerful

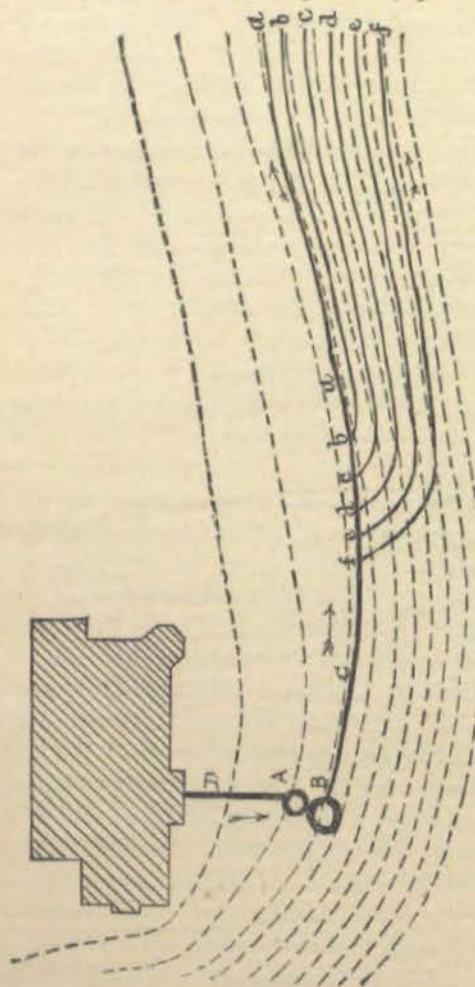


Fig. 6.

working of the system, that the discharge of sewage from the sewage-tank to the irrigation field be *intermittent*, and that, instead of a constant, dribbling stream from the tank there be a powerful

Disposal of Rural Sewage.

rush of sewage in a large volume, so as to secure an even distribution and the perfect filling up of all pipes. It is, to say the least, desirable that the discharge should not occur more frequently than *once a day*, that is, every twenty-four hours, and the size of the tank should be governed thereby.

The soil of the field should, preferably be gravelly and porous. All tight clay soils and ground liable to dampness, should be properly under-drained by deep land drains. The sub-irrigation field should not be located too near a house, wherever there is abundance of land favorably located, permitting the sewage to flow away by gravity. As a matter of precaution, it is well that some attention be paid in locating the irrigation field, to the direction of the prevailing winds, although as a matter of fact, a properly working irrigation field is quite inodorous. So much is this the case that the tiles may be, and in practice often are, laid under the well kept lawns adjoining summer residences, without ever causing an offense. Another precaution to be observed where the water supply of a country house is derived from wells or springs is, that the field should not be located near them.

The preparation of the sub-surface of the field is accomplished in the following manner: Common, unglazed agricultural tiles, two inches inside diameter and one foot in length, are laid eight or ten inches below the surface on

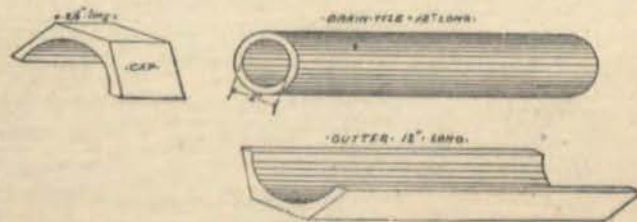


Fig. 7.

continuous boards, or better in gutters of earthenware, laid accurately in the trenches at the uniform grade required. (See Fig. 7.) Should the tiles ever clog up, it thus becomes an easy task to take them up, to clean them and to relay them in the gutters, an operation readily performed by a common laborer. It is quite important that there should be between the tiles at each joint, a space of about one-quarter inch to facilitate the oozing out of the sewage. Small earthen caps about three inches long are placed over the ends of tiles at each joint to protect it from dirt or earth falling from above.

Disposal of Rural Sewage.

(See Fig. 8.) It is not necessary to give the absorption tiles a greater fall than about two or three inches per hundred feet, for if laid at too steep a grade the sewage would rush to the lowest level, and saturate that part of the irrigation field. It should be noted that much of the success of the system depends upon the accuracy with which the distribution tiles are laid. They should branch out from the bottom of the main carrying conduit, and special **T** and **Y** branches are manufactured for this purpose. (See Fig. 9.) The main drain should be laid at least two feet deep, and the two-inch branches should be cemented until they strike the proper depth of eight or ten inches. The main drain conducting the sewage from the flush-tank to the irrigation field should be four inches in diameter, except in the case of large institutions, when the size of the flush-tank often requires a six-inch main conduit. It can be



Fig. 8.

laid with as much fall as the layout of the land will require, but when it approaches the absorption field, its fall should be limited to four or six inches in one hundred feet, to prevent the sewage from running to the lower part of the field, overcharging the lower lines of drains. The distance between the lines should average about five feet. The ramification and the general layers of the lines will depend on the contour lines of the land. In the case of level ground the lines may be parallel to each other.

The number of feet of tiles which it is necessary to lay will depend upon the quantity of sewage delivered each day. It will vary, moreover, for like quantities of sewage, with the general character and porosity of the soil of the absorption field. Wherever the soil consists of a heavy clay, or is liable to be wet or swampy, it is absolutely necessary to thoroughly under-drain the field by a complete system of agricultural tiles, laid at a depth of from four to five feet, removing and discharging the purified sewage as well as any excess of soil moisture.

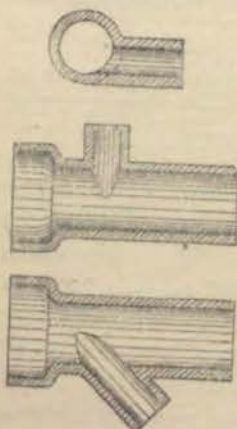


Fig. 9.

Disposal of Rural Sewage.

The flush-tank is usually built of hard-burned brick, laid in hydraulic cement mortar, and made perfectly water-tight. (See Fig. 10.)

An important and most necessary precaution to prevent the clogging of the siphon, which empties the tank, or of the distribution tiles, is to build in connection with the flush-tank, and between the house and the latter, an intercept-chamber or grease-trap, intended to intercept all solids, undissolved paper and fatty waste matters from the kitchen. Such a chamber is, in a cer-

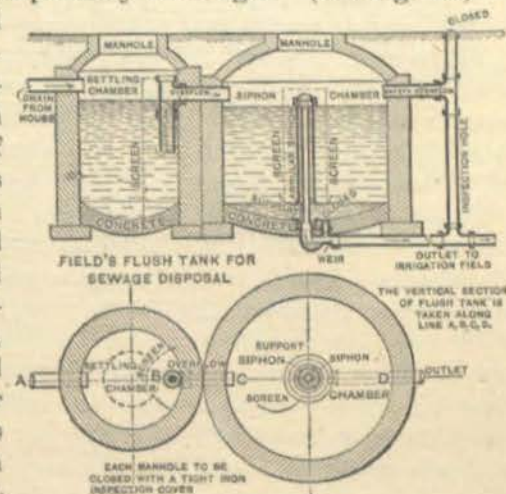


Fig. 10.

tain sense, a cesspool, although it differs from the ordinary objectionable device of this kind in having its liquid contents frequently changed, and in being built of small size. Its emptying and cleansing must, of course, by no means be neglected. Much of the solid matters and papers, etc., is reduced by maceration and decomposition, and flows dissolved by water into the liquid sewage chamber. The overflow pipe connecting both chambers must dip well below the surface of the water level in the first chamber, to prevent scum or grease from overflowing into the flush-tank. The flush-tank proper should, generally, be built circular in shape, and of a size to hold one day's volume of sewage. The liquid wastes from the household are retained in this tank until it is filled, when its whole contents are suddenly delivered into the main drain, and thence into the irrigation tiles, whereby all the rows of tiles are *uniformly* charged, and the whole of the absorption field is brought into use each time the tank is emptied. If the sewage is discharged suddenly in a large volume, it oozes out, not only at the bottom, but also at the sides and top of each joint. The purification begins at once. The clarified liquid soaks into the ground, the impurities being retained

Disposal of Rural Sewage.

by the earth, where they are quickly destroyed. Air enters the pores of the soil and prepares it for future use, while the tank is gradually filling for the next discharge.

The interval required between two consecutive discharges, the exact proportion between capacity of tank and size of house, between size of tank and number of feet of drain tiles, etc., are details requiring judgment, skill and experience, which must be left to be determined in each individual case separately.

To discharge the flush-tank, recourse may be had to various mechanical appliances. The simplest arrangement, but one that requires daily attendance and some manual labor, is to place a gate-valve at the outlet pipe leading from the bottom of the tank, which valve is opened or closed by hand whenever the tank becomes filled. This arrangement may answer for smaller country houses, in which the amount of water used is limited, being usually pumped into the house tank by hand. An *automatic* device is preferable in many respects. This may be either a tumbler or tilting tank, or one of the several siphon devices now in the market. I have so far, found none better nor cheaper than the annular siphon, as devised by Mr. Rogers Field, C. E. If space would permit, I should illustrate and describe the manner in which I usually arrange it, but this is not possible, and I must refer my readers to my illustrated book, "The Disposal of Household Wastes."

My description of the system of sewage disposal by sub-surface irrigation is, I trust, sufficiently definite to give a correct general idea of it. Having spoken so much in its favor, it is but proper that I should notice and mention the objections, which are at times, brought forward both by professionals and by laymen against the system.

1. It is sometimes feared that the land into which sewage is continually poured, will, after some years, become saturated with sewage, its surface wet or swampy, and the whole of the irrigation field a large cesspool, spread out latterly instead of downward. There is, however, absolutely no reason for apprehending such trouble. Wherever the soil is not naturally loose and porous, *under-drainage* is essential and must be provided for. If properly carried out, all superfluous moisture in the ground will be removed. *Aëration* is another essential condition, and wherever it is neglected the soil may become saturated with sewage matters. Finally,

Disposal of Rural Sewage.

intermittency of discharge is required, with intervals of at least twenty-four hours between consecutive emptyings of the flush-tank. Under-drainage of the soil and intermittent action of the flush-tank secure the much desired aëration of the sub-surface. This secured, oxidation and nitrification, and the destruction of the organic particles attaching to the earth will follow with regularity.

2. Much apprehension is often felt lest such a system will not work properly in winter time, and fear is expressed about the freezing up of the ground about the absorption tiles. Experience with the system in the coldest parts of the New England States has fully removed any doubts on this point. Where the system has been in continuous use, Winter and Summer, it is found by practical experience that the warmth of the sewage is sufficient to keep the ground at the disposal-field from freezing.

3. It is often objected that the necessary intercepting chamber for solids is in reality a cesspool. This is true to some extent; nevertheless I always advise to build this chamber in connection with the flush-tank, but I use the utmost precaution in its construction to make it perfectly tight. As regards this intercepting chamber, it should be remembered that the liquid sewage in it is constantly changed, for a large volume of water passes through it every day. Although the chamber retains organic waste matter partly putrefied, the amount can not be compared with that in a cesspool. Some of the solid matter is undoubtedly reduced by maceration, and being dissolved passes into the liquid chamber, from where it is discharged into the absorption drains, to be finally oxidized and rendered innocuous. By cleaning the intercepting chamber once a month, the amount of solid putrid matter may be kept down to a minimum; consequently there will be little if any exhalation of gases of putrefaction, and inasmuch as the water level remains constant—the intercepting chamber being always filled to the overflow level—gases are not forced out as in the case of ordinary cesspools. By means of proper ventilation the intercepting chamber may be kept quite free from offense.

Perhaps I should mention here that owing to these objections attempts have repeatedly been made to do away with the intercepting chamber. But in cases where water-closets are used and their contents discharged into the tank, it becomes imperative to prevent

Disposal of Rural Sewage.

the solid portions of the sewage from clogging the tiles, and the siphon which discharges the flush-tank.

I well remember an attempt made some years ago to do entirely without the intercepting chamber by simply surrounding the siphon (a Field annular siphon) with a double cylindrical wire screen of both coarse and fine mesh. In less than six months the tiles were entirely choked. The only alternative would seem to be to strain the solids.

English sanitary engineers, among them such well known authorities as Mr. Rogers Field and Mr. Wm. Eassie, prefer a straining chamber. To quote Mr. Field: "The distinguishing feature of this arrangement is that there is no tank or depression for the sewage to collect in, but that the bottom of the chamber is on the same level as the bottom of the drain, so that liquid sewage passes through the chamber without any obstruction. The interception of the solids is effected by two strainers, which consist of small iron rods fixed in an iron frame and so arranged as to be movable. The bottom of the chamber is constructed of concrete, smoothly cemented and rounded, so as to form a sort of a channel for the passage of the liquid, and to enable the solids to be more readily cleaned out. This bottom also has a rapid fall from the inlet to the outlet, which still further facilitates the rapid passage of the liquid. The sides are usually formed of brickwork, and the hole is covered with a light wooden lid, opening on a hinge." With such an arrangement a man can easily remove the solids by scraping them up by means of a hoe over the edge and mixing them with dry earth. To prevent such a chamber from becoming offensive solids should be removed daily.

A different arrangement from the above, which has also been repeatedly suggested, is that of having in a straining chamber a perforated pail or movable iron basket, which intercepts all the solids and which must be emptied and cleaned every day.

Of the two devices, the plain strainer appears to me to be far preferable. Personally, I have not yet tried either of the arrangements described. I should be willing to substitute the straining chamber for the intercepting chamber if I could rely explicitly upon *daily* removal.* The trouble involved is not large, it is true,

*NOTE.—Since writing the above the author has constructed such a straining chamber as is described in the preceding pages in connection with a 30,000-gallon flush-tank for sewage disposal at the State Homeopathic Asylum for the Insane, at Middletown, Orange county, New York.

Disposal of Rural Sewage.

but servants are proverbially neglectful, and the arrangement suggested certainly robs the system of one of its best features, namely, that of being automatic. If daily attendances is required, it might be just as well to require the help to empty the sewage-tank daily by opening a gate-valve, and thus do away with every kind of automatic siphon or other device, while retaining the features of intermittent discharge, and of a discharge of a large volume suddenly distributed over the whole of the irrigation field.

4. Owners of country residences find an objection to the system in the necessity of frequent emptying of the intercepting chamber just referred to, which, they claim, causes more or less of a nuisance. As an answer to this objection, I would say that of the two evils of cleaning out a large ordinary open cesspool and the comparatively speaking small intercepting chamber, the latter is far preferable. But in doing so I probably overlook the fact that the same people who raise such an objection would probably never see to it that their large cesspool is cleaned, paying no attention to it so long as the sewage runs off, no matter where to.

5. It is sometimes objected that the tiles will choke, and must be taken up and relaid. I cannot deny the possibility of such an occurrence, although this may only become necessary about every three years on the average. They will choke sooner if they lack the cleansing effect of a flush delivered at intervals from the sewage tank. Even supposing for a moment that the tiles would have to be cleaned and relaid every year, how little amount of labor, trouble and expense is involved in doing so, owing to their being laid in permanent gutters and close to the surface. Compare this with the trouble and annoyance of having to empty and clean a disgusting overflowing cesspool.

6. The system is objected to because the ground where the tiles are buried cannot be plowed, nor can heavy wagons drive over it without risk of breaking or displacing the pipes. This objection cannot be denied, but it is a slight one, if one at all.

7. Many people object to the cost of the automatic siphon. However expensive this may be, it cannot be considered a valid and sound objection against the system. As a matter of fact, the annular siphon, at least in the case of isolated suburban and country houses, does not cost very much. But, where this expense

Disposal of Rural Sewage.

is objected to, the mistake should not be made of providing only one large overflow pipe from the liquid sewage-tank, from which a constant small stream dribbles toward the irrigation field. This is a very imperfect and faulty arrangement. Only a short length of the tiles would receive an almost constant trickling flow of sewage, saturating the ground around it to the surface and keeping it in an unwholesome condition. Moreover, the tiles would rapidly choke up with such an arrangement. Aëration, intermittent action, oxidation, powerful flushing, the uniform and entire filling of the tiles—all of these conditions essential to the success of the system would be absent.

As indicated heretofore, a stop-valve in the outlet pipe, worked by hand, may take the place of an automatic siphon. The only other admissible arrangement, and one which I have adopted with perfect success for smaller country houses, where the owners objected to the cost of an automatic flush-tank, is a sewage-tank provided with a large number of overflow pipes, all placed exactly *at the same level* in the tank—not a very easy thing to do, by the way—and all discharging simultaneously equal or nearly equal portions of the sewage into the various lines of absorption drains, thus securing a better distribution of the sewage. In this arrangement the tiles are likely to choke sooner than in the system with intermittent flush-tank, since they lack the cleansing effect of a sudden rush of water from the tank.

8. Another objection is the cost of the system. The first expense is, of course, more than that for a cesspool of moderate dimensions, but the frequent recurring expense of cleaning and emptying the latter soon renders the sub-surface irrigation system cheaper than the ordinary cesspool. For a small country house its whole expense should not exceed two hundred and fifty dollars, and for a large country residence the system ought not to cost more than five hundred dollars, which prices include the royalty on some of the better class of patented automatic flush-tanks.

9. It is sometimes stated that the sub-surface irrigation system is impracticable in the case of level ground, or where the lawn rises at the rear of the house, or where the main soil-pipe leaves the house at a depth below the cellar floor. To this I add that some concessions must, under such circumstances, be made. For instance, in places where the available fall from the house to the

Disposal of Rural Sewage.

irrigation field is slight, no plumbing fixtures should be placed in the basement, and the soil-pipe should leave the house as near the surface as practicable. In some cases it may even become necessary to build the flush-tank in embankment, hiding it in a sort of artificial terrace at the side of the house. By making the tank of a shallow depth it is usually possible to effect a suitable arrangement. In extreme cases it may become necessary to lift the sewage after straining, and this may be accomplished by a variety of mechanical devices. Where a small air compressor may be operated in the cellar of the house, Shone's sewage ejector appears to offer a simple solution of the problem. Where steam is available, a pulsometer pump could be used for lifting the sewage. If gas is laid into the house, or a gasolene gas-machine is in operation, a gas-engine or hot-air engine may prove economical. Finally, the motive power of the wind may be used for such purposes, by erecting a wind mill with suitable pumping apparatus. Whatever the special difficulties may be in each case, they can usually be overcome at a slight sacrifice. Certainly they should not be considered objections to the system as such.

10. The objection that the sub-surface irrigation system poisons wells may be removed by simply locating the field away from wells, or where it must necessarily be close to a house by abolishing wells, and depending on rain-water collected in tight underground cisterns, as a source of water-supply.

11. Some think that it is impossible to purify sewage by turning it into agricultural drains located at a depth below the roots of the plants. It is hardly worth while to consider this objection, as many years of successful working of the system seem to amply contradict it.

12. The system has received condemnation because "sub-irrigation is a process faulty in principle, as it feeds vegetation by the upward rising of the moisture, accompanied by evaporation, with all the chilling influences which are so injurious to vegetation as well as to human beings." I can only answer that, so far as my personal observation goes, practically no harm has ever been done to vegetation; on the contrary, it stimulates the growth of grass, of shrubbery, and of fruit trees, which statement, I am confident, is borne out by the experience of other sanitary engineers.

Hygiene—The Science.

13. Where the irrigation field is under-drained it frequently happens that at first the sewage leaks away too quickly, and without being purified, at the points where the distribution tiles cross the lines of agricultural tiles. This can be remedied after a while, when the earth in the deep trenches for the land-tiles settles down and solidifies.

This, I believe, comprises all the criticisms raised against the sub-surface irrigation system. While I do not wish to be understood as claiming this method of sewage disposal is a panacea for all the evils incident to country house drainage, I hold that the system is an excellent one wherever suitable land, of suitable character and of sufficient area, properly located, may be obtained. For a more detailed discussion of the whole subject I may be permitted to refer to a small volume, recently issued, entitled "The Disposal of Household Wastes."*

HYGIENE—THE SCIENCE†.

As chairman of the delegation accredited to you by the State Board of Health, I salute the Iowa Public Health Association to-day. We bring the cordial greetings of the parent body to this a vigorous daughter society, which is beginning to distinguish itself in its chosen career, whose object is "to check the fill of human graves."

The parent organization has lived a busy life since it was created by legislative fiat nearly thirteen years ago, and its achievements, limited as are its powers under its organic law, have not been few nor unimportant. Mindful of the restrictions which general lack of hygienic knowledge has set to its endeavors, the parent body welcomes the assistance which such an educational organization as yours can give it. Coming, as you do, from all sections of the

* *The Disposal of Household Wastes*, by William Paul Gerhard, C. E., New York: D. Van Nostrand Co., New York, 1896. Price 50 cents.

† Address to Iowa Public Health Association, Des Moines, Oct. 27th, 1892, by E. A. Gullbert, A. M., M. D., LL. D., and member of the State Board of Health.

Hygiene—The Science.

State, where you are in direct contact with and have the ear of the public, if you rightly cultivate and expand the latent influence you possess, there is no limit to the good you may do in the direction of the proper hygienic education of the people; no boundary to the aid and comfort you may render the State Board, whose counsel, sympathy and official support we are commissioned to tender you.

The allegorical vignette of the State Board of Health explains the reason for the creation of that body and outlines its duties as well. That theory and practice, likewise, belong to this kindred society, and the same might with propriety be adopted by you. The vignette represents, as you are aware, the queen of Grecian mythology—Hygeia, the beautiful daughter of Esculapius, with the emblematic Egyptian serpent drinking the water of wisdom, health and life from the cup in her hand. At the base of allegory is seen the legend "*The welfare of the people is the supreme law.*" The lesson of the motto forcibly announces the benign aim which is the breath to the life of both organizations.

But, gentlemen, if you elect to adopt the design as your own, let me beg of you not to repeat the solecism which the parent body committed when it clothed Hygeia in modern garb, instead of the picturesque classical costume of the olden time. It is as much a violation of the eternal fitness of things as it would be to put pantalets, breach-clout and chest-protector on the Venus de Medici before exhibiting that marvelous presentment of the "human form divine" to a popular audience.

To emphasize its good will, and to signify its appreciation of the value of your cooperation, the State Board sends as one of its formally appointed delegates to this body, its genial president himself. It also tenders you as essayists, its very efficient secretary, and the distinguished president of the State Board of Medical Examiners, thus again announcing its respect for its daughter society, between whom and the parent body, "no contention should ever exist, except that noble contention, or rather emulation, of who best can work and best agree."

Mr. President, as we look backward through the ghostly aisles of the generations and note how numerous have been the medical theories which have been wrecked on the shores of the ocean of time; imposing heavy penalties for the lessons of wisdom they have inculcated; we are gladdened to observe that the day star of

Hygiene—The Science.

Hygiene has never ceased, since its discovery in the forenoon of the ages, to shine with a distinguishable luster. Its healing rays have often been obscured by the fogs of mediæval ignorance, and later on, by criminal public indifference and municipal parsimony; but still the votaries of the good goddess Hygeia, have never failed to recognize the light of her day star with the eye of faith; always comprehending the analogy between its temporary obscuration and that of the sunshine which though "broken in the rill and turned astray is sunshine still."

Indulge me in some retrospective reflections on the theme of this desultory address. They will not be found to be inopportune, I think. Consider them to be ephemeral appetizers, "little tiny kickshaws," introductory to the substantial viands of the elaborate intellectual banquet prepared for the budding and full-blown scientists here assembled. From this banquet, to-morrow rising and departing "serenely full" these epicures will say: "Fate cannot harm me, I have dined to-day." And they will go hence like athletes from their trainers, endowed with new skill, strength and zeal for the conflict awaiting them in the arena of this hurrying life. This banquet, by the way, is unlike one of the fashionable public banquets of the times, so graphically described by Donnelly as being: "An intellectual exhibition interrupted by food; a commingling of the 'feed' of our gluttonous ancestors with the literary lyceum and debating society of our modern civilization; neither perfect eating nor perfect thinking; but an incongruous mixture of both belly and brain stirred together in a kind of uncomfortable suet pudding."

At this banquet of the mind attend men "whose God is not their belly." They are rather, the self-ordained preachers of a hygienic gospel whose aim is to lighten humanity's burdens by teaching it the ways and means to human health and length of days, chivalrously unmindful of the effect a general practice of their teachings may have upon the bank account of the preachers.

The wide-spread enlightenment of this generation has made it vain-glorious and often forgetful of the fact, that it is only within the past fifty years that hygiene has risen from an art to occupy its foreordained and conspicuous position in the family of sciences. Our vainglory has likewise caused us to ignore our debt to Moses, the lawgiver, "the heir of all ages in the foremost files of time."

Hygiene—The Science.

Moses, the incomparable patriot, who compacted the inharmonious horde of fugitives from Egyptian bondage into a nation and gave them a system of jurisprudence and social and governmental philosophy which has tinctured the laws and customs of subsequent peoples, and who was also, the first great sanitarian whose name is recorded in literature accessible to us. No modern writer on hygiene has better outlined the human principles of the science than did Moses in the Pentateuch. We find their scientific directions regarding the detection and management of infectious diseases; the proper uses and methods of applying quarantine and isolation; the necessity and modus operandi of disinfecting infected houses; the obligation of personal and home cleanliness; the relations of the sexes; the care to be observed by women during the physiological process of menstruation; the sanitary treatment of puerperal women; the prompt cremation of infected garments; the hint on which the inventor of the modern earth-closet spake; the wise directions as to what his people should eat, drink and wear—in fine, the Pentateuch contains the very essence of the science of hygiene, so succinctly stated as to justify us in proclaiming Moses to have been its founder. We of latter days have never been able to add new principles to those enunciated by Moses. It has simply been ours to manipulate his teachings amid more complex surroundings, reducing to practice and simplifying the details of the numerous outgrowths of his hygienic doctrines, and then giving them "free course that they might grow and be glorified throughout the earth." I may add that among the many hints anent the medical treatment of disease, some of which have been verified in modern times and enlarged in their application, developing new and benign thought, is the treatment of *boils*. Some years ago I read in a medical journal the announcement, accompanied by an amusing flourish of print pyrotechnics, of the discovery of a *new* poultice for "gum boils!" which, the same, was a fig! The idea seemed familiar to me. I searched the scriptures and I found that the appliance was of the old, oldest, and was of more general application among the ancient Jews. Here, let me parenthetically remark, I am reminded that the fig tree, which by the Jewish preachers, down to and including the greatest of all, "Jesus Himself," was so often pressed into the service "to point a moral," had still other significance. The leaves thereof were honored by use at

Hygiene—The Science.

the nativity of the beneficent hygienic virtue, *Modesty*. Recall to mind the record of the episode and its dramatic details. The command not to make the fruit of the Tree of Knowledge an article of diet; the flirtation of Eve with the snake; the immediate development of her fateful gastronomic crime, in which by her winning ways—so often since repeated by her daughters to man's undoing, as I have heard—Adam was persuaded to participate; and then, the sudden resultant knowledge of their nakedness, which came to the complaisant father of the race, and his beguiling help-meet; then the corollary, the prompt establishment of the first manufactory of hygienic clothing of all time, in which the two perverts "sewed themselves fig-leaves for aprons." At that supreme hour "pure and vestal" Modesty was born and became the heritage of Humanity.

But to return: The article of the ambitious writer aforesaid whom Artemus Ward would have called "an amosin cuss," seemed to furnish a new meaning to the Musselman's street-vender cry: "In the name of the prophet Figs!" The medical journals, strange to say, teem with these second-hand discoveries, these illustrations of the adage, "great minds run in the same channel." But then, occasionally they succeed in reviving valuable forgotten truths, and so have a certain use. Tennyson's couplet seems to explain these unconscious cerebrations of men ambitious to see their names in print—

"I doubt not through the ages one increasing purpose runs,
And the thoughts of men are widened with the process of the suns."

Again: The origin of the "Faith Cure" of modern days is found in the "brazen serpent" episode of that event-filled forty years of pilgrimage in the wilderness, a probationary period necessary to the thorough blending into the semblance of a nation of the motley ignorant and rebellious horde of Jews whose problematic future, and whose present exigencies burthened the great heart of their leader. They who were poisoned by the fiery serpents, and who looked and lived, worshiped not the things they saw, but the all-beneficent powers behind it. *This* Faith Cure was proffered "without money and without price." It came in prompt response to the simple muscular endeavor involved in the turning of the infected body, and the opening of the eyelids. No Pecksniffian bunchoist,

Hygiene—The Science.

richly apparelled, stood in the shadow of that sacred symbol with "itching palm" extended to receive unearned tithes from the beneficiaries thereof.

Modern Faith Curists, who are nothing if not commercial, and who profanely claim to stand as angel ministers between Deity and the sick, ply *their* art for a consideration!—that is to say, they have "stolen the livery of Heaven to serve the devil" of unmerciful greed in.

It does not detract from the force and validity of the sanitary preaching of Moses, that he was the mouthpiece of the historic cultivation of the Egyptians. Up to the age of forty years, and until he fell from their grace by righteously slaying one of the oppressors of his people, he was admitted to the inner circles of the scholarly priesthood, the conscience-keepers of the masses. He had sounded the depths of their conceded wisdom, and it insensibly colored his after-utterances, and gave force and power to his teachings. Even in the unsmiling system of religion which he delivered to the Jews, and of which, in a certain sense, he was the author, the same influences crop out in the costumes of the priests and in the forms and ceremonies of the Tabernacle worship, and are seen at this day in one direction. The sanguinary law of retaliation which was the key-note of their religion, was also inspired by Egypt, but it was the best, the most logical system probably, which Moses could bestow on the ignorant multitude whom he was leading out of bondage, who were the brutalized out-put of centuries of grinding oppression, and whose natural hatred of their Egyptian task-master thrilled every fiber of their being, leaving no avenue for the ingress of a more merciful creed. Moses created a people who had a long and romantic career. But their nationality has ended, their temple is a thing known only to tradition, and upon its echoless area, whose cyclopean walls attest the indomitable patience and the mechanical skill of Solomon and his craftsmen, an alien race and religion are seated. Israel has become "the Niöbe of nations," a nation of no abiding land, a wanderer on the face of the earth. Yet the theology of Moses is at this present, a distinct entity. The positive racial characteristics of the ancient people still distinguish their prolific descendants, and to-day, no matter what may be his surroundings, the Israelite stands forth a

Hygiene—The Science.

well-defined and living link between the hurrying Present and the storied Past. To-day, as in the Mosaic age, the social and sanitary doctrines of the law-giver, dominate the Jewish family and community, and as distinctively shape their methods of living as they did in the aforesaid. Reverence for and obedience to those wholesome sanitary lessons announced in the forenoon of the ages is as much a part of the Jew's being as is the air he breathes. Unreasoning and vindictive persecution, and the outlawry of centuries, during which "sufferance has been the badge of their tribe," has failed to make apostates of the Jews, or to cause them to ignore in their "lives and active correspondences," those sanitary lessons which have been the primal sources of the conspicuous mental and physical health of the race, and has constituted it a shining example of the blessings which practical hygiene is capacitated to bestow upon a receptive people.

Mr. President: My theme is beguiling and might indefinitely be expanded, but in mercy to you I forbear. Indulge me a little longer, while I submit a few reflections germane to the mission of your association, and I will give place to the intellectual banquet awaiting your members and guests.

The triumphs of our science within the past thirty years have been many and notable. In them are heard the trumpet-blasts which rally the knights of hygiene to newer and greater achievements in the future, within the present generation. State Boards of Health became possible and materialized in almost every commonwealth of the land. *They* have been the promoters of that expansion of the curricula of medical colleges which has put them more closely in touch with the progressive spirit of the age. They have been largely the instigators of the decadence of the didactic method of teaching, which had become canonized by use, and the general adoption of the more rational policy of clinical instruction.

They have been the main factors in the final adoption of the four years' course as a condition precedent to graduation, and of that graded system of teaching; that invaluable reform, which my lamented friend, the late Prof. H. P. Gatchell, devised and saw satisfactorily exemplified for the very first time thirty-six years ago, when we were colleagues in the Western Homeopathic College, at Cleveland, Ohio, though singularly enough they have ignored the author thereof.

Hygiene—The Science.

They have mainly been instrumental in securing the adoption of that wholesome rule which demands that he who aims to begin the study of medicine, shall first be the possessor of adequate scholastic attainments.

And above all, they have given new impetus to the study of the science of hygiene and its numerous outgrowths; arousing the public from its conservative lethargy, and fixing its considerate attention upon methods, which, if carried out to their logical sequences, will add millions to the wealth of the nation.

We can hardly estimate the effect upon the nation's material resources, which is superinduced by the prompt stamping out of epidemics; by the prevention of preventable diseases; and by hygienic measures promoting the health and increasing the longevity of the people.

The annual sum-total of money loss to our country consequent upon sickness and the enforced idleness of producers, is beyond computation. Reduce this loss to a minimum, as is now gradually being done under the beneficent influence of hygiene, and thus keep the worker uninterruptedly, in harness, and it goes without saying that I do not romance when I aver that general observance of the laws of our science, is certainly rewarded by national financial blessings.

During the twelve busy years of its life, our State Board of Health has been a moving factor in the college reforms and the public enlightenment to which I have referred. Its members have, uniformly, been at-one-ment among themselves, and are devoted to the important duties devolved upon them. The organization has indicated its right to live, and has demonstrated its capacity to use, as not abusing them, the modified powers bestowed upon it by the legislature of the State. Its usefulness would be greatly enhanced if those modified judicial powers were increased.

Your members, Mr. President, as I have before stated, sustain cordial and intimate home relations to the public. They have likewise a wide acquaintance with the conductors of the state press, that potent educational agent, whose influence is vast and far reaching, and whose utterances, when well considered, compel public attention, and are generally trustworthy, except when the conductors aforesaid discuss *partisan* politics, or the last salacious scandal, or the latest prize fight abnormality. Hence you have it in

Hygiene—The Science.

your power, speaking as intelligent men to intelligent men and women, to prepare the way for legislative enactment such as those we crave for the purpose of placing our State Board of Health on a par with those of Illinois and New York, whose decrees on matters relating to the public health are really mandatory instead of being largely advisory, as are ours. The State Board desires such enlargement of its powers, solely because then it would be enabled better to subserve the interests it was formed to promote. Speaking as I am, to a body of well informed men, it is perhaps unnecessary for me to say that no question of the personal aggrandizement of members of the State Board is hid in the suggestions I have made. Its members are not built that way. Such is the nature of our charter that all questions are eliminated from any proposition to add to our judicial powers.

There are many topics of paramount importance which confront the hygienist of to-day. Permit me to name a few of them ere I close.

First—The necessity of the immediate enactment by the general government of stringent quarantine laws applying to the frontiers of the country. The quarantine burden should be removed from the seaboard States, and should be transferred to the United States Marine Hospital Service, which is admirably equipped for duty. The reason for such national quarantine I have no time to specify, nor is it necessary. The mere mention of the topic to the thinkers whom I address, at once suggests to them the arguments in its favor. We needed such government quarantine two months ago. Possibly, nay probably, we may need it more next Summer. So experience teaches. It is best therefore to prepare for the threatening exigency in advance. In the words of Edmund Burke: "Early and provident fear is the mother of safety." Would it not be well for the Iowa Health Association to cause to be prepared and forwarded to our senators and representatives in congress, a terse memorial, urging the adoption of a national quarantine law? And should not such memorial set forth, in strong terms, the necessity of requiring the cremation of the bodies of those dying from infectious epidemic diseases, as in the long ago did the Jews in Tophet in the valley of Hinnom?

Second—The intelligent restriction of immigration. Is it not time that congress acted in the direction of prohibiting the dump-

Hygiene—The Science.

ing of the pauper, diseased refuse of foreign nations, on our shores to pollute our air, fill our hospitals and alms houses, and impede American labor in its hot race for subsistence? Ought not public health associations and state boards in every State unite in organizing a monster petition movement on this behalf? If you say, yea, why not inaugurate such a movement at once?

Third—The cremation of the dead. As our cities grow to be more crowded annually, this question has become one of great moment to the living. I am aware of the sentimental arguments against this policy. I am also aware that the welfare of the people, as a whole, is the supreme law. That law should govern in the discussion of this question, which like Banquo's ghost, will not down.

Fourth—The passage of state laws requiring the cremation of garbage in villages and cities. This is one of the most important sanitary questions of the time. It needs that the State itself intervene between the apathetic municipalities and the people, for the people, in order that this reform should become universal. Have you not also a duty to do in this direction?

Fifth—The modification of the curricula of our public school system; the change of the school age from five to seven years, with proper Kindergarten prelude; and the reduction in the school hours of children under ten years of age. These are questions that we should discuss and then decide to press our deliberate conclusions upon our legislature. They are questions involving the mental and physical health and the future career of those restless little nerve-stormers, those delightfully troublesome counter-irritants who are being trained to take up the public burthens we must soon lay down. Nothing concerning our public school system should escape your attention as hygienists and patriots. In both capacities you should resolve to "spend or be spent" in the "reasonable service" of that system which is designed to help shape the character of our successors. It is the only platform in the land on which the children of men of diverse countries, sects and opinions, can meet, and blend, and grow in the nurture and admonition of patriotism and tolerance into the full stature of stalwart Americanism. May he be anathema who would "remove the land-mark our fathers have set."

Many other sanitary questions are in mind, but I pass them for the present. Those named will suffice to give you ample work, if

Hygiene—The Science.

you elect to advocate them. To attempt too many reforms at once, weakens endeavor, and threatens failure in all.

That you have the zeal and power to become leading factors in this sanitary crusade, seems to me to be a truism. You are of the people, by the people, and for the people. You are now in counsel as "the genius and mortal instruments" thereof.

The harvest is ripe. Workers are needed. Therefore, make haste to increase your membership from the ranks of brainy men and women. Arrange for semi-annual meetings, and do not hold them exclusively in one city. Rather, put your association on wheels and *seriatim* fill all the towns in Iowa with your life-giving, hygienic clamor. Let your essayists cultivate the arts of docimacy, the art of applying tests, and the art of avoiding learned technicalities, which "pall upon the sense" of the general public and repel it as well. Above all, let me admonish you to discipline all selfish instincts into docility to the noble legend: "The welfare of the people is the supreme law," which is inscribed on the banner under which you march. Thus battling "for the right which lacks assistance," and against "the wrong that needs resistance," you will quit yourselves as men, and will duly accomplish your mission.

"Men of thought, be up and stirring,
Night and day.
Sow the seed, withdraw the curtain,
Clear the way.
Men of action, aid and cheer them,
As ye may."

How much do you weigh?" said one to a Hoosier, who replied: "My ordinary weight is one hundred and sixty-nine pounds, but when I am mad I weigh a ton." Such, in my judgment, should be the normal weight of every hygienist—intelligently mad in the advocacy of that science, which stands for the "healing of the nations."

Mr. President, I have done. Pardon me if I have seemed to be dogmatic in speaking as I have to-day to a body composed of men whom I recognize and salute as being "first among their equals." "Out of the abundance of the heart the mouth speaketh." He whom experience and study have made to feel deeply on given topics must needs speak strongly.

Myopia.

MYOPIA.*

In attempting to prepare a paper for this society I realize the fact that you are a heterogeneous body—some of you being physicians, dentists, teachers, while still others are business men and women. With these thoughts in view, and to make what I have to say as comprehensive as possible to all, I have deemed it wise to talk in plain language, throwing aside scientific terms and names, so far as possible. I realize that a few facts, plainly put, will benefit you more than a long scientific discourse, of which you might understand but little. I will begin by making a general outline of the eyes, so we may understand what is being said in the body of what comes after.

The eye, then, is the organ of vision. It is a globe filled with liquid. It has three coats. The outer one a white fibrous, the middle a vascular, and the inner a lining coat. The inner called the retina, forms a film for the reception of images falling upon its surface. In the front part of the eye we have a round, transparent portion, which admits rays of light to the interior of the eye. Immediately behind this clear portion, called the cornea, is the colored part of the eye called the iris. It has for its function the admitting of light, much or little, as it is open or closed. Behind this is the lens through which all the rays of light entering the eye must pass. All in front of the lens is filled with what we term the aqueous humor, a fluid about like water, having nearly the same density as water. Behind the lens is the larger cavity of the eye which is filled with a semi-fluid mass called the vitreous. These media are transparent and tend to center the rays of light passing them. If the eye be looked at and compared with the photographer's camera, we find a remarkable similarity. The cornea represents the opening in front of the camera. The iris is simply a

*Read before the Iowa Public Health Association at Davenport, August 31, 1893, by Dr. Charles M. Robertson, residing at Davenport.

Myopia.

shutter which works automatically. The aqueous humor, lens and vitreous humor, correspond with the lens of the camera, and the retina is the counterpart of the film plate which receives the image. Now with these points in view let us see how the rays of light are treated as they pass into the eye.

If the rays of light coming parallel to each other—that is, making with each other an angle less than five minutes—focus in a point upon the retina, we have what we call a normal eye. If, however, the axis of the eye is shorter than normal, the rays of light will come to a focus behind the retina, and thus at the position of the retina we would get circles of diffusion and therefore an indistinct image.

This is known as a far-sighted eye. Now, if the reverse is true, that is, the axis of the eye from before backward is too long, the rays would focus in front of the retina, and crossing, would begin to diverge again before they would reach the retina. Here also we would have circles of diffusion and consequently an indistinct image. This is what is known as a myopic, or near-sighted eye. We do not care to treat of the eyes that are too short, but look only at those whose axis is too long and see what we can find in young people who are growing up and whose future eyesight we hold in our hands. We are here assembled as a society, the chief object of which is the prevention of disease in every form. We believe in the adage that an ounce of prevention is worth a pound of cure. This being the fact, I feel it my duty to call your attention to the increasing near-sight in school children and students, it being a disease that is making great inroads on the healthy structure and functions of our young friends' eyes. I mean by this the disease that comes on, taking with it eyes that under proper surroundings would never have become near-sighted, or at least very little so. It has been thirty years since the increase of myopia in the school children was noticed, and we have to thank Dr. Cohn, of Europe, for his valuable and able work in examining over ten thousand scholars of different schools and formulating tables for showing the per cent in the different grades. In 1865 and 1866 Cohn undertook and examined ten thousand and sixty school children in such a way that first a preliminary examination of all children was made in the classes with letter tests, and then individual examinations with the ophthalmoscope of those who had not seen

Myopia.

the letter tests at normal distance. Farther, he measured in each of the one hundred and sixty-six classes the size of the children, and all the dimensions of the seats which he found. In each case the age of the pupil, school year, reading test, and result of the ophthalmoscope were recorded. In this detailed manner he examined five village schools, twenty town elementary, two intermediate, two schools for girls, two common and two gymnasium schools.

In the five village schools he found 1% per cent myopic.

In the twenty elementary schools he found 6% per cent myopic.

In the two schools for girls he found 7% per cent myopic.

In the two intermediate schools he found 10% per cent myopic.

In the two common schools he found 19% per cent myopic.

In the two gymnasium schools he found 26% per cent myopic.

The per cent in the total was 9%.

In the city elementary schools from four to five times as many short-sighted children were found as in the village schools. In the village schools the number of short-sighted varies only in general from % per cent to 3% per cent; on the contrary in the elementary schools they varied from 1% per cent to 15% per cent. In the gymnasium the variation amounted to only two to four per cent. It appeared that the number of short-sighted from class to class increased. Of the village schools the number of short-sighted in the third class was 1% per cent; in the second class 1% per cent, while in the first or highest class it was 2% per cent. In the twenty elementary schools it was in the third class 3% per cent, and in the first class 9% per cent. In the common schools it was in the sixth class nine per cent, and in the first class forty-four per cent. In the gymnasium, sixth class, 12% per cent; first class, 55% per cent. Here more than one-half of the first grade were near-sighted.

In the village and elementary schools no essential difference was found between the two sexes. But in the higher grades twice as many boys were near-sighted. (This was perhaps because so many girls drop out of school early.) From the preceding we find that the percentage of myopia increases as the length of time spent in school and that the degree of the disease increases in like proportion. These results were confirmed by Dr. von Reuss, of Vienna, in his investigations in the Leopoldstadt gymnasium. In May, 1872, he

Myopia.

examined four hundred and nine pupils, thirty-five per cent of whom were normal, twenty and five-tenths per cent far-sighted and forty-one and eight-tenths per cent near-sighted. The remaining two and seven-tenths per cent were troubled with astigmatism or sore eyes. He examined them from class to class and found the myopia to increase from twenty-eight per cent in the lowest class to forty-eight per cent in the highest. Far-sight decreased from thirty per cent in the lowest to twelve per cent in the highest. One year later he examined them again, only twenty per cent of the same children being present, myopia was found progressive in forty-six per cent. The same in forty-two per cent, and decreased in twelve per cent. In the lower class more stationary cases were found than the higher. In France the pupils at Lyons were examined and found to be three per cent myopic. Later they examined the scholars in a lyceum and found twenty-three and four-tenths per cent myopic, about the same as in the German gymnasiums. At Marseilles three thousand, four hundred and thirty-four pupils were examined with glasses and the ophthalmoscope and seven to eight per cent were found near-sighted in the children of the Christians, while fifteen per cent were found in the Jewish schools. The larger proportion of Jewish children being descendents of store keepers, while the Christian children were the descendents of farmers and peasants. Some claim that there is no difference in per cent between Jews and Christian children, but both are about thirty-five per cent. In Italy nearly the same results obtain. Also in Sweden and Hungary. In America four hundred and fifty-seven negro children were examined at ages varying from five to nineteen years who attended the New York schools. In the lowest class 1 $\frac{1}{2}$ per cent, in the highest 3 $\frac{1}{2}$ were myopic. The short-sighted were, as a rule, over ten years of age. The higher degrees of myopia occurred in pupils over fourteen years of age. In the primary departments of both schools there were no myopic children. Derby found in Amherst college twenty-eight per cent, in Harvard twenty-nine per cent of myopia. After three years he repeated the tests and found over ten per cent of the normal eyes had become myopic, and that myopia had increased twenty per cent. One thousand four hundred and seventy-nine pupils were tested in New York and found to be twenty-nine per cent myopic, about the same as the Germans. Collard, among seven hundred and ninety

Myopia.

eyes of Dutch students, observed twenty-nine per cent myopic. We can go on and give statistics obtained in America by gentlemen in Philadelphia, Springfield, Hartford, Boston, Cincinnati and Kansas City and find the general per cent increases from the lowest primary schools at two or three per cent, to the average of twenty-five or thirty per cent in the higher schools, up to Amherst college, which in '83 had forty-seven per cent. If we should go higher still and examine theological, medical and higher classical students we find myopia reaching in some places as high as eighty-one per cent—fifty and sixty per cent being common.

From these tables we see at the present rate the whole civilized world will soon become near-sighted with the demands which their school work is making upon them.

The question naturally arises as to the cause of this increase in myopia?

We know that the eyes have on six sides of them muscles for the purpose of turning them in accordance with the will, so that when we fix our attention on any object two or more muscles pull the two eyes so as to bring the center of vision of the two eyes upon the same point. This, in the case of children studying at school, would be at a point from six to fifteen inches from the eye. I think we might say that ten inches was the most general distance used in study. The student, as we remember him, humps over his book and usually has his nose at no greater distance than ten inches. Now, in doing this, the eyes are compressed from without by these muscles pulling upon them, thus causing an increased pressure on the contents of the eyes. We have the muscles of accommodation in the eyes exerting their influence, which also produces pressure within. We also know that some of the veins carrying blood from the eyes make their exit from the globe around these muscles, sometimes under them. Now when the muscles act, they compress the veins between the globe and themselves, which dams back the flow of blood in the veins, causing a temporary congestion. All of these together create within the eye an unnatural pressure. At the entrance of the optic nerve the coats of the eye offer the least resistance, and so are stretched at this point. The anterior pole of the eye is pressed upon by the lids and external muscles of the eye while the posterior pole is surrounded by connective tissue only, hence this is the part where the least resistance is offered,

Myopia.

although the external coat is thickest in this part. This repeated time after time brings about an elongated eye. These are supposed to be the main causes of myopia in school children.

We might add that pupils studying music in dark rooms, or doing fine needle-work, would also come under this head. Poor light, real or artificial, and bad seats only aggravate these causes by making the pupil strain the eye more to see. Acting on these hints, Dr. Von Hippel, of Germany, bettered the condition of some of their schools and found an abatement in the number of cases of myopia amounting to six per cent. This was, to be sure, a small amount; but it showed he was on the right track. It is true that in some of our institutions it would be hard to improve on the hygienic surroundings, but there are other places where the causes of the disease are in great abundance. I know of plenty of schools where the pupils have to sit facing the light, or some have hardly light enough to read. We can improve most of the places very materially. Little children are kept at close work too long. They enter school at 9 A. M., working until 11 or 12 o'clock, often running to school to keep from having to stay in at night for being late. Then kept at it again from 1:30 to 3:30 or 4:30. I can remember of spending many hours in a school room when I could hardly see to read my book. How many of you would submit to this now? Yet you make your children submit to it.

In many cases teachers of the present have too many rules in schools. Scholars are not allowed to turn or whisper, thus keeping them in a constrained position all the time in school. I could cite you cases where children have been kept in at night, and made to work one-half to one hour after all the rest had gone because their eyes were so poor they could not see to get their lessons.

What are we to do, have good eyes or ruined ones? I believe in objective methods of teaching. Books are good in their place, but they have no business in our lower grades. The children of to-day are pushed through a lot of books and do not understand one-half of them. I ask you, cannot the scholars learn as much by object lessons as they can from books? I will answer the question by asking you which you remember longest, the things you have read or the things you have seen? How are we going to combat this disease? Five things are necessary for the accomplishment of the result.

Sanitation in Construction of the Residence.

1. Good light and plenty of it—best when coming from the left and behind the pupil.
 2. Well constructed seats, so that they will fit the scholar and not the scholar fit the seat.
 3. Good print, having it large enough to be read at a distance of eighteen inches or two feet.
 4. Plenty of recess; so that the eyes can have a change often. I am for having a recess of ten minutes at the end of each hour and where pupils are working at close work it should be longer.
 5. Good ventilation and heat, allowing ample cubic feet for the room when filled with grown people.
- In doing this we will benefit our race and make our people stronger, healthier and happier and give them better eyes.

SANITATION IN CONSTRUCTION OF THE RESIDENCE.*

Even so material a subject as building of the dwelling is accessory in the great field of sanitary science, because we spend so much of our time in this abode. It is the place in which is provided the body's nourishment and raiment, the place for long hours of rest and recreation for body and mind, and of repose in restful slumber. If, therefore, the residence is faultily constructed it may easily become the etiological factor in causing disease, or it may aggravate the morbid ravages of prevailing pathological conditions; and if built on correct hygienic principles it may equally as well, and even in a greater degree, promote the comfort, happiness and health of its inhabitants.

The owner and the builder of the residence are accustomed to study accurately the tenets of the law and of commercial values in reference to the building; but teachings of the medical sciences are but too frequently ignored by the one as well as by the other; and

* Read August 31, 1893, at a meeting of Iowa Public Health Association, Davenport, Iowa, by Rev. Father J. F. Kempker, M. D.

Sanitation in Construction of the Residence.

yet frequently when the family physician finds his anxious vigils unavailing, he is obliged to attribute the failure to the unhealthful habitation.

In order to secure a good, healthy house there will be an advantage in studying all the plans and component parts from the standpoint of health, especially in regard to light and ventilation, and these with reference to climate and temperature. The well-lighted and airy house is cheerful and inviting; whilst the dark, poorly ventilated house becomes the rendezvous for armies of death dealing microbes, which overwhelm the unsuspecting victim and frustrate even the efforts of therapeutics and surgery. It is a lesson easy to learn, yet difficult to execute, unless health associations and other instructors impart this knowledge to the masses, that when they build it is expedient to consult not only the legal status, and the commercial values and the bold front of external appearance, but equally as well to seek advice from those who are competent to teach the political economy contained in the principles of hygiene.

The following recommendations may be made for this climate:

Having chosen the most eligible site, place the new house on the sunniest and driest spot, with a due consideration for shelter against winter blast, if feasible. Good drainage is necessary, so that the soil moisture and surface drainage is conducted away from, instead of into, the building. Do not sink the foundation deep into the ground, and place the drainage both inside and outside of the foundation wall six inches below its lowest level, with a good incline toward its lowest point. Provide a basement under the entire building seven or ten feet high to the ceiling or ground floor, and have large openings in the basement walls for ventilation and light, the same to be closed in Summer with wire netting and in Winter with board or with double glass windows. Furthermore, have at least one chimney flue extending down to this basement, with a large fire-place or crematory on the basement floor. Such a basement can be used as cellar, storage room or workshop, easy to keep fresh and clean, and will aid in keeping the pernicious microbes out of the residence, who often, like the burglars, find an entrance through the cellar-way,—to say nothing of many noxious gases generated in unventilated ground-spaces and permeating through floor-chinks and pores into the living rooms day in and

Sanitation in Construction of the Residence.

day out. It is a matter of surprise to see how many dwellings are built throughout the State without any regard to ventilation under the ground floor, and how, seemingly, an effort is made to imprison the microbes there against every access of their mortal enemies, light and fresh air, or also to feed them fat with decomposing vegetable matter in dark, dank cellar holes. At this stage of the planning due consideration must be given to the water works and sewerage systems, which should always be the best. In the absence of these the well and the cistern should be placed at a reasonable distance from the house, with care to have them on the highest and most open spot of the grounds,—because good, pure water belongs to a good house. A case will illustrate this: In August, Mr. A. T., in the vigor of health and residing on a choice site, was puzzled to account for a sudden alarming sickness. Being asked for advice, I counselled opening and examination of the well, which was located hard by the kitchen door. Then the cause became apparent, not only to me, but also to the sufferer.

For building material I have found brick to possess superior hygienic qualities. Do not select an inferior grade of soft, unfinished brick, but take, even at a higher value, the best quality of brick, well burned and hard finished. It is healthy and will withstand the ravages of noxious elements longer than other material at the same cost; it is sterilized and becomes aseptic in the manufacturing process, and in making the wall is imbedded in chloride and carbonates of lime. Though porous, it is a poor place for the microbes.

Make the wall thick and strong and build it with a hollow space, or vacuum, in the inside, which must be broken or closed at the level of each floor. This is much superior to the so-called style of furring, or leaving an air space underneath the lathing which reaches from cellar to attic space, and becomes a giant's causeway for disease germs, foul air and noxious gases, and is no less a disturber in the equilibrium of temperature. The house with a brick wall as described aids to secure for the dwelling a cooler temperature in Summer and warmer in Winter, and evens out the rapid vicissitudes in the changes of temperature.

The heating apparatus, whether stoves, steam, hot air, or hot water system, should be so constructed that the contaminated air is properly replaced by a new supply of fresh air, and always should

Sanitation in Construction of the Residence.

be under the control of the operator as to a high or low degree of heat; and in connection with the heat supply should be some means of ventilation in every room, such as the cold air shaft joined with the smoke flue, or the ventilation in transom or window. This precaution will obviate asphyxiation from carbon dioxid, carbon monoxid, or the depression caused by non-ventilated rooms. In order to secure equality of temperature in Winter the so-called storm-window is a great improvement; that is an exterior sash, well fitting and covering the whole window. In the high storms of winter day the direct pressure of the winds against the glass decreases the temperature in the room fifty to seventy per cent, and a storm sash, therefore, will save fuel and add to healthy comfort.

To provide properly for good light and fresh air, have all the rooms made eleven or twelve feet high in the ceiling, and the windows not only ample, but properly placed. It is a poor design to have the north exposure well lighted and a heavy growth of trees close to the windows, whilst the sunny east and south sides are closed off with hall ways or dead walls; but it is made better to have as many rooms as possible with good east and south lights, and to keep the growths of trees on these sides a respectable distance away from the buildings; and to tolerate either none, or only very small verandas on three sides. The west sun is not to be despised; but the builder must keep in mind that the north and the west generally bear him the cold storms in Winter; and *fewer* openings, therefore, on these exposures, the brow of a hill-side over the north, or a double row of white pine and Scotch fir will give him a protecting wind-break in Iowa.

To recall the advantages of sunlight and fresh air we need only consider consumption, the dread destroyer of so many young lives, and yet the *Bacillus tuberculosis* dies in two minutes when placed in direct sunlight. In thicker masses the direct sunlight destroys them in from two to seven hours, and even in strong indirect sunlight the specimen can generally survive only a few days. Other germs have an equally disastrous story to tell. The fresh air of the mountains is none too highly extolled, because it contains so few bacteria. Our sunlight here is abundant; and so is likewise our fresh air, stirred by the gentle zephyrs of the west; admit both broadly into your new house, and then modify excessive chilliness or humidity by a judicious heating system.

Sanitation in Construction of the Residence.

In all cases of building, from the humblest cottage to the pretentious structure, the prudent man will consult a competent architect. The small tribute of well earned wages to this scientific man will be many times over saved in the cost of building, and in the well written plans and specifications. When the architect enquires about your tastes and desires, speak to him of the hints for health briefly referred to in this paper, and he will have the tact and ability to make your builders embody them in the dwelling. When it comes to speaking of the ornaments, a prevalence of plain lines will form a commendable feature for hygiene. A costly aggregation of intricate moldings and scroll work in all possible and impossible places and angles only forms a very convenient depository for dust and filth, and is frequently the unsuspecting lurking place of unwholesome contamination. It is also an undoubted line of beauty to have the architectural ornamentation, at least to some degree, in harmony with the building material. It is certainly as little beautiful as healthy to have the roman or gothic arch of masonry everywhere set forth in a frame house; nor are the many-fold frame work appendages and additions ornamenting or healthy for a good brick house.

While the builder may construct a den in the house entirely suitable to his own taste, he should remember that in the course of time fifty or more people will occupy the house as a living place, and both charity and justice demand a consideration of their comfort and health. In the arrangement of the house the bath room should not be forgotten.

Finally, let me recommend to all the members of this excellent and most honorable association to urge upon the housebuilders the practical advantage of the infirmary in the residence. Let it be a lightsome, friendly room in a retired nook on the upper floor, with only one entrance, and no closets, having a good hall-way window on the outside, near the entrance; the floor of cement laid tiling, with all the frame work on very plain lines, and the ceiling and walls painted in oil. Let the furniture consist of a comfortable iron or brass bed, plain chair, plain table, and a modern steam sterilizer; all other furniture and rugs to be supplied fresh for each occupant. The ventilation and heating in this room should be the best in the house. In the long periods of continued health this room can easily be made attractive for other use.

SANITARY EDUCATION OF PLUMBERS.*

The importance of registration of plumbers under this particular heading is most forcibly brought to our notice, and it affects every individual, both rich and poor, as the sanitation, and thereby the health of each and every household is in the hands of the plumber; therefore, should he not be well versed in sanitary matters generally, the results are, as we know, in many cases disastrous. It is naturally, then, to the interest of the public and to all plumbers, to have the sanitary arrangements of the best and most approved principles. The community at large is now waking up to the importance of these matters, and the medical officers of health have an all-important work to undertake. The medical profession in general now look upon the value of sanitation, and frequently in cases of illness suggest the calling in of a thoroughly efficient person to examine the sanitary arrangements. Plumbing, or more especially plumbing fixtures, in the past were considered luxuries, but have now become a necessity, not only for convenience, but for cleanliness and health. Even a small house has its scullery sink, water-closet, and some have baths, while larger houses have a more elaborate system, and I think that it might be said that even with a larger house the less sanitary fixtures to meet the demand the better, as with a multitude of fixtures these mean a larger number of soil and waste pipes, and the chances of leakage of sewage air through defective joints increase correspondingly. In all houses the plumbing system should be arranged so as to exclude any possibility of the escape of noxious gases from the house drain or sewer. It is the duty of the plumber, as it is of every man, to take an interest in his work, and to have none but good work executed under their supervision, or, should bad work be done the results may be disastrous.

* A paper delivered by Mr. Moxham, M. S. A., at the annual conference of the National Registration of Qualified Plumbers, Swansea, England.

The cases of unsanitary plumbing which come under our notice are numerous. Such as a defective water-closet, perhaps with no interception whatever between the pan and the sewer; defective piping; the sink discharging direct into the main drain; no ventilation to soil pipes; the water-supply system for household purposes connected direct with the water-closet; all of which make a house quite unfit for habitation. What a frequent occurrence on going to a water-closet to find it nothing more or less than a stink hole. It is all very well to say that the time occupied in a water-closet is so short that it is of little or no consequence; but it must be borne in mind that this vitiated air is distributing itself about the house day after day. A water-closet should be fixed so that it would be objectionable to no one. In carrying out some new sanitary arrangements lately I found the old wash-up-scutlery sink waste pipe was connected straight into the soil pipe, no trap or any interception whatever, the consequence being that it acted as a ventilator to the drain. In another case I found the bath on an inside wall with the waste pipe, which had no trap, carried for a length of fifteen feet or more under the floor, and then discharging itself into a cast-iron head connected direct with the soil pipe. In many cases I have found water-closets on the inside wall with no window or ventilation whatever excepting the door. The great want of education in the past on this subject is obvious; but I say, and I am sure you will agree with me, that during the last few years plumbing has taken a big step forward in the right direction. We have at all times got to work under disadvantages; even so with the plumber, and one of those worthy gentlemen, a few days ago, in pouring out his griefs to me, remarked the disadvantages they had at times to labor under, for he said: "Sometimes we have to work under a most faulty specification, and sometimes under a man who knows little or nothing of his work" (and the less he understands the more he wishes it to appear he knows).

Another time, should the plumber point out some particular piece of work, making some suggestion that would be of material advantage, he is answered abruptly and told to do as he is bid, that he is paid to work and not to give opinions of his own. Drainage into cesspits may be considered now obsolete in all large towns, but still there is no doubt at the present time that there are many old disused cesspits which are throwing off obnoxious gases, and it

Sanitary Education of Plumbers.

is most essential that care should be taken to see that all old drains and cesspits be removed from the premises. Large drains should be avoided. It has been proved beyond all doubt that matters easily carried away by a small pipe remain an obstruction to a large drain; as a rule, four-inch-diameter branch-pipes are sufficient for soil or surface water, and then six inch pipes into sewer. Junctions should never be made at right angles with the pipe, but should always be made at a gentle curve or bend into the length of the pipe. All traps in drain pipes should be earthenware syphon traps, with inlets and covers so laid and constructed as to be ready of access for cleansing out. Grease traps should be provided in connection with all scullery sinks, and so constructed as to be of easy access for removing the accumulation of grease periodically. It has become the practice of some to have two separate and distinct systems of drainage, viz., one for the wastes from sinks, baths and rain water, the other for the water-closets alone. This a mistaken idea, as we require all the waste water to help flush out the soil drains, and with one system of drainage instead of two—with a good flushing and sufficient fall in the drain, is what we require.

Sinks and water-closets should be placed against the external walls, so that refuse water or soil may be discharged into a drain outside the main wall. Water-closets should never be placed where they cannot be thoroughly ventilated directly from the external air. All drains and soil pipes should be on the outside of the buildings. Every sink, bath, lavatory, etc., should be trapped immediately under with a lead trap and brass screw joint and screw for use in case of choking, that each of these wastes should then be carried on the outside of wall, and discharged on an open gully or into a vertical pipe head. All rain-water pipes should discharge on open gulleys also. All soil pipes leading from the water-closets to drains should be either lead or glass glazed iron. Great care and attention must be given to the ventilation of the soil pipes—to have the ventilation shaft carried well up beyond the eaves, and not to be right opposite a window, in which case a certain amount of vitiated air would become dangerous to the occupant of the adjoining room. All water-closets should be trapped, and, wherever practicable, drawn lead pipes should be used in preference to the soldered joints. With regard to water-closet pans, it would be well to bear in mind that no D traps should be used under any circumstances,

Sanitary Education of Plumbers.

and that the best pans are the pedestal washout. Each water-closet should have a separate water-supply cistern; the best method is to have a small three-gallon flush-out cistern connected with the water-supply cistern, and in no case should the water supply for flushing purposes be taken direct from the cistern which is used for domestic purposes. Every cistern should have its overflow pipe discharging into the open air. All public urinals, water-closets, etc., for schools, workhouses, asylums, and large public institutions, should have automatic flush-out cisterns. The testing of drains, after they have been completed, or the testing of old drains, and the general subject of making thorough sanitary examinations of houses, is a matter which should always have attention. Thus, when the piping of a house is completed, the pipes should be tested before the fixtures are connected.

There is an imperative demand in Iowa for legislation upon this subject. While we have ample protection afforded against the ravages of contagious diseases, there is none against one of the most insidious devastators of the home. As the result of incompetency and defective plumbing and sewerage. Protection against loss of life and property from the dangerous petroleum requires a fixed standard for safety. Protection against the spread of infectious diseases requires quarantine and isolation of the sick. Why not protection against sewer air, one of the most deathly poisons which may permeate every nook and corner of a home, undetected even by odor, by a system of inspection?

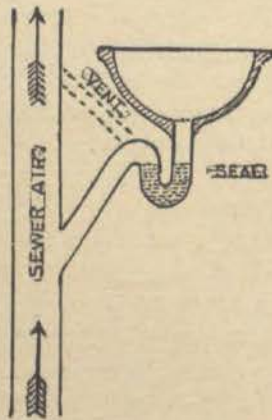
There is no legislation upon this subject, and in this regard Iowa is behind nearly every State in the Union. The legislature should come to the help of sanitary science, which is now making such rapid progress throughout the world.

SEWER AIR AND MODERN PLUMBING.*

Few persons have any idea of what sewer air is, and what constitutes the danger from it. They have only a vague notion that it is poisonous, and a thing to be avoided. They are as ignorant of the reasons why it should be avoided as they are of the means by which it is guarded against. In the first place the term "*gas*," as applied to sewer emanations, is a misnomer. The sewer air, it is true, often contains a number of gases, but these gases play a very small part in causing the diseases attributable to such emanations. The real danger comes from the atomized sewage which the sewer air carries with it. In other words, the sewer air acts as a vehicle for carrying little particles of sewage, and these latter contain disease germs of various kinds. The object of the safety devices of modern plumbing is to prevent the entrance of sewer air into dwellings. Though these safety devices may seem very complicated to the uninitiated, they are in reality very simple.

The ordinary **S** trap is the simplest form of trap in use. It is a bent pipe formed thus:

The shaded portion shows what is called the water seal, which is caused by the reflux of the water discharged by the fixture drained by the pipe. This water acts as a barrier between the pipe and the house. Now, to displace this barrier — my article has been written, and would be very inextinguishable to destroy the water seal or to render it useless. The



tion of the pipe the water seal, which is caused by the reflux of the water discharged by the fixture drained by the pipe. This water acts as a barrier between the sewer into the house. Now, to displace this barrier — to destroy this water seal or to render it useless. The most important of

* By Cyrus Edson, M. D., Commissioner of Health, Board of Health, City of New York.

these is the vacuum produced in the pipe when several fixtures empty into it, by the discharge of one or more of them. The vacuum sucks the water from the traps into the pipe, leaving the former empty and unprotected. This action is called "syphonage." The emptied trap is said to have been "syphoned." To overcome syphonage the plumbers have devised what is termed ventilating the pipes and "back airing" them. These terms are more or less synonymous and may be described as follows: 1st. The main line of pipe is continued from its highest point in the dwelling to about three feet above the level of its roof, where it terminates in an external opening. 2d. The traps are each ventilated or back aired by connecting another pipe with them at the highest points in their curve, and this pipe is continuous with an air pipe of the same or larger calibre, the latter terminating like the main soil or waste pipe above the roof level. Every one is familiar with the two pipes, one large, the other small, that appear above the roof of all well plumbed houses. Ventilating the pipes of a house cures another evil that occurs in houses where the pipes are not ventilated. I refer to "blowing" the water seals of the traps from back pressure. A column of water suddenly descending from a height above one or more traps may so compress the air in the pipe between the column and the house drained trap as to force a portion of it through the water seals into the house. Again: A sudden large flow of water from the discharge of a fixture may not be carried off through the house drain with sufficient rapidity, and by displacing the air in the pipe may force it through the water seals. Yet again: The sewer may be overtaxed by a rain storm, or for some reason may not carry off the water flowing into it with sufficient rapidity and may back a portion of its contents into the house drain, thus forcing sewer air through the water seals.

Now, while the ventilation and the back airing of pipes and traps will render plumbing as safe as it can be made, nevertheless, the pipes must not be left unwatched and uncared for. It is only a question of time when something will occur to derange their action. This something may be the clogging of the ventilating openings on the roof by frost accumulating, or as the ventilating pipes are constructed of iron, the interior constantly scaling off in the form of rust, this rust may be caught by a bend or elbow where the pipe changes its direction, and the calibre gradually closed (and this is

Sewer Ordinances.

really a serious defect in the present method of venting). Of course, the moment the free play of air through the pipes is interfered with, syphonage and blowing will render the traps inoperative. This may be detected by a gurgling noise which can be plainly heard in the room where the fixture is situated, and should call at once for a careful examination into its cause, which, when found, should be at once remedied. In conclusion the writer believes that improvements in plumbing should be in the direction of simplicity, and the avoidance of complication with due regard to economy.

SEWER ORDINANCES.

It is feared the people of Iowa do not fully appreciate the danger of defective plumbing, as but few cities have adequate ordinances regulating that important part of drainage. The ordinances relating to plumbing are almost universally general in character—nothing specific, at most requiring that plumbing of residences be done in a “first class manner” without attempting to define what is required.

A notable and commendable exception is found in the health laws for Davenport. In order that the people of Iowa may have a better conception of what is implied, in detail, by sanitary plumbing the following is taken from the Davenport health laws, adopted February 1, 1893.

AN ORDINANCE relating to plans and specifications for house drainage and the ventilation thereof, and for the registration and duties of master plumbers, and persons engaged in the plumbing and sewer business in the city of Davenport, under the powers vested in the board of health.

Be it enacted by the City Council of the City of Davenport:

SECTION 1. The drainage of all buildings, public or private, and the alterations of the same, shall be executed in accordance with plans and specifications previously approved in writing by the board of health or an inspector selected by such board.

SEC. 2. There shall be a separate plan for each building, public or private, accompanied by specifications describing the drainage of said buildings on blanks prescribed and furnished for this purpose, showing the size and kind of pipes, the traps, closets, fixtures, etc., to be used, the same to

Sewer Ordinances.

be placed on file in the office of the board of health. Said drawing and descriptions to be furnished by the owner, or his authorized agent, and prepared by the architect or builder, where one is employed, or person competent to the satisfaction of the board; and an application for a change in plans must be made in writing to the board of health.

SEC. 3. Drawings and descriptions of the drainage of buildings erected prior to February 1, 1893, may be placed on file in the office of the board of health, and approved or condemned by such board.

SEC. 4. Rules for drawings and specifications for drainage will be furnished on application at the office of the board of health. One vertical drawing will be sufficient for a building where it can be made to show all the work; if the work is intricate and cannot be shown by one drawing, two or more shall be made.

SEC. 5. When the drainage of buildings erected prior to February 1, 1893, has been inspected and condemned, plans must be filed, and the new work or alterations shall be executed in accordance with these rules and regulations.

SEC. 6. Plans will be approved or rejected within twenty-four (24) hours when practicable, and under no circumstances will a delay beyond ten (10) days be permitted.

SEC. 7. All material shall be of good quality and free from defects, and the work must be executed in a thorough and workmanlike manner.

SEC. 8. The main drain of every house or building shall be separately and independently connected with the street sewer, where one is provided; and where there is no sewer in the street, and it is necessary to construct a private sewer to connect with one on an adjacent street, such sewer plans may be used as may be approved by the board, but in no case shall a joint drain be laid in cellars parallel with street or alley. All house drains laid beneath the ground inside of building or beneath the cellar floor, shall be of plain extra heavy cast iron pipe of size approved by the board of health, with well leaded and caulked joints; all other drains or soil pipes connected with the main drain, or where the main drain pipe is above the cellar floor, shall be of plain cast iron or lead pipe. Outside of buildings where the soil is of sufficient solidity for a proper foundation, cylindrical terra cotta pipes of the best quality, free from flaws, splits or cracks, perfectly burned, and well glazed over the entire inner and outer surfaces may be used, laid on a smooth bottom, with a special groove cut in the bottom of trench for each hub (in order to give the pipe a solid bearing on its entire length), and the soil well rammed on each side of the pipe; the spigot and hub ends shall be concentric. The space between the hub and the pipe shall be thoroughly filled with the best cement mortar, made of equal parts of best cement and sand thoroughly mixed dry, and water enough afterward added to give it proper consistence. The cement must be mixed in small quantities at a time, and used as soon as made. The joints must be carefully wiped and jointed, and all mortar that may be left inside thoroughly cleaned out, and the pipe left clean and smooth throughout, for which purpose a swab shall be used. No tampered cement shall be used, a straight edge shall be used, and the

Sewer Ordinances.

different sections shall be laid in perfect line on the bottom and sides; but in no case shall a terra cotta pipe be permitted within five feet of any foundation wall, or air inlets.

SEC. 9. The main soil pipe under the building shall not be less than four (4) inches or not more than ten (10) inches in diameter, and the fall shall not be less than one-eighth ($\frac{1}{8}$) of an inch to the foot, unless by special permission of the board of health. It shall be laid in a trench cut at a uniform grade, or it may be constructed along the foundation walls above the cellar floor, properly supported; no test shall be made by the inspector until said pipes are secured to satisfaction of inspector.

SEC. 10. The arrangement of soil and waste pipes shall be as direct as possible, all changes in direction on horizontal pipes shall be made with "Y" branches one-sixteenth ($\frac{1}{16}$) or one-eighth ($\frac{1}{8}$) bends.

SEC. 11. Where the drain passes through a new foundation wall, a relieving arch of brick or stone or solid stone shall be built over it with a two-inch clearance on either side.

SEC. 12. Every vertical soil pipe shall extend at least two (2) feet above the roof, and shall be of undiminished size with the outlet uncovered. Such soil pipes shall not open near a window nor an air shaft. Where a two-inch pipe is used for ventilation it must be enlarged to four (4) inch two (2) feet below line of roof, and run out two (2) feet above roof, and where a four (4) inch pipe is used it must be enlarged to six (6) inch, where a six-inch is used it must be enlarged to eight (8) inch, all to follow above rule and in no case shall a smaller pipe than four (4) inch be allowed to project through a roof for ventilation.

SEC. 13. Every branch or horizontal line of soil pipe to which a group of two (2) or more water-closets is to be connected, and every branch line of horizontal soil pipe eight (8) feet or more in length, to which a water-closet is to be connected, shall be ventilated either by extending said soil pipe undiminished in size to at least two (2) feet above the roof or by extending said soil pipe and connecting it with the main soil pipe above the highest fixture, or by a ventilating pipe connected to the crown of each water-closet trap, not less than two (2) inches in diameter, and connected to a special air pipe, which shall not be less than four (4) inches in diameter, or by connecting said ventilating pipe with the main soil pipe above the highest fixture.

SEC. 14. Where a separate line of waste pipes is used, not connected with sewer pipes, it shall also be carried two (2) feet above the roof, unless otherwise permitted by the board. But in no case shall a waste pipe connect with a rain water conductor.

SEC. 15. There shall be no traps, caps, or cowls on soil or waste pipes which will interfere with the system of ventilation.

SEC. 16. The owner or agent of any building or buildings shall have the entire drainage system tested, and all soil, waste, anti-syphon pipes and traps inside of new buildings, and of the new work in old buildings, and also of the entire system when alterations are made in old buildings, shall have all openings stopped and all pipes shall be filled with water to the highest

Sewer Ordinances.

point, or test of not less than three (3) pounds atmospheric pressure to the square inch applied for inspection by board.

SEC. 17. The drain soil and waste pipes and the traps shall, if practicable, be exposed to view for ready inspection at all times and for convenience in repairing. When placed within walls or partitions, and not exposed to view, or not covered with woodwork fastened with screws so as to be readily removed, or when not easily accessible, extra heavy pipes shall be used to the satisfaction of the board of health.

SEC. 18. No drainage work shall be covered or concealed in any way until after it has been examined and approved by the board of health, or a plumbing inspector under direction of such board, and notice must be sent to the board in writing when the work is sufficiently advanced for such inspection; and immediately on the completion of the work, application must be made for final inspection. The failure of any plumber to make such application for final inspection, or the violation of any of the rules of the board of health, or as herein defined in the construction of any drainage work, and failure to correct the fault after notification, will be deemed sufficient cause to place his name on the delinquent list until he has complied with said rules and regulations. Any attempt on the part of a master plumber to construct or alter a system of drainage during the time his name appears on said delinquent list will be a misdemeanor, and on conviction shall be punished accordingly.

SEC. 19. All drain and anti-syphon pipes of cast iron shall be sound, free from holes, and of a uniform thickness, and shall have not less than the following relative weights:

STANDARD.		EXTRA HEAVY.	
2 inch pipe,	4 lbs per ft.	2 inch pipe,	5½ lbs. per ft.
3 "	6 "	3 "	9½ "
4 "	9 "	4 "	13 "
5 "	12 "	5 "	17 "
6 "	15 "	6 "	20 "
8 "	20 "	7 "	27 "
9 "	25 "	8 "	33½ "
10 "	35 "	10 "	45 "
12 "	45 "	12 "	54 "

SEC. 20. Lead waste pipes may be used for horizontal lines that are two (2) inches or less in diameter, and shall have not less than the following prescribed weights:

1 inch pipe, 2 lbs. 0 oz.	1½ inch pipe, 3 lbs. 8 oz.
1½ " " 2 lbs. 8 oz.	2 " " 4 lbs. 0 oz.

SEC. 21. Lead bends or traps for water-closets shall not be less than one-eighth ($\frac{1}{8}$) of an inch in thickness.

SEC. 22. Waste pipes from wash basins to be not less than one inch, and for sinks and bath tubs shall not be less than one and one-quarter ($1\frac{1}{4}$) inches in diameter, and wash tray waste pipes not less than one and one-half ($1\frac{1}{2}$) inches in diameter.

SEC. 23. All joints in cast iron drain, soil and waste pipes shall be caulked with oakum and lead.

SEC. 24. All connections of lead with iron pipe shall be made with a

Sewer Ordinances.

brass or lead or combination ferrule not less than one-eighth ($\frac{1}{8}$) of an inch in thickness, and shall be put in the hub of the iron pipe and caulked in with lead, except in cases of iron water-closet traps or old work when drilling or tapping is permitted; the lead pipe shall be attached to the ferrule by a wiped-solder joint.

SEC. 25. All connections of lead pipe shall be wiped-solder joints.

SEC. 26. Every water-closet, sink, basin, wash tray, bath and every tub or set of tubs shall be separately and effectually trapped.

SEC. 27. The trap must be placed as near the fixture as practicable. All waste pipes shall be provided with strong metallic strainers. All drains from hydrants shall be trapped and in a manner accessible for cleaning out.

SEC. 28. Traps of fixtures shall be protected from syphonage. All anti-syphon pipes shall be carried up and through the roof or connected with the main vent pipe above the highest fixture.

SEC. 29. Every anti-syphon pipe shall be of lead, or plain cast iron pipe. They may be combined by branching together those which serve several traps. These pipes where not vertical must always have a continuous raise to avoid collecting water by condensation, but in no case shall wrought iron pipe be used.

SEC. 30. All drip or overflow pipes from safes under wash basins, baths, urinals, water-closets, or other fixtures shall be a special pipe run to cellar or outside the house, or some conspicuous point, and in no case shall any such pipe be connected with a soil, drain or waste pipe.

SEC. 31. No waste pipe from a refrigerator or other receptacle in which provisions are stored, shall be connected with any drain, soil, or other waste pipe. Such waste pipes shall be so arranged as to admit of frequent flushing and shall be as short as possible.

SEC. 32. The overflow pipes from tanks and the waste pipes from refrigerators, shall discharge into an open fixture properly trapped.

SEC. 33. All water-closets within buildings shall be supplied with water from special tanks or cisterns which shall hold not less than eight (8) gallons of water when up to the lever of the overflow pipe for each closet supplied, excepting automatic or syphon tanks, which shall hold not less than five (5) gallons of water for each closet supplied, the water in said automatic or syphon tanks shall not be used for any other purpose. The flushing pipe of all tanks shall not be less than one and one-quarter ($1\frac{1}{4}$) of an inch in diameter.

SEC. 34. No closet except those placed in the yard outside of buildings shall be supplied directly from the supply pipes.

SEC. 35. A group of closets may be supplied from one tank, but water-closets on different floors shall not be flushed from one tank.

SEC. 36. Water-closets, when placed outside of buildings, shall be so arranged as to be conveniently and adequately flushed, and their water supply pipes and traps shall be protected from freezing by placing them in a hopper pit at least five (5) feet below the surface of the ground, the walls of which shall be of brick or stone laid in cement mortar. The waste water from the hopper stop cock shall be conveyed to the drain pipe through a three-eighths ($\frac{3}{8}$) inch pipe properly trapped and connected.

Sewer Ordinances.

SEC. 37. No water-closet shall be permitted to be put in any building or buildings unless it shall have been properly ventilated, or in direct communication with the external air: by a window or an air shaft having an area to open air of at least four (4) square feet.

SEC. 38. All water-closets within a building using lead connections shall be soldered to a cast brass flange not less than three-sixteenths ($\frac{3}{16}$) of an inch in thickness (fitted with a pure rubber gasket of sufficient thickness to insure a tight joint) bolted to the closet.

SEC. 39. Where latrines or urinals are used for schools, public or private buildings, they shall be of iron or other non-porous material as good; shall be properly supplied with water and located in yard at least twenty (20) feet from building, or where it is practicable, to satisfaction of the board.

SEC. 40. Rain water conductors shall be discharged onto surface of ground or into street or alley gutter, and where necessary to connect to sewer, shall get special permit from board.

SEC. 41. No steam, exhaust, blow off, or drip pipe shall connect with sewer or any house drain, soil, or waste pipe; such pipes shall be discharged into a tank or condenser from which a suitable outlet into house drain shall be provided.

SEC. 42. No privy vault or cesspool for sewage shall hereafter be constructed in any part of the city where a sewer is at all accessible.

SEC. 43. No connection from any cesspool or privy vault shall be made with any sewer, nor shall any water-closet or house drainage empty into a cesspool or privy vault.

SEC. 44. In rural districts waste pipes from buildings may be connected with cesspools constructed for that special purpose, properly flagged or arched over, water tight or not, by special permission of the board.

SEC. 45. Privy vaults must be constructed as follows: Each building situated on an unused street must have a privy vault not less than four (4) feet wide and six (6) feet deep lined with hard brick laid in cement mortar and proved to be water tight.

SEC. 46. Privy vaults shall not be located within two (2) feet of party lines or within twenty (20) feet from any building, and before any privy vault shall be constructed, application shall be made and a permit for the same issued by the board.*

SEC. 47. No opening will be permitted in the drain pipe of any building for the purposes of draining a cellar, unless by special permission of the board.

SEC. 48. Cellar drains shall be constructed as follows: By a system of trench drains, or field tile to a catch basin, flagged over; the outlet pipe shall be properly trapped and connected with the house drain, and shall also be provided with a back pressure valve or stop cock the required size.

*An important omission in this section is a protection against contamination of wells. No privy vault should be permitted within eighty feet of a well, and the State Board has so ordered. That a privy vault is cemented and water-tight when constructed, is no protection against the action of frost above the frost line, thereby breaking the cement and endangering the well by leakage and soil percolation.—
SECRETARY.

Sewer Ordinances.

SEC. 49. No person shall place in any building a whirlpool or plunger water-closet, or pan water-closet, and when such kind of closet is removed for repairs or other causes it shall not be replaced.

SEC. 50. Wooden wash trays and sinks are prohibited inside of any building; they shall be of non-absorbent material.

SEC. 51. Every water-closet, urinal, sink, basin, bath, and every set of wash trays, tub or set of tubs must be effectively and separately trapped. When floor washes are connected it must be by means of a deep sealed trap and brass trap screw. Traps on bath tubs must be placed in such a manner that the cleanout will be in plain view and above the floor.

SEC. 52. Every person engaged in the plumbing business in the city of Davenport as a master plumber, and every person coming from other places for the purpose of contracting for and doing plumbing work in the city of Davenport as a plumber, shall appear in person at the office of the board of health and register his name and business address upon forms prescribed by the board, and receive a certificate of registry, upon presenting satisfactory proof that he is a *bona fide* master plumber, and no person other than a registered plumber shall be authorized to carry on, or engage in the plumbing business, or make any connection with sewer, drain, soil, or waste pipe, or any pipe connected therewith, except outside of street line, which connections can be made by competent workmen under supervision of the board of health.

SEC. 53. Every registered plumber shall give immediate notice of any change in his place of business, and upon his retirement from business shall surrender his certificate of registry to the Board.

SEC. 54. All licensed plumbers shall be held responsible for all acts of their agents or employes done by virtue of his or their said license. No license shall be granted for a greater period of time than one year, nor the unexpired portion thereof. All licenses shall expire on the last day of December of each year, unless sooner revoked.

SEC. 55. Any change of the firm name or location of business must be promptly reported to the board, and the license shall be posted in a conspicuous place at the place of business of the licensee.

SEC. 56. When two or more persons are co-partners, licenses shall issue in the name of the firm or co-partnership, and no license shall be transferable.

SEC. 57. Any plumber who shall be guilty of a violation of any of the provisions of this ordinance shall forfeit his license and shall be subject to a fine upon conviction of not less than ten dollars, nor more than one hundred dollars.

SEC. 58. Wherever in this ordinance the "board" is referred to, it shall be taken to mean the board of health of the city of Davenport, or the officers or agents of said board of health, and said board of health is charged with the duties herein imposed, as well as the general enforcement of this ordinance, and the supervision of all plumbing, drainage, and sewer work within said city, so far as the same relates to the sanitary condition of said city, its buildings, public and private, and the health of the inhabitants thereof, as imposed and authorized by the laws of the State of Iowa.

Emergency Hospitals.

EMERGENCY HOSPITALS,

Emergencies are liable to come to any community demanding hospital accommodation and service. The importation of contagious disease by an infected tramp or immigrant is possible and liable at any moment. Floods and conflagrations are also imminent. Every city and town in the State should be prepared for such an emergency, and thereby save what might otherwise cost life and property. Believing that a knowledge of temporary hospitals, cheaply provided, would be of value, the following plans and estimates are suggested, the illustrations for which are given by courtesy of the Provincial Board of Toronto, and the Pennsylvania State Board of Health:



HOSPITAL TENT.

SIZE.—24x14. Four rooms, 7x7 (two in each end), and one larger room, 14x10, through the centre. The divisions are of sheeting, to slide on cord, and the same height of the tent wall.

The tent poles are 12 uprights, 1 ridge pole 10 feet long, and 23 wall poles 6 feet long.

MATERIAL.—Ten-ounce white or nine-ounce striped duck of best quality.

COST.—Complete, with poles, stakes, guys, etc., about sixty dollars. Flooring, beds and furniture are, of course, extra.

Emergency Hospitals.

For comfort, security, and thorough ventilation, this tent is the nearest approach to a house in tent form.



COOK TENT.

[Size, 7x7 feet, wall 4 feet high. Material, 10-ounce white duck, best quality. Cost, completed, with poles and stakes, not including furniture and utensils, about \$12.00.]

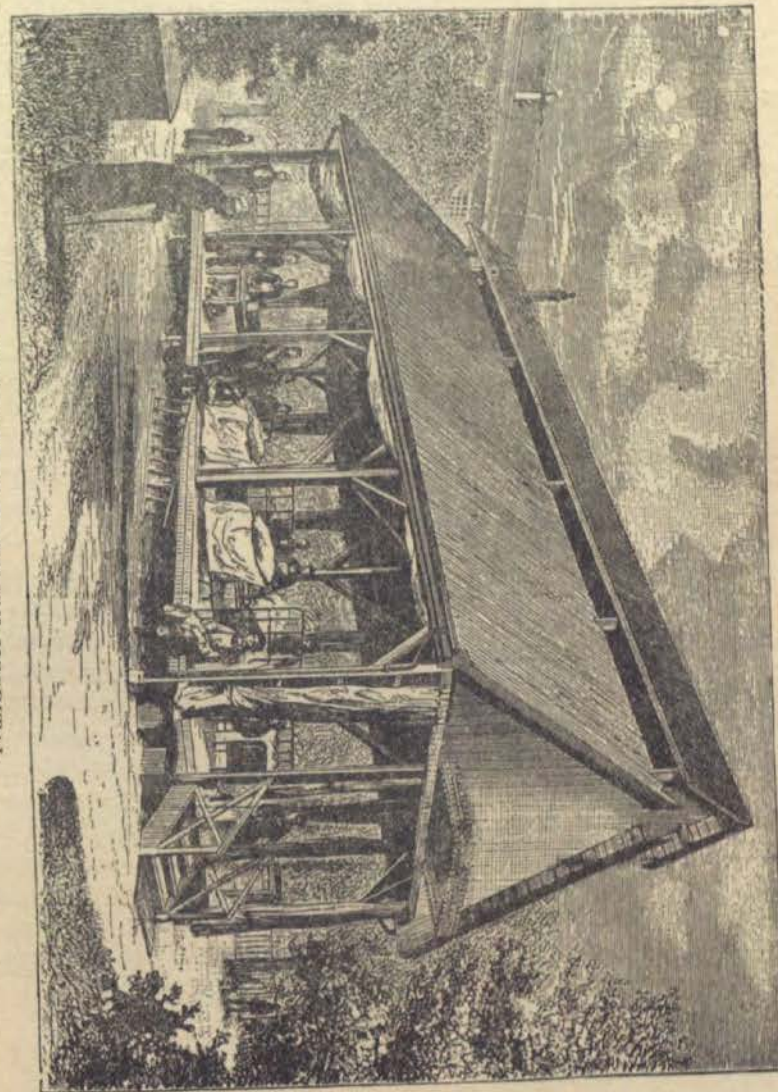
Dr. F. H. Brown says of tent hospitals: "The more nearly patients are brought to the condition of being treated in the open air, the more quickly and surely will they recover. The wooden barrack, and the hut, are good, but in many cases the tent is better."

Dr. J. H. Kellogg, of Battle Creek, Mich., writes in Handbook of Hygiene and Medicine: "During the late war a large hospital had in the winter season three hundred and twenty cases of measles. Just at this time it took fire and burned to the ground. The patients were placed in tents, and all but one or two recovered. If the patients had remained in the hospital there is no doubt but thirty to forty, at least, would have died. At one time, one hundred men, but slightly ill, were sent to the general hospital at Nashville, and seventy-five of them died."

Such hospital tents have been in use in Berlin, Vienna, Dresden, Leipsig, and other European cities for many years, with great success.

Emergency Hospitals.

A more permanent structure is in use in Geneva, Switzerland, and is known as "Pavilion Hospital," an illustration of which is here given from "La Nature."

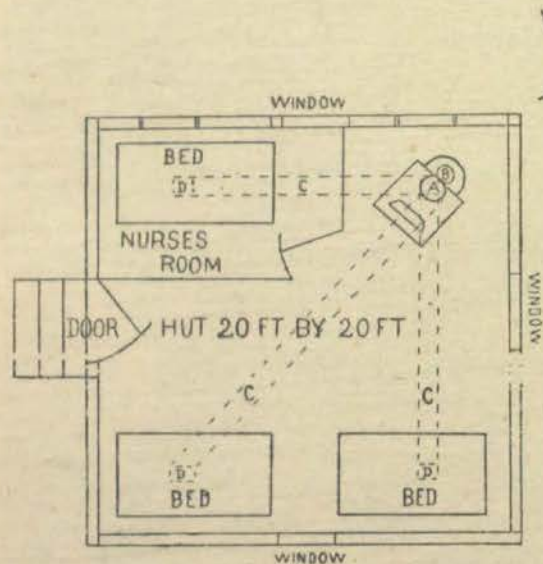


PERMANENT PAVILION HOSPITAL.

Emergency Hospitals.

The movable canvas walls give complete ventilation, and, on pleasant days, gives the open air, while they protect at night, and against inclement weather. In Winter these walls are double, the ridge construction affording ample ventilation.

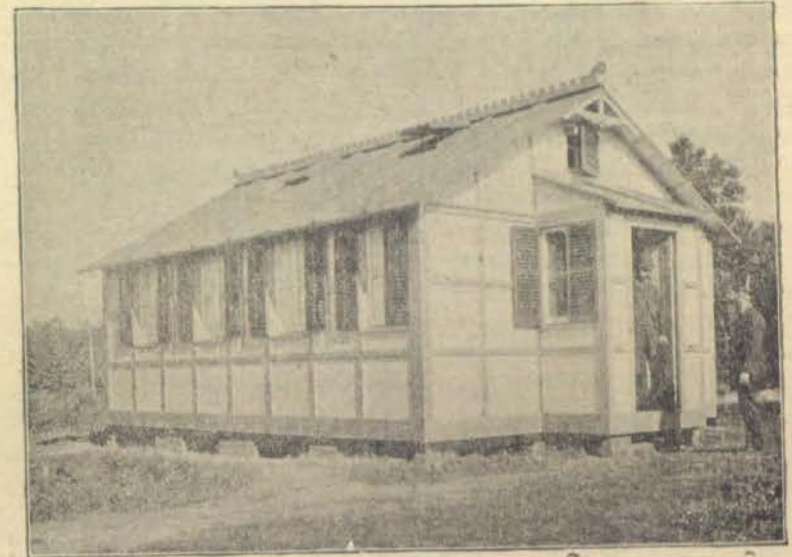
To provide for contagious diseases not advisable to admit to the general hospital, what is called a "hut" is recommended, an illustration of which is here given from Wylie's excellent work on "Construction and Organization of Hospitals."



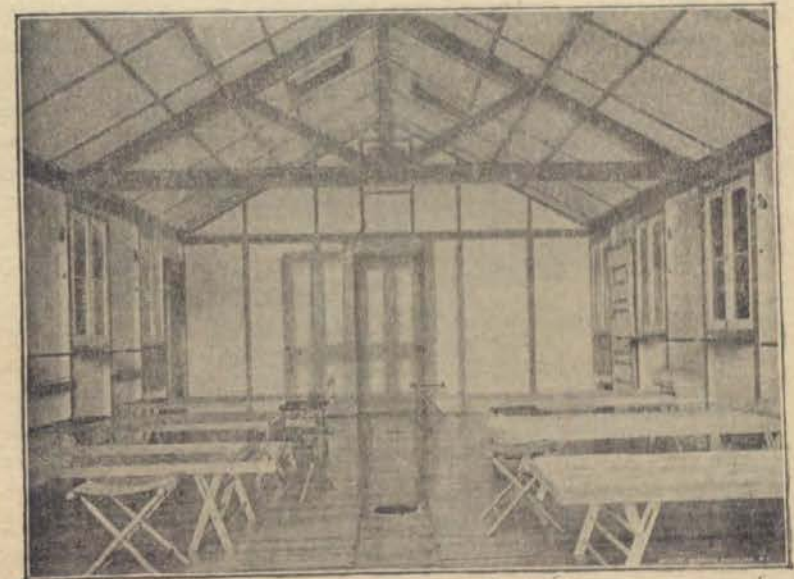
ISOLATING WOODEN HUT (Wylie.)

A—Stove. B—Smoke flue. C—Air conductors under floor from under each bed to stove. D—Openings into air ducts.

These huts are planned to have two fresh air ducts from the roof down to within seven feet of the floor, and there provided with scatter boards. Frame structures are more permanent and durable, and may be used at all seasons. In Winter they are warmer than tents. Portable frame houses can be procured, sufficient in size to accommodate a few patients, and with proper arrangement for ventilation will serve admirably as pavilion hospitals. They can be quickly set up, and if necessary quickly destroyed, and their cost is not great. Illustrations are here given of such a structure:

Emergency Hospitals.

PORTABLE HOSPITAL PAVILION—EXTERIOR.



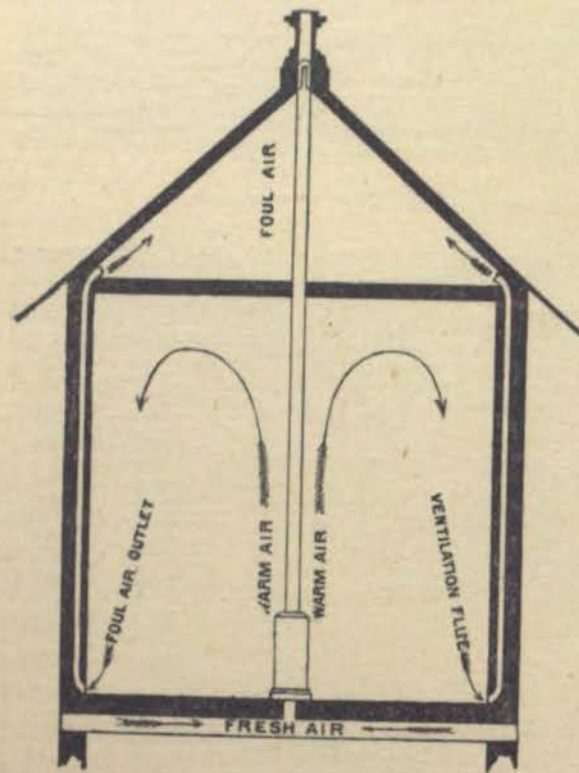
PORTABLE HOSPITAL PAVILION—INTERIOR.

Emergency Hospitals.

Every city and town should be provided with one or more such buildings, which can be stored in small space until an emergency necessitates their use. Time is an important factor in suppressing a contagious disease in a community. The sooner isolation of the risk is secured, the more certain are favorable results, and nowhere can proper isolation be more completely secured than in an isolation hospital.

Isolate the first case of a contagious disease, so that others cannot be exposed to it and there will be an end of it—there will be no epidemic. With every additional case the danger of spreading is multiplied rapidly. This is the true purpose of an isolation hospital—to prevent epidemics by segregating the first case in a community.

One of the most important essentials of a hospital is ventilation.



Provision for "Ridge" Ventilation. (Hatchison.)

location. Pleasant surrounding scenery is also desirable. Avoid

The illustration shows an admirable plan to secure this.

Whether pavilions or tents are used, portable or permanent, they should be trenched around to prevent dampness.

In locating a hospital the healthiest possible location should be selected. It should be in an open field, on high, dry, porous ground, but protected so far as possible, from chilling winds. In Summer a tree-sheltered field or orchard, with grass soil is an excellent

Emergency Hospitals.

valleys and neighborhood of swamps, marshes, open sewers, or offensive factories, and slaughter-houses most rigidly.

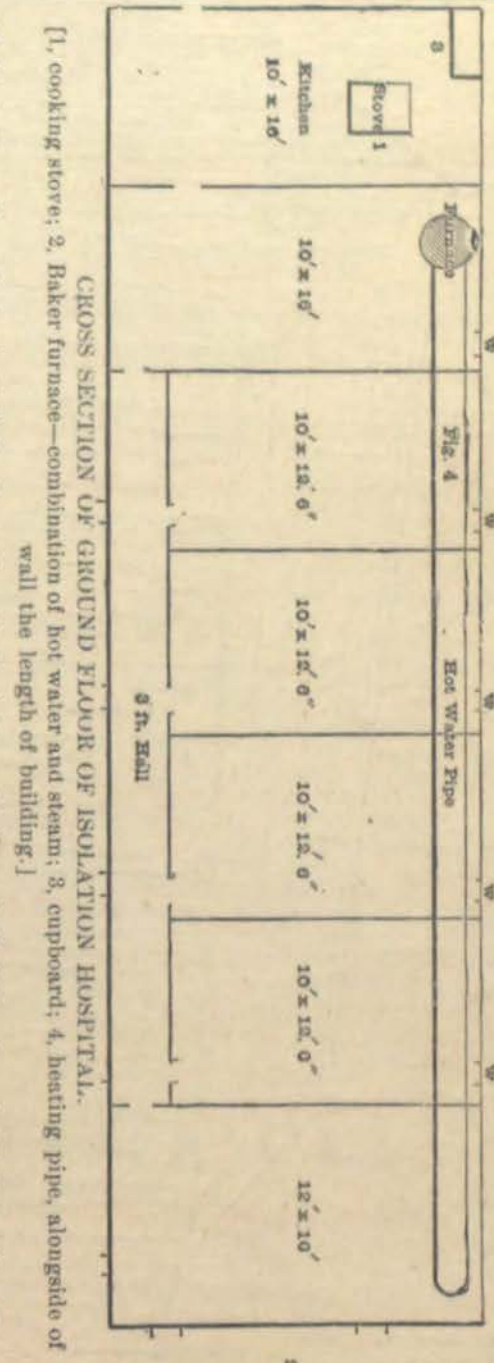
Secure also an ample supply of pure water.

No furniture should be used that will absorb or harbor disease germs. Bedsteads should be of iron and nickel-plated. The mattresses should be of wire. The beds should be of two-thirds the usual size. No upholstered furniture should be used.

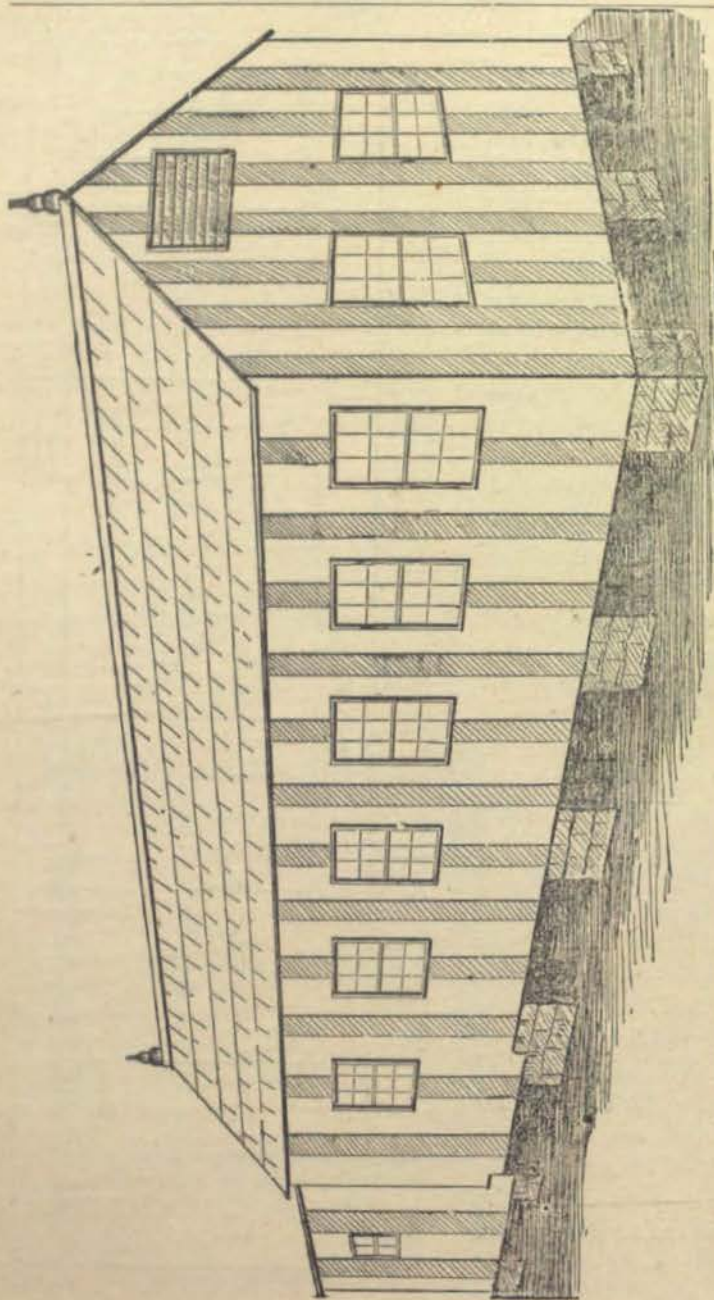
When completed do not condemn it, and excite public abhorrence by calling it a "pest-house." Give it any name but that, which invariably shocks the sensibilities of every human being.

A very commendable and inexpensive permanent frame isolation hospital was planned by St. Thomas' local board, an illustration of which is here given.

The addition of another story over the kitchen and dining room would provide dormitories for nurses. By placing a tank above the furnace, and taps on pipes, hot water could be carried to each room.



[1, cooking stove; 2, Baker furnace—combination of hot water and steam; 3, cupboard; 4, heating pipe, alongside of wall the length of building.]

Emergency Hospitals.

ISOLATION HOSPITAL, ERECTED BY ST. THOMAS LOCAL BOARD, MARCH, 1889.

Size—16x73 feet; height of ceiling 11 feet; ventilations in gable end and every room in ceiling. Kitchen painted; other rooms and hall oiled twice; all close-sheeted inside and hand-smoothed. Cost, including stove and heater, \$905.

Apthous Fever Among Dairy Cows.

APTHOUS FEVER AMONG DAIRY COWS.

The following correspondence is deemed of sufficient importance to merit a place in the annual report of this Board. While the incidents recorded had been passed some time when the period for publication arrived, they are nevertheless important as furnishing a history of a disease hitherto unknown, and one that might exert no small influence on the health conditions of our people, as well as on the domestic animals.

During the Summer of 1892, few if any cases were certainly recognized, and not a single case was reported to the office of the state veterinarian during the season of 1893:

AMES, August 13, 1891.

Governor Boies, Des Moines:

DEAR SIR—I have just returned from a tour of inspection among the diseased cattle of Tama county. Your attention has doubtless been called to a disease that has become quite general in southeastern Iowa within the last two or three weeks. Several newspaper accounts of the trouble have appeared from time to time, some of which give a pretty clear account of the disease. So far as I have been able to learn, the disease is confined to cattle alone. Milch cows seem to be the most susceptible, but no class is entirely exempt. The disease is a form of aptha, though differing, I think, from any form of the disease heretofore definitely described.

The most characteristic symptoms consist of soreness of the mouth, producing salivation and loss of mucus membrane of the tongue, lips and nose, soreness of the feet, eruption of the skin on the teats and udders of cows, with some elevation of temperature, and rapid emaciation. The tongue in some instances becomes so swollen as to protrude from the mouth, becoming dry, cracked and

Apthous Fever Among Dairy Cows.

very painful. Canker-like ulcers invade the mucus membrane of the mouth, especially the dental pad against which the incisor teeth rest, thus rendering it impossible for the animal to crop the grass. This inability to eat causes in a large measure the rapid loss in flesh. The lips, tongue and nose are covered with dark-colored scabs in aggravated cases, and not unfrequently the membranes of the nasal passages are involved, causing a profuse discharge. The lesions on the udder and teats are not of so severe a type, usually consisting of slight superficial cracks, and a sunburnt appearance of the general surface. This condition, however, is evidently associated with a considerable degree of pain from the resistance the animal makes against being milked. A rapid falling off of the flow of milk is a noticeable symptom, and often precedes any external evidence of the disease. In none of the cases I observed was there any abrasion of the skin of the legs or feet, though this does not coincide with observations made by some others who have investigated the same disease. In the cases I examined, the foot trouble seemed to be confined to the deeper structures, associated with swelling and fever about the pastern joints, not unlike the effects of rheumatism.

Locomotion is performed with pain and difficulty, and often the animal will rise to its knees and remain in that position, refusing to get upon its feet from the pain induced by standing. The symptoms as given above, would apply to the more severe type of the disease. In many instances the foregoing symptoms are so modified as to severity, that it would require close attention to recognize their presence. In such cases the animal continues to eat and drink, and in the course of a few days is restored to normal conditions of health.

There are two questions the farmer will invariably ask of the man who goes to his farm with the intent of investigating the outbreak: *First*, "What causes it?" *Second*, "What am I to do?" The second question is easily answered; the first is not. Let us take the easy one first. In a majority of instances the disease is of a mild type, and recovery will take place in from one to two weeks without giving the case the slightest attention. The more severe forms require treatment. This, for the greater part, will consist in astringent and antiseptic applications to the diseased surfaces. For the abrasions in the mouth and on the lips, probably nothing is

Apthous Fever Among Dairy Cows.

better than a saturated solution of borax or chlorate of potash, to which one per cent of carbolic acid may be added. This should be applied to all raw and ulcerated surfaces by means of a soft swab, and should be repeated several times each day until the patient is convalescent. Either the borax or chlorate of potash can be finely pulverized and mixed with two or three times its bulk of salt, and given to cattle with the milder form of the disease, thus saving the labor of catching and confining a large number of refractory animals. I observed that animals suffering with the disease, even in quite a severe form, would take salt readily. For other parts of the body, where abrasions occur, a mixture of carbolic acid and glycerine, in the proportion of twenty parts of glycerine to one of the acid, will be found a suitable application. Animals not able to graze from the severity of the disease, should be given bran mashes or other soft food until the more active stage of the disease is passed: Other complications, as constipation, will have to be treated as they arise. If the above precautions be taken with reference to the worst cases, the loss from death will be practically nothing.

The responsibility of all parties does not end with the proper treatment of the sick. I am receiving many letters from dairymen wanting to know what they must do, and whether the dairy products from such cows should be placed upon the market. Allow me to say, once for all, that the milk from no diseased cow should be used as an article of human food. Even an injury that would be sufficient to produce a rise in temperature is sufficient to condemn the milk of the injured animal. It is not likely that the present disease would be reproduced in the human being by the use of the milk from an affected animal, but both common prudence and common decency forbid its use as an article of food. It may with propriety be given to the lower animals after it has been boiled. I am not of the opinion that the milk from any herd where the disease exists should be used, though reasonable precautions are taken to exclude the milk of animals actually suffering from the disease. There is an early febrile stage of the disease which may escape detection, and during which the danger may be quite as great as during the more active stages of the disease. It is certain that an exceedingly disagreeable odor is given off from the heated milk. This can even be detected in cheese made from

Apthous Fever Among Dairy Cows.

such milk. I had an opportunity of examining such a product, made for the express purpose of testing the quality of the cheese. It is my judgment that local boards of health should insist on this precaution.

As to the cause of the disease, I am not able to give a satisfactory answer. In fact, I have not taken the time to make a study of this feature of the subject before giving you the benefit of such facts as I believe the public should have as speedily as possible. The cause will call for time and careful study to elucidate, or at least much time and pains may be necessary to arrive at right conclusions. This, however, will make little difference in the line of work that will fall to the lot of the average cattle owner. I reserve for a later time, and after more mature study of the question, my judgment as to the cause. I have already said I do not think the disease has been described in works on veterinary science, or, if so, the present outbreak is so modified by local conditions as to produce symptoms widely different from anything coming under my observation. My attention was first called to the disease some three weeks ago, in the southeastern part of the State, but under conditions that did not create suspicion of anything unusual. Since that time cases have been reported to me from a large number of localities in almost one-fourth of the State. From the most recent information I have, it is as far west as Monroe county, along the line of the C., B. & Q., and Tama county on the C. & N. W. Before this reaches you the affected territory may be greatly extended. There are some facts that would indicate that the disease spreads by contagion, while other evidence would seem to point to other sources of poison. I do not anticipate any serious loss to the stock interests of the State as a result of the disease.

There will be more or less temporary embarrassment of the dairy interest, and a notable shrinkage of the product for a time. The disease runs its course quite rapidly and from what I am able to see of it, my impression is that a few weeks will bring us out of the serious part of the difficulty.

It makes its appearance in a community so suddenly and affected herds are reported in such rapid succession as to defy all attempts at quarantine, were it evident that such measures, if enforced would prove availing against further spread.

M. STALKER.

How to Bandage a Finger.

[Since writing the above, numerous letters of inquiry have been sent to the sections of the State where the disease has been most prevalent. From the best information I am able to gather from answers to these letters it seems there have been a number of new cases, though but few have assumed an aggravated type, and the loss is trifling except in the way above indicated.

Probably the greatest injury that has resulted to the cattle interests in connection with this trouble, has come about from the indiscriminate way in which some individuals have rushed into print, giving the impression that the cattle of Iowa are affected with the contagious form of apthia, or foot and mouth disease, so prevalent in European countries. This has given unnecessary alarm, especially in England.]

At this date, October 24, the disease appears practically to have disappeared from the State, so far as I can learn. It seems to have been self-limited, disappearing in a manner as little to be accounted for as was its appearance. I have not completed any work that enables me to assign any satisfactory explanation as to the cause. It now seems more than probable that some cases of the same disease existed during the summer of 1890. Its appearance again during the summer of next year need not be a matter of surprise.

HOW TO BANDAGE A FINGER.

Railroad employes are the frequent victims of bruised and mangled fingers caught between the drawbar heads. Pressmen and machinists get their fingers pinched. The bandage ordinarily put on a finger is unsatisfactory. It gets loose and slips off, and is generally very bungling from superabundance. Dr. S. G. Hermance, of Rochester, N. Y., gives in the *International Journal of Surgery*, a very

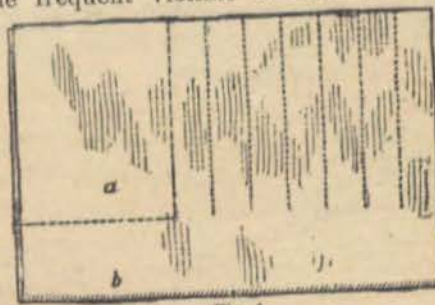


Fig. 1.

How to Bandage a Finger.

simple and most efficient method of cutting and applying a bandage which will remain firm in place, and with which a man with a pinched finger may in many instances return to his work.

Measure a piece of cloth twice the length of the finger and cut square. Fold the cloth double, as in Fig. 1. Cut out the square *a* and cut the seven tails as shown by the dotted lines. Open the bandage and place in position as shown in Fig. 2, the hand lying palm down on your knee. Then turn the flap *b* over your finger, and tie the first set of tails over it in one knot, leaving the ends loose to be covered by the tying of the second set of tails, as shown in Fig. 3. The remaining tails are all tied in the same way, making a double knot in the last set. In tying the tails draw them snug, but not too tight, and thus stopping the blood circulation. This makes a neat, firm, and very satisfactory bandage, which, when once used will demonstrate its advantages.

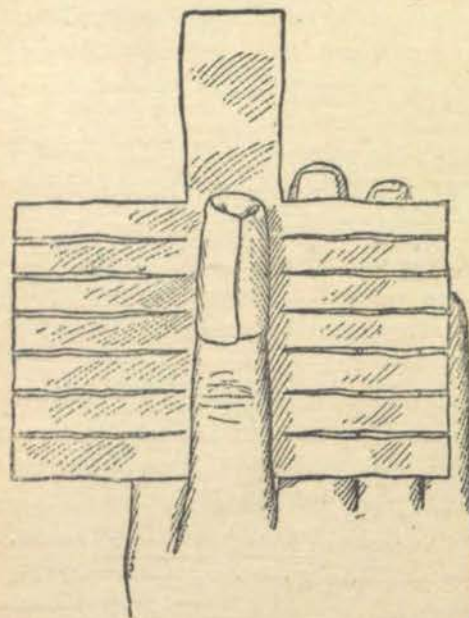


Fig. 2.

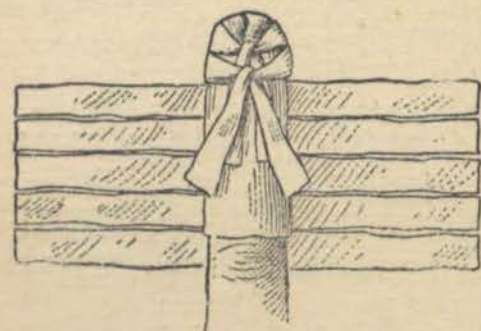


Fig. 3.

Railroads.

RAILROADS.

The railroad link-and-pin coupler still remains, although it is going out of existence as rapidly as mechanical forces can accomplish it. It is estimated the entire capacity of car-coupler factories is one hundred and fifty thousand cars a year, which is not sufficient to apply to cars added each year by the increased demands of traffic. It is a matter of congratulation that the conflict between inventors has ceased and a uniform coupler adopted, so that the reform can now go on limited only by the capacity to supply the coupler.

The report of the Railroad Commissioners for the year ending June 30, 1893, shows more people killed than the previous year, with an increased number of protecting appliances, but there is a decrease of four in fatality from coupling cars, and a decrease of seven in persons injured. The following are the casualties for the years named:

	1889.		1890.		1891.		1892.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Employees	35	442	73	579	82	601	81	682
Passengers.....	4	25	9	67	5	80	17	78
Others.....	33	40	69	101	91	92	79	64
Total.....	72	513	151	747	178	773	177	824
Coupling cars.....	8	149	14	203	13	242	10	196
Falling from cars and engines.....	5	44	17	83	23	82	32	68
Overhead obstructions.....	.....	.....	4	4	2	17	.....	3
Collisions.....	2	21	15	55	5	38	25	57
Derailments.....	3	16	5	42	7	60	8	65
Other train accidents.....	7	30	43	28	16	56	19	21
At stations.....	11	18	17	36	16	27	13	10
At highway crossings.....	8	7	14	23	16	21	14	55
Other causes.....	18	229	51	303	84	230	63	349
Total.....	72	513	151	747	178	773	177	824

Railroads.

The following table shows the application of air brakes and automatic coupling on locomotives and cars for years named; on June 30, 1893:

	LOCOMOTIVES.			PASSENGER CARS.			FREIGHT CARS.		
	1890.	1891.	1892.	1890.	1891.	1892.	1890.	1891.	1892.
Air brakes.....	2,445	2,872	3,619				3,220	6,658	11,821
Automatic couplers.....								5,557	14,994
Miller buffer.....							3,134		
Driver brakes.....			3,698						

It will be seen that while there has been a large increase in safety appliances, there has also been a large increase in fatalities, and this will continue under the system by which the cars of every road run over the track of every other road and trains are made up of new and old couplers, and with and without air brakes. State legislation is entirely inadequate to secure the proper remedy. There is a demand for immediate action of Congress.

There has been a most gratifying escape from loss of life of passengers, the number for the year 1892-3 being only twelve, thus evidencing careful management, competent employes and obedience to rules, the latter being one of the most important requirements in successful operation of railroads, the history of the horrible catastrophes of the last year having shown their cause to have been disobedience of orders by employes.

From these statistics it will be seen that one hundred and seventy-seven persons were killed during the year ending June 30, 1893. Add to this the medical and burial expense, and we have:

177 persons at \$5,000 each.....	\$885,000
Medical attendance, care, etc., \$50 each.....	8,850
Burial expenses, at \$50.....	8,850
Total.....	\$902,700

The report of the Inter-State Commerce Commission for the year 1892 shows the number of persons killed on all the railroads for the year to be: Employes, 2,660; passengers, 293. Of these there were:

	<i>Employes.</i>	<i>Passengers.</i>
Coupling cars.....	415	
Falling from trains.....	598	
Collisions.....	303	59
Derailement.....	206	43

Railroads.

According to the foregoing estimate, this is a loss of \$15,060,000 to the industrial wealth of the country, and which ought not to exist. The loss of life from collisions suggests the necessity of the adoption of a block system as a prevention of such casualties.

RISKS OF RAILWAY TRAVEL.

The risks of railway travel and menace to human life are not confined to collisions, derailments and blundering of railway employes. Thousands of human lives have been sacrificed to terribly defective heating, ventilating, and sanitary condition of passenger coaches. The closets, urinals, water-tanks, wash-stands, and the various departments of the coach are conspicuous for their neglect. The average railroad brakeman or car cleaner has as little conception of sanitation and hygiene as he has of the Egyptian hieroglyphics.

So very expressive of advanced, yet eminently practical, thought upon this subject are the remarks made by Dr. P. G. Conn, President of New Hampshire State Board of Health, and a member of the American Association of Railway Surgeons, before the New York Association at a recent meeting, they are given a place herein:

That railroads and steamships, in their capacity of common carriers, may and do become disseminators of infectious and contagious diseases, can be assumed without any fear of the assertion being controverted.

It is a well known fact that smallpox came into Montreal in 1895, amid all the luxurious appointments of our justly celebrated Pullman service; that yellow fever came into Grenada and Memphis, as well as other towns, in 1878, riding in all kinds of coaches; that steamship lines every year, bring to our shore more or less that are suffering from typhus fever or other contagious disease, and that experience has proven that all forms of transportation may and do become the avenues by which disease finds its way from place to place.

It is an equally safe assertion that there is no one connected with the management of our railroads but will disclaim any intention of their lines being used to spread disease, and at the same time they would gladly welcome any reliable information that would enable their lines to formulate rules and regulations that would overcome the difficulties that now surround the problem of sanitation as applied to railway transportation.

The public, since the epidemic of yellow fever in 1878-9, have become critical and easily alarmed upon questions bearing directly or indirectly upon the health of individuals, families or communities, and therefore State boards

Railroads.

of health as well as municipal health officers oftentimes feel called upon to exercise authority at different points, much to the discomfiture of the management and patrons of great through lines of travel.

If we had a central or national board of health that could act in conjunction with the interstate commerce commission, it is possible something might be done to give to the public and the management of roads some uniform method by which all might be governed; but as we have nothing of the kind, it is quite time that associations like this and our national association of railway surgeons were discussing this subject, for we may at any time in our association with railways and their management be brought face to face with an epidemic traveling across our country with the devastating power of a cyclone.

To show that I am not the only one who holds this belief, I will instance the following: So long ago as 1884, W. Thornton Parker, Surgeon U. S. A., then stationed in New Mexico, in a paper read before the American Public Health Association, entered an emphatic protest against allowing people ill with contagious and infectious disease occupying cars in which the public were expected to travel. To quote from his paper, he said, "Not only are the ordinary cars thus constantly contaminated, but the more luxurious and expensive sleeping cars are very much used for cases suffering from whooping cough, scarlatina, and other diseases. Patients convalescing from contagious diseases are very commonly met with. I understand that quite recently a very prominent and educated lady traveled from San Francisco to Boston, and even beyond, with children sick with whooping cough. In this case a private compartment was used; but, of course, the danger of infecting other children was only lessened, not removed. Several cases of that most dreaded of all diseases of children, scarlet fever, have to my knowledge been communicated in this way. A healthy child occupies the same seat where a convalescing scarlet fever patient has been sitting, and falls a victim to this terrible disease. Such license is an outrage on the traveling public and should not be tolerated another day."

Such was the language of an acute observer nearly ten years since, and while State and local boards of health have made great advancement in most matters connected with sanitation, the condition remains the same in our railway cars. I am not certain but the conditions are worse, for I believe that with the opening of new avenues for travel, far more people are passing over our roads in the pursuit of health than was thought possible ten years since.

At that time Dr. Parker suggested that railway station officials, conductors, and others connected with the train department, be required to prohibit persons suffering from contagious diseases from occupying cars used by the general traveling public. Surely a commendable suggestion, but I fear impractical, as these men could not be expected to diagnose disease. He added that a hospital sleeper could be furnished on through lines, and a medical inspector for large stations like those of New York, Chicago, St. Louis, and other large places, and said these inspectors should have the

Railroads.

legal authority to force patients suffering from contagious diseases or convalescing from infectious disorders into these special cars. To-day this would not be considered practical, for small pox and diphtheria, scarlet fever nor measles would be considered fit subjects to be placed in the same car.

As another instance, allow me to quote from the address of Medical Director Albert L. Gihon, U. S. N. In the course of his address to the section "On Hygiene, Climatology and Demography" of the Pan American Medical Congress, on the occasion of its recent meeting in Washington, Dr. Gihon used the following impressive language: "The consumptive, whose traits no professional acumen is required to recognize, frequents our crowded thoroughfares, sits beside us in unventilated street cars, and at the hotel table, occupies Pullman sleeping-berths and shares the steamship stateroom, wholly unrestrained and innocently ignorant that he or she may be sowing the seeds of disease among delicate women and children. Any one may verify this who uses his eyes for the purpose along the railway and coastwise steamer routes to our invalid resorts. Within a twelvemonth, on my way to Mexico by rail, I was a fellow passenger with two invalids in the advanced stage of phthisis, en route for San Antonio, one of whom occupied the opposite berth, and the other one diagonally across the car, so that I could see and hear them coughing and expectorating, with only such attention as well intending but unskilled relatives could render. They had no vessels for receiving their sputa, which was discharged in their pocket handkerchiefs, to be scattered over pillows, coverlets and blankets. They left the car next morning and I saw those same berths, it is true with change of linen sheets and pillow-cases, but with no change of blankets, mattresses or pillows, occupied that very night by other travelers, who were thus subjected to contact with a pathogenic microbe far more tenacious of life and power of evil-doing than the dreaded cholera spirillum. One has only to sit in a crowded street car on a Winter day and watch the clouds of respiratory steam circling from the mouths and nostrils of the unclean and diseased into the mouths and nostrils of the clean and healthy, as the expiratory effort of the one corresponds with the inspiratory act of the other.

"The road is short but straight and sure from vomica and mucous patch to the receptive nidus in another's body. Who that has ever had forced upon him an aerial feast of cabbage, onions, garlic, alcohol, tobacco and the gastric effluvia of an old debauchee can doubt that acquerous vapor can transport microscopic germs by the same route? Not long ago I traveled by sea from New York to Charleston, and for two nights was cabined with some twenty consumptives going to Florida. The air was chill, and they huddled around the stoves and fearfully and fearlessly closed doors and windows, until the atmosphere became stifling with their emanations and the dried sputa, which they ejected on every side. It was comparatively easy to escape during the day by staying on deck, and I slept with my stateroom windows wide open, but the curtains, carpets, pillows and mattresses had been saturated by I know not how many expectorating predecessors. I have visited fifty small pox patients a day, have gone through

Railroads.

yellow fever wards and stood by cholera bedsides with far less apprehension than I experienced on that trip, yet it was one taken by many thousands of people, who would have been terrified if a case of cholera was within a mile to leeward of their homes."

Now, let us for a moment digress and suppose that the conditions Dr. Gihon has so graphically described, and which almost any one having had occasion to make long journeys over trunk lines of railroads can duplicate over and over again—suppose that instead of diseased men, women and children, there was to be found Texas steers, glandered horses from New York, or diseased animals from any part of our country, would such diseased animals be allowed to travel in close proximity with other cattle? Certainly not; but if any one disbelieves this assertion, let him start from Texas or Wyoming with a car load of diseased animals with the intention of finding a market for them in New England. He will not get far before he will find he is the centre of a cyclone, and will be expected to run a bureau of information. It will be exceptional if he can travel twenty-four hours before every cattle commission and board of agriculture in the United States will be informed of the dangerous character of his herd, and protests against his being allowed to go from State to State will reach him from all directions. The transportation companies will also be notified that they are transgressing the law in opening an avenue by which contagious and infectious disease may be spread among other herds of cattle that are now in a healthy condition. Boards of cattle commissioners all along the expected route will assume unusual activity; telegrams will be sent over the wires at lightning speed; distinguished experts in veterinary medicine and surgery will be consulted; the federal power at Washington, as represented by a distinguished member of the president's cabinet, will be apprised of the dangers to be apprehended, and appealed to by those who have good reason to believe the transportation of diseased cattle through the country is liable to become a menace to the material interest of a large class of our citizens; and all these efforts proving unavailing, the strong arm of the law is invoked, not only to prevent the transportation of diseased animals, but the transportation companies have been made the defendants in suits brought to recover damages.

"There can be no doubt but it is a simple act of justice to our agricultural friends to promptly and intelligently meet such an emergency, and I believe I have as much sympathy for the welfare of the lower animals as any one, and would be glad to insure them at all times the kindest treatment and the best of care in all their conditions; yet I must admit that, under similar circumstances, I should like to see the same spirit prevail in regard to the human race, so that where epidemic influences are abroad we could appeal to the strong arm of the law and call to our aid expert knowledge with the same facility that can be done for the brute creation.

*NOTE.—While this paper was in preparation the writer saw in the Daily Press a statement to the effect that a large cattle owner in one of our western States had commenced a suit for damages against a railway running through his ranch, on the ground that the road had been guilty of transporting diseased cattle and as a consequence his herd had become affected.

Railroads.

Dr. C. W. P. Brock, in his address as president of the National Association of Railway Surgeons, at its meeting in Omaha, refers to this in the following eloquent language. He said:

"Human beings, born to immortality, are entitled to as much protection as the dumb beast; but it is not accorded to them by the laws governing the transportation of the country.

"The government has established a Bureau of Animal Industry, to prevent the exportation of diseased cattle, and to provide means for the suppression and to prevent the dissemination of contagious and infectious diseases among domestic animals, and makes an annual appropriation for the support of the bureau and assigns a cabinet officer to the head of it. This officer can stop the shipment of domestic animals from any section of the country he may see fit, and issue specific directions how the cars, pens, etc., shall be disinfected. Now this is as it should be and shows wonderful foresight and care on the part of our great government in protecting the pockets of her citizens from loss by disease and death of their domestic animals. But how is it when you come to human beings? Why, absolutely no protection is afforded to them. If there was a money value attached to each individual that would make him equal in value to one of these domestic animals, congress might be moved to the enactment of laws for the protection of those who are but 'little lower than the angels, and created in the image of God himself'."

"Man's inhumanity to man makes countless millions mourn."

At this point we may naturally inquire whether, as surgeons to important railway interests, we have any duties regarding railway sanitation. It is true that in some sections of our country railway directors and managers seem to regard us a necessary evil; like a fire extinguisher, only to be used in case of fire; our service to be called for only in case of accident, and only paying for such service, they very soon think of us as in some way connected with misfortune. In this they are very much like other people, for the majority of the public do not, as a rule, think it necessary to consult us except that misfortune overtakes themselves or some member of their families. Yet in this there has been a marked improvement during the last decade, for the public are becoming more and more alive to the necessities of personal hygiene as well as public sanitation.

In this way public sentiment in matters pertaining to sanitation is fostered and developed until State and municipal authorities are warranted in making and maintaining wholesome rules and regulations governing the hygienic conditions of individuals and communities.

Such being the fact, we may confidently expect that the management of our railways will find it for their advantage to take more advanced ground, and instead of following in the wake of public sentiment, take a new position, and either establish a department of hygiene in connection with surgery, or arrive at the same conclusions by some other means that will suit them better. It must in some way take cognizance of the sanitary condition of its cars, grounds, depots and warehouses, as well as of those accidentally

Railroads.

injured along the line. It is quite certain that the patron of the road who is enabled to make a journey across the continent without suffering the discomforts arising from the lack of an intelligent care of the heating and ventilating of coaches, and who can arrive at his destination in a good, sound, healthy, vigorous condition, ready for business as soon as the train comes to a full stop, will never forget that line, nor fail to draw congratulatory conclusions regarding the management whose intelligent care has been the means of rendering such results possible.

Domestic animals, although their owner may be quite willing to pay a fare, are generally consigned to the baggage car, and this without regard to whether they are in health or diseased; yet it will not do to send a passenger to the same compartment, and especially one that is seriously ill. Therefore, on great through lines, the transportation of individuals is liable to become a serious question to the general manager. The invalid seeking a change of climate in his search of health will naturally resent the imputation that his presence is a menace to the health and lives of others; while those who believe themselves to be in good health will object to being associated for long distance travel with those suffering from tuberculous and other infectious diseases. Sooner or later it is quite probable that on through routes to Florida, Colorado, New Mexico, California, and other places, a hospital car will become part of the train service, the number of trips per month to be regulated by the demand. Such cars should be constructed under the direction of the most expert sanitarians; should have all the important improvements in heating, ventilation, and appliances for the comfort of individuals and their attendants; but all luxurious appointments, such as curtains, carpets and plush coverings, should be reduced to the minimum, and every part of the coach and its fixtures should be so arranged that it could be cleaned and completely disinfected at any station, or if need be, the same could be thoroughly accomplished while en route.

Other things being equal, a car of the boudoir pattern, somewhat modified would probably meet the wants of that class of passengers better than almost any other of our present style of coaches, as curtains and other things which would become soiled and unwholesome could be reduced to a minimum or left out altogether in the furnishing of the car.

I am not a practical mechanic, and therefore feel a diffidence in making suggestions which require the approbation of a master mechanic, but it would seem to the professional mind that with our present means of heating with steam direct from the engine that it should be very easy to arrange for the complete disinfection by steam with but little trouble, and that it might be done very expeditiously. This is a matter in which the expert sanitarian and the practical mechanic must meet on mutual ground and agree upon some method that will be effectual and secure the confidence of the public; at the same time it must be simple and inexpensive, else it will not receive attention from the trainmen and others, to whom it would have to be entrusted. I should have some doubt of such a coach being at once self-supporting, much less of its ability to pay a dividend on the amount invested,

Shipping of Corpses.

yet it is quite possible that in advertising the trunk line over which it was intended to run at regular intervals it might prove as profitable as any other means of bringing the route into favor with the public. To do this it must be constructed on such mechanical and hygienic principles as to commend itself to every one having occasion to investigate its use; and the possibility of its being thoroughly cleaned and disinfected must be obvious and recognizable by all classes of people, else distrust instead of confidence will be engendered, and therefore it would fail of accomplishing the grand work for which it was intended.

This paper has been somewhat discursive in its character, but if I have succeeded in impressing upon the members of this association that there is a need of discussing this question, as well as of the fact that in the solution of the problem, the invalid, those in good health, and the stockholders and management of the roads are all deeply interested in bringing about a much needed reform, the object of its being written will have been accomplished."

SHIPPING OF CORPSES.

The regulations regarding the transportation of corpses continue and have received hearty coöperation by railroad companies. Similar regulations have been adopted in several other States. It is only a question of time when they will become national in operation.

During the biennial period considerable trouble arose over the shipment of bodies dead from scarlet fever, which had been buried for more or less years, and regardless of all regulations for transportation. The probable danger from infection by the disinterment and shipment of such bodies was deemed so great that their disinterment was prohibited by the State Board and the following circular issued:

THE STATE OF IOWA.—HEALTH DEPARTMENT. }
STATE BOARD OF HEALTH. }
SECRETARY'S OFFICE, DES MOINES. }

To Whom it may Concern:

In accordance with the rules and regulations adopted by the National Association of Railroad General baggage agents, and the Iowa State Board of Health, whenever it is desired to disinter the dead body of a human being, for removal or transportation, application for permission so to do, must be made to the State Board of Health for each body to be disinterred.

Shipping of Corpses.

The application must state the full name of the deceased, also the age, cause of death, date of death, name of physician who made the certificate of death, place of burial and where to be reinterred.

No disinterred body will be received for transportation by any railroad unless accompanied by a special disinterment permit from the State Board of Health, which is additional to the regular transportation permit.

The disinterment permit must also be approved by the local board of health of the jurisdiction where the body lies buried.

Depositing bodies in a receiving vault is deemed a burial, and a disinterment permit will be required for removal of a body therefrom.

A body dead from diphtheria (membranous croup), scarlet fever (scarlatina, scarlet rash), small pox, Asiatic cholera, leprosy or typhus fever must not be deposited in a receiving vault.

A receiving vault in which is deposited a body dead from Asiatic cholera, small pox, diphtheria (membranous croup), leprosy, scarlet fever (scarlatina, scarlet rash), typhus fever, must not be opened for the removal of such bodies, nor for the deposit of bodies dead from non-contagious diseases, nor for the entrance of living persons, and no permit will be granted for the removal of such bodies from such vault.

Where the disinterment is for the removal of bodies to another part of the same cemetery, or to a contiguous cemetery, the removal must not be by any public conveyance. In such cases, it is not required that the bodies shall be prepared as for transportation by railroad or other public conveyance. But a disinterment permit, approved by the local board must be obtained for each body disinterred.

Children must not be permitted to be present at disinterments.

No permit will be granted for the disinterment of bodies dead from small pox, Asiatic cholera, typhus fever, diphtheria or scarlet fever (scarlatina, scarlet rash), and for sanitary purposes, membranous croup will be deemed to be diphtheria.

Blank forms for application for permits will be furnished on request to this office for Form 24 E.

Undertakers and others will save possible delay and trouble in the removal of corpses, by strictly conforming to these instructions.

These regulations apply equally to all express companies.

J. F. KENNEDY, M. D., Secretary.

STATE OF IOWA: }
HEALTH DEPARTMENT. }

APPLICATION FOR DISINTERMENT PERMIT.

To the State Board of Health:

Application is hereby made for a Disinterment Permit for the body of
(Give full name here, whether it be one, two or three, use no initials.)

now lying at
cemetery in the
of
(City town or Township.)

Shipping of Corpses.

county of
State of Iowa, and who died on the
day of
18
aged
years
months
days, the cause of death being
and not the sequela of diphtheria, membranous croup, scarlet fever, (scarlatina, scarlet rash) or other contagious disease, and
contagious as shown by the certificate of
(Give full name of Physician here.)

The body is to be removed by
(State whether by railroad or by private conveyance.)
cemetery in the
of
(City, Town or Township.)
County of
State of
for reinterment.
Applicant.

Post office address
County of
Iowa.

NOTE—A body deposited in a receiving vault is deemed a burial, and requires a Disinterment Permit.

STATE OF IOWA. }
HEALTH DEPARTMENT. }

DISINTERMENT PERMIT.

Application having been made for the disinterment of the dead body of
now lying buried in
cemetery, in the
of
county of
state of Iowa, who
died on the
day of
18
aged
years
months
days,
the cause of death being
and not the sequela of diphtheria, scarlet fever, or other contagious disease,
as shown by the certificate of death of said deceased, given by
attending physician, and which is
this
is to certify that permission is hereby given for such disinterment and
removal by
to
cemetery in the
of
county of
State of
by the Local Board of Health of the
of
this
day of
189
President Local Board of Health.

(If a City or Town
affix corporate seal.)

Attest
Clerk Local Board of Health.

The foregoing application for the disinterment and removal by
for the body of
is hereby approved to take effect upon approval of the Local Board of Health of the
of
it being understood and provided that nothing herein shall be deemed as contravening or in anywise modifying or releasing the Regulations of the State Board of Health governing the transportation of corpses, or the requirements for a transit permit, and all transportation companies will be governed accordingly;

Kerosene.

and provided further, that where the disinterment is for the purpose of re-interment in another part of the same cemetery, or in a contagious cemetery, the removal shall not be made by any public conveyance.

Given under my hand and seal of the State Board of Health at
Des Moines, thisday of.....
A. D. 189....

.....
Secretary

KEROSENE.

Continued immunity from loss of life and property, through the statute governing the sale of kerosene, commends it to all sensible persons. The inspection service has been enlarged and improved during the biennial term, thus affording increased protection to the people. It may be truthfully said that no law in the statutes of Iowa has secured greater protection to life and property than that regulating the sale of this article. Of reports received from over one thousand health officers of local boards throughout the State the return is made that no accidents have occurred from kerosene within their jurisdiction. Accidents from the use of gasolene in stoves continue however, with great multiplicity. Graveyards are being rapidly peopled, and maimed and mutilated human bodies, and conflagrations, are daily added to the enormous list of horrors attributable to that highly inflammable and dangerous fluid. It is regretted that no legislation has been provided for regulating its use. That a necessity exists therefor, is as plainly apparent as in the sale and use of kerosene.

With the efficient cooperation of the Secretary of the State Farmers' Alliance the traffic in kerosene by parties outside of the State direct with farmers, in violation of the statute, has been stopped. Unscrupulous refiners, under the rigidness of the inspection service, have nearly ceased their attempts to force low grade and illegal oil into the State. There is no profit in paying transportation in and out of the State of the contraband stuff.

There has been several so-called lamp explosions in various parts of the State, which upon investigation proved fallacious. The State Board requires a thorough investigation made by oil

Kerosene.

inspectors of every case of alleged lamp explosion. In each instance it was shown that there was negligence in the care of the lamp; that the lamp had fallen and broken, or that gasolene had been carelessly substituted for kerosene in filling the lamp. With the latter exception, the oil used was legal standard.

On the 20th of June, 1891, in the Council Bluffs *Nonpareil*, appeared the following item:

Yesterday morning about 4:30 o'clock, Mrs. William Cooper, who resides on Avenue C between Eighth and Ninth streets, met with an agonizing accident which may yet result in her death.

Mrs. Cooper had just arisen from bed and lighted a kerosene lamp to give her light while she prepared breakfast. As the flames from the match touched the wick, they ran down into the lamp. There was a sudden and terrific explosion, and then for a moment all was quiet.

The oil had spread in every direction, a part of it striking Mrs. Cooper upon the arms, chest and stomach. Almost immediately the neighborhood was aroused by the heart-rending screams of the woman and many people sprang out of bed to see what was the matter. By the time they arrived at the Cooper home Mr. Cooper had extinguished the flaming fluid, but there were several pieces of furniture afire and willing hands soon put out the fire.

Mrs. Cooper was then cared for. Dr. Waterman was summoned and discovered that the woman had been frightfully burned where the kerosene struck her. He dressed the burns and the woman is doing quite as well now as could be expected.

Mr. Cooper had his hands badly burned while trying to tear the burning clothing from his wife's body. That gentleman regards it as a miracle that his wife was not burned to death, and states that it was only her own presence of mind that saved her from a horrible death.

An investigation was made, which showed that the lamp had been used a long time. The caps covering the opening for filling the lamp had been lost and a rag had been used as a stopper. The lamp had burned all night. About four o'clock in the morning Mrs. Cooper arose, turned up the wick, removed the chimney, and set a cup of milk on the burner. The rag stopper at once igniting, also ignited the oil, when she attempted to throw the lamp out of the door, but dropped it, thus setting her clothing on fire and burning her severely, from which she soon recovered. The oil had a flashing point of 110°.

In August, 1891, the newspapers reported a lamp explosion in the office of the American Express Company, at Boone. It was

Kerosene.

found that the lamps had been filled and cleaned as usual. They were then lighted, the wick turned up to a full flame, but the chimneys were left off. The employes then left the office. The room was soon after discovered in flames, which were extinguished without much damage. A kerosene lamp burning without a chimney, or with a broken chimney, will be liable to explode in about fifteen to thirty minutes, from overheating the oil.

On the evening of December 31, 1891, a fire burned a stable at Tipton, and its contents, consisting of valuable horses, carriages, etc. An investigation showed that a Rochester lamp used in the office of the barn was taken across the street to a store and filled, and lighted at an early hour. About eight o'clock the barn was discovered in flames. It was alleged that the lamp had exploded. A sample of the oil said to have been the same as that with which the lamp was filled was tested and was reported to be of legal standard. As the question of the cause of the explosion is now before the courts, no opinion is here expressed.

In February, 1891, a lamp explosion was reported by the press in the drug store of A. Benesh, at Cedar Rapids. It was shown that a tin lamp had been in use eight years, was seen when lighted to be smoking badly. It had become overheated, and the soldered joints had separated. The lamp was placed on the floor and the leaking oil allowed to burn up. There was no explosion.

In February, 1892, a lamp explosion was reported at the residence of H. M. Griffin in Ft. Dodge, and the house set on fire. An investigation showed that the lamp was set under some bric-a-brac hanging on the wall, and left burning with the room vacant. Shortly after the room was discovered on fire, which was extinguished without much loss. There was no lamp explosion. The cause was undoubtedly the igniting of the bric-a-brac.

In March, 1892, a lamp explosion was reported in the residence of J. P. Rollins, Cedar Rapids. The lamp was on a table, with books and writing material, in a room occupied by a student who about midnight went to his bed weary from study, dropped his head upon the pillow to rest his eyes. He was aroused, as alleged, by an explosion of the lamp, and the burning of the contents of the table and the carpet. The fire was extinguished without great loss. The oil used was found to be of legal standard. The probabilities

Kerosene.

are that the lamp was overturned while the student was "resting his eyes."

September 28, 1892, a lamp explosion was reported at a farm house near Highland, in Wapello county. An investigation showed that by mistake the kerosene tank of the oil dealer had been filled with a barrel of gasolene, and from it the farmer was supplied. On attempting to light the lamp filled with gasolene there was an instantaneous explosion, fortunately with no serious damage.

October 30, 1892, a lamp exploded in the house of Nelson Baker, West Chester, Washington county, causing serious damage to the house and contents. An investigation resulted in finding that the lamp was of glass, in use twenty-three years; burner clogged and unclean; common glass chimney, not fitting the burner; that the lamp was not kept in good condition; was set on a table between an open door and window in strong current of air. As the room was on fire when discovered, the evidence is conclusive that the chimney was broken by the air current, and the burner becoming overheated, the oil ignited and exploded the lamp. The oil was above the standard required.

In September, 1893, a lamp explosion was reported in Ottumwa daily papers at the house of A. B. Wetton. It was found on inquiry that the lamp, an old one, had just been supplied with a new, cheap burner, and cheap, common glass chimney, and filled with oil which had been in the house a long time. The wick was turned very low, for a sick room. About one o'clock the family were aroused by smoke, and found the lamp broken and the carpet on fire. No sample of the oil could be secured for testing. The burner was evidently unsafe and overheated the oil. No lamp should be left burning with the wick turned down. It should be given a full flame or extinguished. If a dim light is wanted, let it be shaded.

In March, 1893, a lamp explosion was reported in Malone's restaurant at Estherville. It was shown on investigation that a large hanging lamp fell to the floor, broke, and set the premises on fire.

In October, 1893, a lamp explosion was reported at the house of A. C. Hobart, Cherokee. It was found there was no unfavorable condition of the lamp, but that the person who delivered the oil

Kerosene.

was in the habit of using a kerosene and gasolene measure simultaneously. A very small quantity of gasoline mixed with kerosene renders the latter dangerous.

November 1, 1893, a lamp explosion at the house of J. A. Stinson, Keokuk, was reported by the daily press, by which a young woman was badly burned. The facts are, a glass hanging lamp fell to the floor and broke, igniting the oil and resulting in the disaster.

Another instance reported is where a new kerosene can had been purchased, and the old kerosene can filled with gasolene. The servant girl, disregarding the change, filled the lamps with gasolene. Fortunately the lamps were in good condition, and the intense smoke on lighting them caused their quick extinguishment, and an imminent disaster was averted.

About a year ago the residence of Frank D. Jackson narrowly escaped cremation through gross carelessness of the man who delivered kerosene, he having filled a ten-gallon kerosene can with gasolene, from which every lamp in the house was filled. As the lamps were all lighted simultaneously the intense smoke thrown off caused their immediate extinguishment and a discovery of the inexcusable blunder.

Thus it will be seen that carelessness and negligence in the use of oil and lamps were the cause of the foregoing lamp explosions, and not unsafe oil, as is to be inferred from the newspaper reports. Oil of legal standard is slow to ignite, and the necessary thing in the event of an accident is the exercise of coolness and good sense. As in other cases, the disasters are caused by people who lose their senses at the moment when they need them most. If kerosene is spilled and ignites it is easily smothered with a woolen garment. Pour no water on it, as that spreads the oil. If a lamp upsets, set it right quickly and gently, so the oil will not ignite the oil spilled. Don't rush out of the room and leave the doors open to create a draught which will increase the danger. A quantity of earth, sand, or flour thrown upon oil that may have ignited on a floor or carpet will extinguish the flame quickly.

It is pertinent here to say that the inspection of kerosene is not intended for any protection against the foolhardy and suicidal attempts to kindle fires in kitchen stoves, with it. The numerous

Kerosene.

fatalities, and mutilations, reported during the past two years, evidences that the fools are not all dead, and that they can be taught only by an experience which it is safe to say will not be repeated.

An important fact, should be borne in mind by all who use kerosene. It is the custom to keep the kerosene can in the barn or shed, away from the house. In cold weather, kerosene contracts greatly. If lamps are filled with cold oil, and the stopper and burner fit tight, when the oil becomes heated it will expand and rise in the wick tube, ignite, and flow down the lamp, thus rendering an explosion and a conflagration certain. At no time should a lamp be filled full.

The standard required by the statute of oil for illuminating purposes, is perfectly safe when used in lamps kept in proper condition, but it is not safe in any lamp where the oil becomes heated above 105° Fahr., and no lamp of any kind, should be used in which the oil becomes heated above that temperature. Only metal lamps should be used in a house where there are children.

During the biennial term the State Board has amended the rules regarding the inspection of products of petroleum, so as to include naphtha and benzene, and it is now required that they shall be branded like gasolene: "Rejected for illuminating purposes." This was done to stop the sale and use of these exceedingly volatile and inflammable liquids by unscrupulous persons who go about the country selling formulas for so-called safety fluids, of which naphtha, benzene and gasolene are the base. These fraudulent mixtures are as unsafe and dangerous as gunpowder, or dynamite; they are only naphtha, gasolene or benzene, under another name.

LIGHTING RAILROAD CARS.

The continued immunity from casualties caused by breaking of oil lamps in railroad coaches operated in this State evidences the wisdom in requiring a very high grade oil, an oil that will not ignite and burn at a temperature below three hundred degrees temperature. There is little if any danger of a car taking fire by the accidental breaking of a lamp in a railroad coach with such oil.

Railroad companies are, however, providing gas as a substitute for lamps, and thus reducing the risk.

Kerosene.

An effort has been made to introduce on roads operated in this state the so-called Frost Carburetor System, whereby several gallons of gasolene are stored in reservoirs filled with cotton, on the top of coaches, the gasolene being vaporized by a process similar to that of the gasolene stove. Under the statutes of Iowa such a system could not be used in this State, for the reason that the use any product of petroleum which does not have a flashing point of above one hundred and five degrees is prohibited for illuminating purposes.

THE GASOLENE STOVE.

The gasolene stove still continues its holocaust of human life, and there is no protection against it. No firm reason can be rendered why the protection afforded by the State against danger from one of the products of petroleum, used for illuminating purposes, should not in some way be extended to another product, vastly more dangerous.

It is true gasolene may be used with a minimum risk of danger, but, there always exists the liability to negligence, carelessness, a leaking can, and a defect in the stove; the stop-cocks may become worn and leak, permitting a flow of gasolene faster than it is consumed; the generating burner may be extinguished by wind, when the gasolene will continue to flow, and explode on relighting the burner. The stove has not yet been made that renders it "perfectly safe" to use gasolene. The danger lies in the gasolene itself, which is not safe to have about a house.

Certain precautionary measures may be adopted to render it less dangerous, if rigidly observed, to-wit:

First. Keep it in a well ventilated, cool place, inaccessible to children; never in any part of a dwelling.

Second. No unclosed vessel, as a pitcher, basin, or cup, containing gasolene should be carried or placed within ten feet of a burning stove, lamp, gas, or flame of any kind.

Third. Gasolene should never be poured from one vessel to another in any room in which there is an open grate burning, nor within ten feet of a stove in which is a fire, lighted lamp or a burning gas jet, as the current of air in a room is always toward a fire or burning lamp, and the vapor of gasolene will be carried in that direction and will ignite at a long distance.

Kerosene.

Fourth. Never fill the reservoir of a stove when the burner is lighted, nor near another stove in which a fire is burning. To do so, an explosion is inevitable. When not in use, close the cut-off between the reservoir and burner. This will prevent overflow from defect or leakage at the burner. If there be an overflow of gasolene, when filling the reservoir, or from the burner, wipe it carefully up before lighting the burner. If the overflow should become ignited smother it with a blanket or cloths. Do not throw water on it, as that spreads the gasolene and increases the danger. This is true of the accidental ignition of any quantity of gasolene or kerosene. Keep the reservoir continually closed air-tight.

Fifth. If from leakage of a stove, or vessel, there is discovered an odor of gasolene in a room that has been closed, throw open the doors and windows until the air is changed before a match is struck, or a flame of any kind is permitted therein.

Sixth. It seems absurd to give warning against kindling a fire with gasolene, but the record of self murder, from this cause is evidence that this superlative folly is perpetrated to an alarming extent. A more certain and horrible method of self destruction can not be easily conceived.

Seventh. Keep gasolene in a tight vessel, and after drawing therefrom place the cap over the spout and close the neck and vent tube if there be one. This will prevent evaporation of the fluid. It is from evaporation, filling the air with an explosive vapor, comes the danger. To test this, pour a tablespoonful of gasolene on a plate, wait a minute and see how near a lighted match can be brought to it, being careful to have your hand below the bottom of the plate.

Eighth. Never attempt to clean gloves on the hand nor dresses with gasolene, near a flame or stove. The fire in the stove will draw the vapor from the gasolene through the crevices, and ignite it like a lightning flash. The deodorizing of gasolene for toilet use does not change its explosive nature.

Vital Statistics.

VITAL STATISTICS.

The law makes it the duty of the State Board of Health to supervise a registration of all marriages, births and deaths occurring within the State. The law does not, however, declare that such statistics shall be published. The General Assembly in providing for such a registration, and in enacting a penalty in case of refusal to report births or deaths in the form and manner prescribed by the Board of Health, evidently intended and expected that the public would have the benefit of their registration by their publication, at least, biennially.

The Secretary of the Board would be glad to publish monthly through the Bulletin; or with the biennial report of the Board such a compilation from these reports as would properly represent the state.

The various county clerks send in the reports as required by law, but the physicians and midwives have been so careless or neglectful in returning births and deaths that a compilation—especially a publication of them—would not even approximately represent the facts.

The report of marriages is perhaps absolutely correct since every person married has to procure a license and every marriage has to be reported to the clerk as a part of the marital contract.

It is perhaps true that all accidental deaths of which a coroner has official cognizance are properly reported. In most of our large cities the municipal regulations are such that no interment takes place except upon a proper certificate from the attending physician, so that the reports of deaths from cities and a large number of incorporated towns are approximately correct. The greatest deficiency in reporting is found in small towns, villages and country townships interring their dead in country or village cemeteries, where no regulations whatever exist. As during any year quite a large number in the aggregate thus die and are not reported the registration of deaths to that extent would be unreliable.

Vital Statistics.

The greatest defect, however, is in the report of births. There are many prominent physicians of the State who have a large general practice—some who do an especially large obstetric practice, who, so far as the official records of their county show, do not attend more than two or three cases of "labor" annually. The same will apply to active midwives.

As a result the returns from some counties do them a great injustice, since they do not fairly represent the facts.

For instance: For the year preceding November 1, 1892, there were in Polk county seven hundred and seventy-nine births, and in Woodbury county, three hundred and ninety-one. In Polk county there were for the same period six hundred and forty-six deaths and in Woodbury five hundred and fifteen deaths. It will be noted that in Woodbury the deaths are far in excess of the births! Compare Fayette and Appanoose counties—nearly equal in population. In the former there were two hundred and seventy-eight marriages and one hundred and eighty-three births—in the latter two hundred and thirty-three marriages and four hundred and sixty-eight births! Why should one county with only two hundred and thirty-three marriages show a birth rate of four hundred and sixty-eight, and the other with two hundred and seventy-eight marriages, only a birth rate of one hundred and eighty-three, unless there is a greater failure to report births in the one case than in the other?

These few illustrations may serve to justify the Board in not furnishing in connection with the Biennial Report any tables or statistics upon marriages, births and deaths. Still, under the law, the reports such as they are, are sent to the Secretary's office, and classified and substantially bound. They are a part of the records of the Secretary of the State Board of Health, and, even defective as they are, are of great value. The law, so far as it relates to a registration of vital statistics, should not be repealed. Such modification, however, should be made as would secure more accurate returns.

What that modification should be is a question somewhat difficult to determine.

Under Chapter 104 (Laws 1886) relating to the practice of medicine, surgery and obstetrics in Iowa, all physicians practicing legally in the State must have a certificate from the State Board of

Vital Statistics.

Medical Examiners. The General Assembly generously, if not wisely, allowed all women who were then engaged in the practice of midwifery in the State to continue such practice without such, or any, certificate. Neither the State Board of Health, nor the State Board of Medical Examiners has any list of, nor control over these women.

The Medical Practice act should be so amended as to enable the Board of Medical Examiners to require that all such women be registered at least, if not licensed, and they then could be furnished with such information as is necessary regarding the registration of births and deaths.

Every legal practitioner of medicine, surgery, or obstetrics in the State, with his or her certificate, receives a copy of the following circular :

OFFICE OF THE IOWA STATE BOARD OF HEALTH, }
DES MOINES. }

Chapter 151* (Laws of 1880), which has not been repealed nor changed by the Medical Practice Act of 1886, not only requires all physicians and midwives practicing in Iowa, whether holding the certificate of the State Board of Medical Examiners or not, to register with the clerk of the district court of the counties wherein they reside, but also requires a report of every birth and death, as well as the cause of such death, to the clerk of the county wherein such birth and death occurs, and fixes a penalty of ten dollars for a failure to so register and report.

The reports in this office show that there has been great negligence in this matter; that while some counties send in good and apparently complete returns, others almost wholly ignore the law. Such faulty and incomplete returns make any deductions based thereon of but little use and therefore do a great injustice to the State. There are those who have no faith in the value of such statistics, and who see no reason why such service should be

* Sec. 5. It shall be the duty of all physicians and midwives in this State to register their names and postoffice address with the Clerk of the District and Circuit Courts of the county where they reside; and said physicians and midwives shall be required, under penalty of ten dollars (10), to be recovered in any court of competent jurisdiction in the State at suit of the Clerk of the Courts to report to the Clerk of the Courts within thirty (30) days from the date of their occurrence, all births and deaths which may come under their supervision, with a certificate of the cause of death, and such other facts as the Board may require, in the blank form furnished, as hereinafter provided.

Sec. 6. When any birth or death shall take place, no physician or midwife being in attendance the same shall be reported by the parent to the Clerk of the District or Circuit Courts, within thirty days from the date of its occurrence, and if a death, the supposed cause of death, or, if there be no parent, by the nearest of kin not a minor; or if none, by the resident householder where the birth or death shall have occurred, under penalty provided in the preceding section of this act.

"A practicing physician should report births and deaths to the clerk of the county where the same occurs, without reference to where he is registered, or where he lives."—Attorney-General, Jan. 4, 1881.

Vital Statistics.

demanding without due compensation. A decision of our Supreme Court sustaining the legality of such requirements says, very justly:

"A physician should honestly endeavor to obtain and report all information required by the regulations of the statute and the State Board of Health. This is his duty as a citizen, and is imposed as an obligation by the ethics of the useful and honorable profession of which he is a member."

Births, marriages and deaths constitute the chief events of human life. The record of these phenomena and of the causes leading to the last named, constitute vital statistics. A faithful registration of births and deaths—the beginning and ending of life—is surely of vital importance to every individual of the State, especially to all physicians and students of sanitary science. Such statistics facilitate the identification of individuals, and thereby aid in the settlement of estates; assist in the detection of criminals; afford data for the estimation of life expectancies; furnish to medical and sanitary science important and invaluable information regarding the state of public health; and throw light upon casual conditions upon which prevailing diseases occur, thus leading to intelligent methods for prevention. Indeed, the information obtained from such statistics, form the foundation of all researches in sanitary science. Such statistics, in order to obtain due credit, ought to be furnished wherever possible, by the medical attendant, and hence it is largely, if not only through the coöperation and assistance of the members of the medical profession that reliable reports can be obtained. New Hampshire, Connecticut Rhode Island, Massachusetts, New York, Michigan, Illinois and Minnesota have reports on vital statistics that are of inestimable value, not only to sanitarians everywhere, but especially to the respective States themselves. Will not the medical profession of Iowa see to it that our State, with a less per cent of illiteracy than any other, is not behind in this particular? Is it too much for this Board to expect that every licensed physician and midwife in Iowa will in the future make full and reliable reports of births and deaths?

They must register in the county in which they reside, and without reference to their place of residence must report all births (including still-births) and deaths to the clerk of the courts of the county or counties in which these casualties occur, within thirty days after their occurrence.

Vital Statistics.

In reporting deaths the names of diseases as given in the circular, "Nomenclature of the Causes of Death," must in all cases be strictly conformed to, so far as possible, except that "164, croup," page 8, must be reported as "membranous" or "spasmodic croup"—the former being regarded for quarantine, transportation, and interment purposes, as identical with diphtheria.

Blanks for making birth and death returns can be had at the office of the clerk of the district court, who is required by law to furnish them upon application to all physicians and midwives in his county. No other form of blank must be used than that prescribed by the State Board of Health and furnished by said clerk.

Health officers, upon application to this office, will be furnished pamphlets upon the prevention and restriction of contagious and infectious diseases, and other information desired, pertaining to their duties and powers under the law.

It is pertinent here to say, no physician can be elected or serve as health officer of a local board of health who is not a lawful physician, and holds a certificate authorizing him to practice medicine in this State.

NOTE.—A physician may authorize, by letter or by proxy, the clerk of the courts to register his name for him. He should furnish the clerk with the data given in his certificate, issued by State Board of Medical Examiners, entitling him to practice.

FACTS TO BE KNOWN AND OBSERVED BY ALL PHYSICIANS AND NURSES.

1. Meaning of Quarantine:

1. The placing of a yellow cloth or card not less than eighteen inches square, having imprinted thereon the name of the disease in large letters, upon such conspicuous place on each building, hall, lodging room, or place wherein exists a contagious disease, as will best protect the public health;

2. The separation of the sick from all other persons, if possible, and from all persons except the members of the family, the attending physician, and nurses;

3. The complete exclusion of all persons from the premises;

4. That no person shall leave said premises except the attending physician, without a permit therefor signed by the mayor (or clerk, if in a township) and countersigned by the health officer;

5. That no article that has been used on or about a person sick with a contagious or infectious disease shall be removed from the sick room, nor from the premises, until the same has been properly disinfected.

Vital Statistics.

6. That when nurses are employed to care for the sick they shall not be permitted to leave the premises during such employment, and where neighbors, relatives and friends serve as nurses, they shall not be permitted to leave the premises without previous change of clothing, proper disinfection, and a permit from the mayor (or clerk, as the case may be).

2. Diseases to be quarantined and period of quarantine.

- Asiatic cholera, twenty-one days; small pox, forty days; scarlet fever (scarlet rash, scarlatina), thirty-five days; diphtheria (membranous croup), thirty-five days; measles, twenty-one days; typhus fever, until complete recovery and twenty-one days thereafter; whooping-cough, exclusion of all children from premises for six weeks from commencement of whooping, provided the characteristic cough and whooping have ceased.

3. Dead bodies not transportable by public conveyance, nor disinterable.

Diphtheria (membranous croup), scarlet fever (scarlatina, scarlet rash), small pox, Asiatic cholera, leprosy, typhus fever or yellow fever.

4. Quarantine, isolation, disinfection, and vaccination, with cleanliness of person and surroundings, are the only successful means known to prevent the spread of infectious diseases. Every true physician is a benefactor, and as such will do all that can be done to prevent, or to restrict the spread of disease.

Thus the work of each board respectively supplements that of the other. All physicians, surgeons, or obstetricians on receiving legal permits to practice, receive with it, through the Board of Medical Examiners, the foregoing practical information relating to the registration of vital statistics, quarantine and other preventive measures having in view the restriction of infectious diseases.

If Chapter 104 (Laws of 1886) were so amended as to enable the Board of Medical Examiners, upon satisfactory evidence of willful and persistent refusal or neglect to report promptly births and deaths, to revoke the certificate enabling the holder to practice, there would be but little cause of complaint.

If, further, every midwife was required to be licensed by the Board of Medical Examiners, and to have such license revoked in

Legislative Suggestions.

case of failure to report births or deaths there would be still less cause for complaint. Nor would such requisition be unreasonable, or unjust. No other modification of the law would so effectively secure such a registration of vital statistics as was intended by the General Assembly, and as would do justice to our commonwealth.

LEGISLATIVE SUGGESTIONS.

Thirteen years' observation and application of Chapter 151, Laws of 1880—the law creating the State Board of Health and defining its duties and powers have demonstrated several defects—several provisions that limit the efficiency and thus defeat in a measure some of the beneficent designs of the law.

It would be well if a bill could be passed by the next legislature enacting such a substitute for Chapter 151 as would meet the requirements of the health service as demonstrated by the practical work and efforts of the Board under the present law.

The amendment to the law made by the last General Assembly has been a great improvement and has greatly simplified the work of quarantine. It was a substitute for section 16, empowering the mayor of a city or incorporated town, or the clerk of any district township to institute, maintain and raise a quarantine instead of the local board of health.

Local boards of health can only make rules or regulations, respecting the public health, but once having adopted such measures and made them a matter of record the mayor or clerk, as the case may be, in all matters of quarantine must act without further action by the board. This enables quarantine measures to be resorted to much more expeditiously and with much less expense.

Local boards of health should include in their regulations specific as well as general provisions for quarantine, and also provision for the employment of nurses, for supplies, medical aid, isolation and disinfection; and also define the duties of the health officer of the board, as he has no powers except as specified by the local board.

Legislative Suggestions.

He is the sanitary adviser of the board, but is relieved from service as an executive officer in matters of quarantine. Neither he nor the attending physician, nor school directors, superintendents or teachers can interfere with quarantine regulations. Nor can local boards make regulations in contravention of those made by the State Board.

The following is the substitute referred to passed by the last General Assembly:

SEC. 16. Local boards of health shall make such regulations respecting nuisances, sources of filth, causes of sickness, rabid animals, and quarantine, not in conflict with regulations made by the State Board of Health, and on board any boats in harbors or ports within their jurisdiction, as may be necessary for the public health and safety. Upon written notice given by any practicing physician that small pox, diphtheria, scarlet fever, or any other contagious disease dangerous to the public health, exists in any place, it shall be the duty of the mayor of any incorporated city or town, and the clerk of any district township, forthwith, without other authority, to establish quarantine in such cases, as may be required by regulations of the State Board of Health and said local boards, and to maintain and remove such quarantine in like manner. If any person shall violate any such regulation as herein provided, he shall be fined not less than twenty-five dollars for each and every day he knowingly disregards and violates the same, to be recovered before any court of competent jurisdiction. Notice shall be given of all regulations made by said local boards, by publishing the same in a newspaper published in their jurisdiction, or where there is no newspaper, by posting in not less than five public places.

First.—It would be well to strike out the word "written" at the beginning of the second sentence so as to have it read, "upon notice." In all towns it is much more convenient to furnish such information by telephone than in writing. Strictly construed, a personal information or an information by "phone" is not legal, and has, in several instances, led to discussion or delay, as well as to irritation and bad feeling. With that word "written" eliminated there would be nothing further to amend in that Section.

Second. Observation has demonstrated that either by ignorance or design false and fraudulent statements are made as to causes of death—for the purpose of securing the transportation of human corpses. Some provision of law should be made to protect against the danger that may come to the public from such perversion of facts. The following amendment would cover such cases:

Legislative Suggestions.

If any physician, or any other person, shall knowingly attempt to secrete, or withhold the true character of any of the contagious or infectious diseases specified in the regulations made by the State Board of Health, or shall in any manner whatsoever attempt to deceive or defraud, or who shall make any false statement in making a certificate of cause of death as required by the statute, by giving any other than the true cause of such death; or, if the decedent was affected with any of such contagious or infectious diseases during his last sickness, he shall neglect or refuse to state such fact in such certificate, he shall be fined not less than twenty-five dollars, nor more than one hundred dollars, or be imprisoned not less than ten days, nor more than thirty days, or be both fined and imprisoned, at the discretion of the court.

Third. The efficiency of section 2 is wholly counteracted by the concluding words, "so far as the efficiency and success of the Board may depend upon their official coöperation." After the word "State" in the concluding sentence the statute should be so amended as to read, "to assist in the enforcement of such rules and regulations," leaving out the remaining words of the section.

Fourth. An amendment to the statute regarding the return of marriages, births and deaths is imperative. As the statute now is the person solemnizing a marriage is not required to make a return thereof to the county clerk until ninety days thereafter. Physicians and midwives are given thirty days in which to make returns of births and deaths. The statute further requires the county clerk to report to the State Board of Health, October first, annually, the marriages, births and deaths which have occurred in his county during the previous year. For the purpose of vital statistics such a report is valueless for the reason that no marriage which has occurred within the three months preceding, or births or deaths occurring within thirty days will be included in the report to the State Board of Health until the following year.

As the person solemnizing a marriage is compelled by law to furnish the bride and groom at the time of marriage a certificate setting forth all the facts contained in his return to the county clerk, there is no good reason why the return to the county clerk should not be made at once or within twenty-four hours. Returns of births and deaths should be made on or before the tenth day of each month for the calendar month preceding.

The time for making the report of the county clerk should be extended to the 15th day of October or the first day of November,

Legislative Suggestions.

and the statute should be so amended as to include all marriages, births and deaths for the year closing October 1st preceding, instead of reading as it now does "All births and deaths recorded in their office." As it now is a clerk may have a number of returns not recorded, and thus fail to make return of them upon the technicality that they had not been put on the record.

Clerks have been requested by the secretary to withhold their reports until November 1st, or until they can include the returns for September, but they refuse because the statute does not authorize it.

Fifth. Section 8 should be repealed as it is in conflict with other laws which declare that such fines shall go to the school fund.

Sixth. Section 12 should be so amended as to make the annual appropriation not less than six thousand dollars per annum, instead of five thousand, as heretofore. The former amount was sufficient at the time the law was enacted, but with the population of the State nearly doubled and the demands upon the Board and the office proportionately increased, it is now wholly inadequate and limits the Board to a policy that is not in the interest of economy or efficiency.

Seventh. Section 10 should be so amended as to provide for a reasonable per diem for the members of the Board when in attendance upon the meetings of the Board, or when called from their homes to visit infected localities in an official capacity. This should be in addition to their actual traveling and other necessary expenses, which is now all they are allowed by law.

Eighth. Section 17 should be amended so as to apply to district townships as well as to cities or incorporated towns, or villages. It should read: "Local boards of health shall order the owner of any property, place or building (at his own expense) to remove any nuisance, source of filth, or cause of sickness found within their jurisdiction," etc.

Ninth. Section 19 should be so amended as to apply to district townships as well as to a "town," and should embrace manufacturing and other places as well as "a dwelling place." It should read "Local boards when satisfied upon due examination that any cellar, room, tenement or other building, or parcel of ground within their jurisdiction has become" etc.

Legislative Suggestions.

Tenth. Wherever the word "forfeit" occurs in prescribing a penalty it should be so changed as to read "shall be fined."

Eleventh. Sections 21 and 23 should specifically or more explicitly state by whom and upon what conditions expenses incurred in maintaining quarantine, including nurses, provisions, clothing used or destroyed and disinfection, shall be paid. As it now is, there is a continual conflict between trustees, acting as local boards, and county supervisors, as to payment of such claims. The statute itself is not clear enough.

Twelfth. An additional section should be added to the statute or section 5 should be so amended as to require all physicians and midwives practicing within the State of Iowa to be registered in the office of the State Board of Health, giving name, age, place of residence, and such other personal data as may be required by the Board; and further providing for the publication of such register in connection with the biennial report.

Thirteenth. In the further interest of more reliable vital statistics it may not be out of place here to suggest that section 7, of Chapter 104, Laws 1886, should be so amended as to give to the Board of Medical Examiners the right to revoke the certificates of physicians, and to prevent the further practice of midwives who willfully and persistently refuse or neglect to report births or deaths occurring within their practice.

Fourteenth. No interments of the dead should take place in the State without a permit issued upon a certificate from the attending physician, midwife, or coroner, by the clerk of a city or incorporated town, or of a district township—all such permits to be forwarded by the undertaker or sexton, with such other data as may be required, to the Secretary of the State Board of Health, on or before the first day of each month. A provision requiring this should be placed in the law.

With such alterations in the general statute relative to the public health every department of work would be so strengthened and its objects so specifically set forth that the best possible results would be attained with the least friction and delay.

In addition to the suggestions stated above it would be well to have one or two special statutes providing for emergencies. Such as the invasion of the State by cholera, yellow fever or small pox,

Legislative Suggestions.

especially in epidemic form. There ought to be special provision for the appointment of inspectors—vaccination, medical services, emergency hospitals, nurses, provisions, etc., and an emergency fund placed in the hands of the State executive council. Should such an emergency arise, the Board of Health, under the statutes now in force, would be greatly embarrassed, if not powerless, to render promptly such efficient service as would best protect the people.

The publication of the MONTHLY BULLETIN by the board has been of great benefit as an educational factor. If this work could be supplemented by the holding in different parts of the State of sanitary conventions, under the auspices of the State Board of Health and the Iowa Public Health Association, conjointly, it would greatly aid in the work of the Board. Michigan has a law providing for the holding of a sanitary convention in every town and district township in the State once a year—a kind of sanitary day. If Iowa by special statute would provide for at least four sanitary conventions annually, and set apart about one thousand dollars for the expenses thereof, to be expended in publishing the proceedings, payment of hall, programmes, etc., the benefits would be incalculable, and would extend to all classes of people. The only persons not benefited financially, perhaps, by such educational measures are those whose profits depend upon expenses incident to sickness, death, and sepulture.

METEOROLOGICAL TABLES—COMPARATIVE STATEMENTS.

1839—IOWA CITY*—1859.

Elevation above sea level, 645 feet.

YEAR.	COMPARATIVE MEAN TEMPERATURE (DEGREES).												COMPARATIVE PRECIPITATION (INCHES).													
	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Average mean for year.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Total for year.
1839	70.6	75.7	78.1	61.1	60.7	35.1	23.9	32.9	31.8	40.5	62.7	68.9	53.03	...	...	...	...	...	...	...	...	...	...	...	...
1840	72.4	73.9	72.1	63.1	52.6	41.9	26.6	19.5	28.3	38.3	52.9	63.1	50.64	...	...	...	...	...	...	...	...	...	...	...	...
1841	71.1	70.4	65.5	58.5	55.0	38.2	28.8	26.9	26.1	37.1	51.0	58.1	48.68	...	...	...	...	...	...	...	...	...	...	...	...
1842	65.6	68.4	68.7	64.5	55.5	30.2	21.0	26.3	28.1	45.8	53.3	57.9	48.82	...	...	...	...	...	...	...	...	...	...	...	...
1843	67.8	70.4	70.6	64.6	42.2	34.1	31.9	25.0	13.4	15.5	47.7	58.2	45.11	...	...	...	...	...	...	...	...	...	...	...	...
1844	65.8	74.9	70.0	61.4	46.1	30.1	25.4	22.7	30.3	38.3	60.8	58.9	48.81	...	...	...	...	...	...	...	...	...	...	...	...
1845	64.3	76.0	70.8	62.9	48.5	33.3	18.2	30.0	29.9	40.4	51.1	55.5	48.39	...	...	...	...	...	...	...	...	...	...	...	...
1846	66.1	73.0	73.0	65.9	43.0	30.1	28.9	31.2	24.2	40.6	52.7	64.1	50.00	...	...	...	...	...	...	...	...	...	...	...	...
1847	62.5	69.5	65.3	59.8	47.8	33.5	25.4	12.3	25.3	29.4	49.1	55.8	44.64	...	...	...	...	...	...	...	...	...	...	...	...
1848	64.3	64.0	66.7	56.3	43.9	30.8	19.1	28.0	28.4	35.2	45.1	62.0	45.31	2.50	5.70	9.10	3.00	4.30	1.40	1.29	1.20	1.60	2.10	0.70	4.40	36.29
1849	67.6	66.5	65.3	60.8	47.8	33.5	25.4	12.3	25.3	29.4	49.1	55.8	44.64	12.20	1.40	12.20	5.00	4.80	6.00	1.14	2.82	1.30	2.41	4.70	4.70	50.27
1850	70.2	74.2	72.2	58.8	44.2	37.6	19.8	24.4	28.9	32.6	41.2	53.3	44.76	2.50	5.00	13.00	3.00	2.70	3.59	2.87	4.62	0.80	2.08	3.30	3.70	38.66
1851	46.6	71.6	69.1	68.3	50.4	34.5	21.4	24.0	27.7	38.2	43.5	58.2	46.12	14.30	8.60	14.00	3.50	1.40	3.63	2.95	1.55	5.34	3.03	6.30	12.60	74.50
1852	66.8	72.4	69.0	59.8	53.2	30.0	22.2	19.9	29.0	36.2	42.2	60.0	45.86	2.20	3.70	2.80	8.30	7.00	5.76	5.11	2.52	1.00	8.60	5.30	6.50	56.39
1853	71.2	68.8	71.1	62.2	45.5	39.7	26.7	27.1	23.4	33.2	47.8	55.7	47.30	0.40	6.60	1.70	6.20	0.21	4.92	0.32	0.43	0.90	0.76	1.80	4.00	45.08
1854	69.0	76.2	73.0	68.2	44.4	36.8	27.8	16.2	28.5	39.9	51.1	60.4	41.00	0.66	2.22	3.33	1.13	4.22	0.19	0.51	0.40	1.80	1.22	1.76	6.21	24.15
1855	67.0	73.0	70.4	67.9	47.2	37.8	21.7	24.8	15.6	30.3	54.0	60.4	47.50	4.75	2.55	3.51	1.84	2.80	2.18	2.15	1.68	0.70	1.87	2.55	1.94	28.68
1856	71.8	73.5	65.4	59.0	52.4	32.8	15.6	6.5	15.0	25.8	49.5	61.4	44.14	2.86	2.74	1.36	2.45	5.21	4.35	6.25	0.12	4.46	0.57	3.44	4.39	38.20
1857	65.1	71.2	70.9	63.8	47.9	31.2	31.4	6.2	28.8	29.9	38.3	53.9	44.90	0.90	4.67	6.00	1.80	1.95	4.77	1.85	0.61	5.80	3.33	5.09	2.75	39.52
1858	70.6	78.8	79.9	66.0	52.0	32.6	25.5	30.0	16.0	38.7	46.1	54.3	49.20	6.70	7.30	4.12	6.10	4.90	4.54	1.82	1.60	2.96	2.20	2.00	8.40	51.68
1859	69.0	72.3	68.2	60.3	37.5	39.6	15.1	24.1	25.8	40.1	43.3	62.1	46.45	5.82	2.93	1.70	1.80	0.85	1.35	1.81	0.94	1.72	5.01	1.05	7.49	32.70

*Observations were made by Prof. T. S. Parvin.

STATE BOARD OF HEALTH.

183

METEOROLOGICAL TABLES—CONTINUED.

1859—MUSCATINE*—1874.

Elevation above sea level, 520 feet.

YEARS.	COMPARATIVE MEAN TEMPERATURE (DEGREES).												COMPARATIVE PRECIPITATION (INCHES).														
	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Average mean for year.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Total for year.	
1860	69.3	71.7	68.06	54.3	61.3	35.7	17.5	21.3	26.6	42.7	49.6	64.3	47.90	3.69	4.03	2.30	2.79	1.00	2.09	4.02	1.17	0.43	0.55	1.67	1.42	25.10	
1861	68.3	69.0	70.1	62.6	50.1	37.0	26.0	13.9	27.1	34.0	47.6	58.7	46.28	0.40	2.70	4.07	9.93	9.16	3.93	2.87	0.28	3.91	2.30	4.40	2.98	46.09	
1862	71.8	73.4	69.3	63.4	48.6	35.2	29.3	15.5	13.2	29.0	42.9	59.4	45.91	5.07	3.10	7.30	6.10	2.49	3.29	2.75	0.29	0.38	4.06	5.39	3.65	47.78	
1863	62.5	71.5	70.4	61.2	40.0	33.8	77.0	26.0	23.4	31.9	43.3	38.7	41.63	0.21	0.80	2.44	4.44	4.10	4.11	3.55	3.40	3.02	2.58	0.55	4.50	33.76	
1864	70.6	76.0	73.0	66.9	47.8	45.8	19.3	15.9	27.4	32.0	46.1	62.2	46.95	5.70	5.00	7.60	2.12	4.53	4.82	1.60	2.30	0.67	5.64	3.97	3.00	47.47	
1865	74.9	69.3	72.4	72.6	53.9	42.6	21.0	29.5	31.5	34.3	48.1	61.4	50.29	6.99	7.39	1.53	3.75	6.35	0.25	0.35	0.30	3.15	3.57	9.31	2.72	45.34	
1866	67.9	77.1	68.8	59.1	53.1	40.2	23.6	29.7	19.6	31.3	51.2	59.2	47.65	4.76	6.55	6.65	6.52	4.61	1.41	2.34	4.19	0.79	0.83	2.92	1.59	43.37	
1867	75.9	73.3	74.7	66.8	54.5	31.6	24.3	17.9	26.3	25.7	47.1	51.9	47.00	3.94	3.94	4.45	4.62	3.06	1.97	0.73	1.26	4.76	1.90	0.95	10.60	42.18	
1868	70.8	80.8	69.1	58.8	46.8	38.0	21.7	13.4	25.3	42.7	44.7	61.7	48.11	1.28	6.15	4.67	5.17	0.33	4.38	0.81	0.17	1.51	6.31	4.92	6.29	43.90	
1869	66.0	70.9	74.4	63.2	42.7	32.1	25.5	26.0	27.0	30.4	47.1	60.0	47.11	7.42	7.42	11.43	3.09	2.07	3.52	2.40	1.56	2.65	0.43	3.16	4.03	49.11	
1870	71.8	78.3	70.9	67.8	53.2	39.3	24.4	23.1	24.9	30.8	53.5	65.6	50.29	1.30	1.85	5.83	6.67	8.16	0.44	0.23	2.30	0.25	2.30	0.25	3.00	28.10	
1871	70.5	71.3	73.8	60.1	52.8	29.0	15.6	22.1	26.2	42.3	...	65.9	...	9.16	5.56	5.23	0.00	5.51	3.77	2.13	1.51	3.10	3.36	3.30	2.00	49.11	
1872	70.5	74.0	73.8	62.9	48.1	27.3	12.6	16.9	23.2	28.3	48.8	58.6	43.75	7.30	5.85	9.65	6.29	0.80	1.21	0.71	...	0.24	...	...	7.82	...
1873	73.5	73.5	74.8	61.1	44.9	31.4	25.1	10.4	16.4	31.5	44.2	56.2	45.25	4.44	3.24	0.65	2.97	2.96	0.82	4.22	...	...	...	...	5.55	...
1874

*Observations were made by Prof. T. S. Parvin.

STATE BOARD OF HEALTH.

295

METEOROLOGICAL TABLES—CONTINUED.

1874—DAVENPORT—1893.

Lat., 41° 30' N.; Long., 90° 30' W. Elevation above sea level, 615 feet.

Table with columns for Years (1874-1893), Comparative Mean Temperature (Degrees), and Comparative Precipitation (Inches). Rows include monthly data and annual averages.

METEOROLOGICAL TABLES—CONTINUED.

1874—DES MOINES—1893.

Lat., 41° 35' N.; Long., 90° 40' W. Elevation above sea level, 849 feet.

Table with columns for Years (1874-1893), Comparative Mean Temperature (Degrees), and Comparative Precipitation (Inches). Rows include monthly data and annual averages.

METEOROLOGICAL TABLES—CONTINUED.

1874—DURBUQUE—1893.

Lat., 42° 30' N.; Long., 90° 44' W. Elevation above sea level, 665 feet.

YEARS.	COMPARATIVE MEAN TEMPERATURE (DEGREES).											COMPARATIVE PRECIPITATION (INCHES).															
	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Average mean for year.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Total for year.	
1874	72.5	78.3	74.3	65.2	52.0	34.4	29.6	21.2	23.2	23.2	41.3	65.2	40.86	3.30	3.34	2.13	7.68	2.14	4.17	0.65	2.45	0.36	1.28	1.54	1.08	30.12	
1875	67.5	73.3	69.7	61.7	52.1	33.7	33.9	6.6	6.1	27.5	45.0	60.7	44.85	4.75	5.39	1.07	6.11	2.71	0.48	2.71	1.00	2.12	1.45	2.71	3.62	35.12	
1876	69.1	74.9	73.8	61.4	47.6	34.1	13.7	27.8	27.8	34.0	48.0	61.6	47.61	7.88	8.15	5.92	5.00	1.10	2.49	0.52	3.20	1.53	4.00	3.63	3.96	50.28	
1877	67.4	74.7	73.0	66.2	51.7	35.0	46.0	15.2	15.2	34.8	45.4	48.2	62.22	50.15	6.75	2.90	3.96	0.67	5.35	5.31	2.70	0.90	0.26	4.53	3.74	3.84	38.07
1878	66.8	76.8	73.7	63.8	49.9	39.7	19.5	27.7	35.3	45.4	53.0	56.0	50.60	4.35	6.78	2.43	2.98	0.93	0.76	1.12	0.49	0.93	2.44	4.34	4.61	38.26	
1879	68.9	76.6	71.6	69.4	58.7	37.4	20.3	17.4	29.1	35.6	48.8	67.4	49.76	4.99	6.02	3.55	2.15	6.84	0.66	2.11	1.25	1.95	1.01	2.55	3.52	3.72	31.54
1880	71.1	74.2	72.8	61.2	48.7	27.8	19.1	34.4	29.1	35.6	48.8	67.4	49.76	6.02	3.55	2.15	6.84	0.66	2.11	1.25	1.95	1.01	2.55	3.52	3.72	31.54	
1881	67.6	75.2	74.5	66.3	53.3	36.2	34.7	12.5	20.1	30.4	45.9	67.7	48.53	7.59	10.53	2.46	10.26	6.70	3.19	1.55	1.87	3.70	3.70	1.30	2.20	42.40	
1882	67.2	69.0	71.6	62.6	55.3	39.2	23.4	24.1	35.7	37.0	48.5	54.4	49.00	6.29	1.48	2.29	2.60	5.29	1.55	1.79	0.94	0.59	1.49	4.47	4.16	41.13	
1883	67.7	72.5	68.5	58.8	53.3	38.5	27.0	10.2	18.8	30.9	49.7	54.6	40.62	5.34	7.90	2.70	2.09	4.44	1.65	1.88	1.59	2.60	0.32	1.93	1.70	33.65	
1884	68.6	80.0	68.4	67.8	53.6	36.3	21.3	14.1	22.2	32.2	48.4	60.6	46.96	4.80	5.30	4.25	4.07	4.16	1.43	4.08	0.69	2.19	3.85	2.77	4.88	31.98	
1885	69.0	75.9	68.8	63.5	55.1	39.2	23.4	12.3	13.3	30.3	47.2	56.7	46.69	6.16	6.16	8.07	4.58	2.30	0.64	3.14	1.80	0.72	0.41	3.69	2.62	34.41	
1886	71.3	78.4	76.8	65.1	48.8	35.8	19.2	10.9	21.8	31.3	51.0	61.1	48.70	0.71	0.89	0.67	2.10	4.08	1.80	1.03	3.17	1.36	4.32	2.12	4.17	29.66	
1887	71.9	77.5	78.2	71.0	46.3	25.0	22.9	11.5	20.7	32.4	50.7	66.6	49.59	1.32	2.44	4.40	7.72	2.22	0.74	3.07	3.33	3.56	1.80	1.37	2.53	32.50	
1888	69.0	74.1	69.0	67.0	46.0	37.0	29.0	7.0	18.0	26.7	48.0	53.9	44.55	5.28	3.59	1.73	2.01	1.62	2.75	1.96	1.20	1.31	3.44	2.58	5.84	32.91	
1889	66.0	73.0	72.0	63.0	48.0	37.0	37.0	22.0	16.0	39.0	49.0	59.0	49.08	3.87	4.22	0.26	1.54	0.65	1.51	1.38	1.55	1.34	0.30	3.56	4.00	24.19	
1890	74.0	75.0	68.8	60.0	51.0	32.9	27.0	22.0	28.6	28.0	51.0	56.0	48.42	9.50	1.21	6.00	3.72	6.43	1.85	0.82	2.31	1.25	1.68	2.94	5.36	40.26	
1891	70.0	69.0	70.2	69.0	51.1	36.6	33.0	26.8	23.1	27.7	50.8	58.2	48.10	2.34	45.9	3.31	0.68	2.20	3.24	2.08	1.27	0.98	2.09	1.63	2.54	26.55	
1892	68.0	74.2	72.6	64.2	54.6	31.4	17.0	14.0	28.6	31.0	45.7	55.0	46.40	14.16	5.08	2.51	3.79	0.44	1.89	2.08	2.34	1.02	1.91	4.37	9.18	40.60	
1893	73.0	76.0	.....	.....	.....	.....	.....	6.6	15.0	32.0	45.0	57.0	.....	5.49	5.57	.....	.....	.....	.....	1.00	1.30	2.62	4.32	3.06	.....	.....

METEOROLOGICAL TABLES—CONTINUED.

1874—KEOKUK—1893.

YEARS.	COMPARATIVE MEAN TEMPERATURE (DEGREES).											COMPARATIVE PRECIPITATION (INCHES).															
	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Average mean per year.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Total for year.	
1874	75.5	80.4	76.7	67.0	55.4	36.7	31.2	27.7	29.4	38.0	44.0	66.7	51.30	4.01	4.61	3.87	7.92	1.84	2.17	1.25	3.82	0.88	0.14	2.40	1.65	34.77	
1875	71.0	75.5	70.3	63.8	50.6	35.1	26.5	16.3	18.4	33.8	48.9	61.8	48.50	8.33	12.70	3.85	5.30	2.71	0.59	3.93	0.61	1.84	1.67	0.89	6.70	48.10	
1876	69.7	76.4	75.8	64.4	51.8	36.2	18.8	33.8	34.2	31.6	72.2	63.5	59.31	6.61	6.79	4.13	11.08	2.12	2.82	0.23	3.68	1.45	3.45	4.07	5.28	31.71	
1877	71.4	76.9	74.3	69.8	55.3	38.9	42.9	22.0	38.0	32.5	50.7	62.1	52.90	7.82	6.90	2.32	3.61	7.01	3.05	3.90	0.51	0.15	3.76	4.22	5.53	49.19	
1878	70.6	81.5	77.7	67.3	54.3	44.0	23.8	34.9	38.4	60.4	58.8	60.2	55.17	3.93	2.37	5.27	1.36	2.31	1.99	1.96	0.16	2.95	3.78	2.31	3.47	31.78	
1879	72.1	80.6	75.0	62.9	61.6	42.7	29.9	22.6	29.8	42.6	52.2	66.8	52.99	2.43	1.98	4.57	1.12	0.28	3.91	1.45	0.50	0.53	1.72	1.55	1.46	22.51	
1880	73.9	77.7	77.5	65.4	51.2	31.5	24.1	41.2	36.3	40.0	53.8	68.9	53.46	3.05	2.25	3.81	3.21	2.62	1.13	0.67	3.01	1.94	1.83	4.79	5.92	34.84	
1881	72.7	79.9	79.2	72.4	57.0	39.6	37.6	18.8	34.9	33.7	46.3	69.3	51.95	8.70	3.08	0.86	4.10	8.01	2.59	1.70	0.50	2.56	2.42	3.12	6.65	42.40	
1882	71.1	72.4	73.4	66.1	58.6	42.8	27.7	28.1	39.5	41.7	53.7	56.8	52.64	9.44	4.53	3.00	2.52	2.71	2.25	1.75	1.07	1.54	3.30	3.22	7.11	41.53	
1883	69.7	76.0	71.2	62.7	51.5	42.8	31.8	15.5	24.9	35.3	54.0	59.2	49.60	5.88	3.15	1.34	1.76	6.96	2.09	1.20	1.21	6.13	1.07	2.97	4.87	38.65	
1884	71.5	75.0	72.0	71.1	58.4	40.6	33.0	18.7	27.5	37.3	50.6	62.3	50.66	4.03	2.29	2.74	4.25	3.35	1.73	3.91	0.85	1.88	3.37	1.31	3.16	31.98	
1885	70.4	78.5	70.0	64.6	49.4	40.6	28.7	16.3	16.4	34.7	49.7	60.6	48.31	6.97	2.29	5.98	3.77	2.59	0.88	1.96	2.44	1.14	0.17	2.33	2.59	34.11	
1886	73.7	77.5	75.1	68.6	57.6	38.5	21.3	14.7	26.2	26.5	53.6	64.1	49.61	2.86	0.65	5.90	3.94	2.38	1.15	1.03	2.08	1.40	2.25	1.52	4.49	26.65	
1887	72.8	79.1	74.1	65.9	50.0	46.5	24.3	19.1	26.2	32.5	41.2	52.1	51.40	1.44	1.57	2.38	3.13	1.93	1.18	2.73	1.48	5.19	0.76	1.84	2.54	26.92	
1888	70.3	75.7	70.8	60.0	48.6	39.2	32.2	13.6	25.7	34.2	53.2	58.0	49.29	5.42	6.00	2.97	2.13	1.62	2.83	1.61	1.57	2.17	2.43	1.85	5.96	34.80	
1889	70.3	74.4	73.2	64.0	50.2	37.6	42.5	27.0	32.1	60.7	51.2	60.7	51.32	3.41	2.49	1.77	4.46	2.44	1.87	0.93	1.81	1.09	2.43	1.79	3.34	26.97	
1890	71.5	76.0	71.1	62.7	54.0	44.0	33.8	28.9	32.2	32.6	54.9	66.1	51.74	3.66	5.77	6.10	0.49	1.40	3.00	1.33	2.59	1.32	2.27	5.06	2.56	35.15	
1891	73.0	74.6	74.8	67.2	57.2	36.4	25.9	19.6	33.6	36.2	49.2	58.1	50.48	2.65	6.18	1.07	3.21	0.71	3.16	1.50	1.96	1.61	2.91	6.15	6.34	37.45	
1892	73.0	78.0	2.37	2.60

METEOROLOGICAL TABLES—CONTINUED.

1874—OMAHA—1893.

Latitude, 61° 0' N.; longitude, 96° 6' W. Elevation above sea level, 1,113 feet. Observations represent Western Iowa.

YEARS.	COMPARATIVE MEAN TEMPERATURE (DEGREES).											COMPARATIVE PRECIPITATION (INCHES).														
	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Average mean for year.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Total for year.
1874	73.1	79.6	77.5	62.7	53.6	36.0	28.2	22.2	23.0	33.1	44.7	66.1	49.12	6.93	0.54	2.08	7.18	1.45	1.05	0.54	0.32	0.92	1.49	2.01	1.34	25.75
1875	70.9	74.2	70.0	62.5	47.6	32.6	33.9	16.8	25.7	30.2	44.9	62.9	47.18	10.95	10.01	7.77	2.55	1.16	0.13	1.00	0.29	0.51	1.24	3.06	4.35	39.89
1876	68.2	75.2	74.9	62.3	49.9	33.1	19.0	26.7	30.4	29.2	51.1	63.0	48.51	3.47	7.30	6.27	4.93	0.69	1.17	0.16	0.23	0.40	3.18	2.65	2.07	32.51
1877	69.1	75.6	72.6	66.4	51.2	36.0	38.9	20.2	37.3	33.9	50.1	60.3	50.96	8.30	0.96	3.13	2.05	5.86	1.39	2.14	0.53	0.44	1.29	6.24	8.62	40.92
1878	60.7	79.0	76.8	64.1	52.0	43.8	21.5	28.2	36.7	47.9	54.6	58.1	52.00	8.48	7.66	2.48	3.22	0.55	0.29	0.27	1.23	0.44	3.09	3.97	5.77	37.05
1879	72.7	78.5	75.0	62.5	61.5	40.3	17.3	21.7	28.8	41.0	53.6	60.8	50.96	4.09	3.17	1.51	1.43	3.64	4.25	1.75	0.07	0.93	2.17	1.77	5.53	30.41
1880	73.0	76.7	74.2	62.9	49.2	26.4	18.4	34.5	30.9	35.9	51.2	69.4	50.22	3.14	5.36	7.10	2.91	3.54	1.70	0.28	0.90	0.14	0.50	0.55	3.40	29.32
1881	74.9	78.9	80.2	66.0	54.4	36.9	36.0	11.8	17.0	27.6	44.4	67.8	50.56	5.56	5.89	1.65	3.36	4.84	1.29	1.56	0.61	3.09	0.72	4.23	7.94	45.75
1882	71.0	71.7	73.1	67.5	57.2	39.7	24.6	27.5	36.3	40.2	52.0	67.6	51.11	12.06	6.78	0.95	0.51	5.09	1.42	0.92	0.74	6.60	0.79	5.91	4.91	45.59
1883	69.1	75.7	71.3	60.8	49.4	39.2	28.6	11.9	21.7	34.6	53.6	57.3	47.76	12.70	4.79	3.39	4.53	5.03	0.64	0.73	1.01	1.00	0.92	3.20	11.29	48.43
1884	72.3	74.5	70.3	68.6	57.3	30.3	17.3	17.0	19.4	35.3	47.5	61.6	48.36	6.11	10.35	7.07	4.91	5.81	0.32	0.72	0.73	1.42	4.01	3.88	1.45	47.68
1885	71.2	77.0	69.9	64.5	49.8	39.9	28.6	12.2	16.6	36.1	50.1	58.8	47.47	2.67	9.24	6.99	2.50	3.86	0.73	1.17	0.41	0.47	0.33	0.34	4.43	33.14
1886	70.2	77.3	75.6	65.1	58.3	34.3	17.9	11.9	24.4	31.9	60.9	65.1	48.52	1.50	0.09	4.53	4.45	1.33	1.54	1.46	1.15	0.36	1.31	7.77	4.58	24.67
1887	72.4	76.3	72.0	65.3	50.7	39.6	23.6	11.8	18.2	38.0	54.5	66.1	48.95	4.56	2.02	3.94	2.44	0.72	0.89	1.11	0.49	1.00	0.48	0.88	1.39	19.92
1888	70.0	77.6	70.3	61.3	48.4	36.7	30.4	8.0	25.9	28.8	52.5	55.9	47.15	3.86	2.56	3.44	0.24	1.19	0.12	0.96	0.58	0.74	4.25	2.95	4.56	20.86
1889	68.7	74.9	74.0	63.6	52.2	35.3	39.4	22.8	21.1	40.2	52.4	61.6	50.50	5.44	4.94	2.90	1.74	0.34	0.87	0.50	1.62	0.25	0.53	1.19	2.67	32.57
1890	74.0	78.8	70.5	63.7	52.0	42.0	35.0	18.0	25.0	33.0	55.0	60.0	50.58	5.04	3.74	1.02	2.50	1.09	1.01	0.98	1.44	0.54	1.35	1.55	2.72	32.98
1891	69.0	71.0	72.0	70.0	53.0	34.0	35.0	30.0	20.0	29.0	54.0	59.0	48.16	6.06	3.54	2.02	1.76	5.37	0.37	2.07	2.11	1.02	2.20	2.80	4.94	39.92
1892	71.0	76.0	73.0	68.0	57.0	38.0	22.0	18.0	30.0	34.0	48.0	54.0	49.08	1.51	3.64	2.50	1.63	1.28	0.14	1.79	0.42	0.54	2.74	4.82	8.43	29.44
1893	73.0	77.0	.....	.....	.....	.....	.....	16.0	20.0	34.0	48.0	59.0	.....	7.11	3.03	.....	.....	.....	.....	0.28	0.97	1.29	3.12	3.84	.....	.....

STATE BOARD OF HEALTH.

1892

METEOROLOGICAL TABLES—CONTINUED.

1889—SIOUX CITY—1893.

Elevation above sea level 537 feet.

YEAR.	COMPARATIVE MEAN TEMPERATURE (DEGREES).											COMPARATIVE PRECIPITATION (INCHES).														
	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Average mean for year.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	Total for the year.
1889	.....	76.1	73.3	61.0	50.4	33.0	35.2	.....	.....	.....	.....	.....	.....	.....	3.31	1.19	1.71	0.21	1.99	1.14	.....	.....	.....	.....	.....	.....
1890	72.4	76.0	69.1	61.8	50.2	40.4	31.5	14.6	22.9	28.4	52.1	57.8	48.71	3.61	2.59	3.64	2.36	1.84	0.84	0.60	1.14	0.40	2.12	1.32	2.29	32.75
1891	67.8	69.2	70.2	68.1	50.5	30.2	30.0	27.6	13.4	24.7	52.6	59.9	46.25	7.02	5.77	3.54	0.91	3.04	0.37	2.48	1.66	1.26	2.01	2.32	2.41	33.29
1892	69.0	75.0	71.8	66.0	55.4	34.8	30.8	14.7	24.7	31.8	46.5	52.0	46.86	1.50	2.63	4.14	0.57	1.32	0.16	0.20	0.41	0.97	1.16	4.76	8.56	26.38
1893	72.0	75.0	.....	.....	.....	.....	.....	12.6	15.2	29.1	44.6	57.0	.....	1.63	2.29	0.57	.....	.....	.....	0.34	0.77	1.43	3.56	3.17	.....	.....

1893

STATE BOARD OF HEALTH.

Temperature for Twenty Years.

NORMALS OF TEMPERATURE FOR TWENTY YEARS.

The following table is compiled from observations of Prof. T. S. Parvin, from 1861 to 1871, and from those of Prof. G. Hinrichs, of the Iowa Weather Service, from 1871 to 1880, and are the result of nearly thirty thousand observations, which were made at Iowa City. The values given are for each decade of each month:

MONTHS.	MEAN TEMPERATURE, DEGREES F.				RAIN-FALL IN INCHES.				
	I.	II.	III.	Month	I.	II.	III.	Month	
January.....	.62	.60	.60	1.72	18.7	19.1	20.3	19.4	
February.....	.55	.55	.70	1.80	22.0	24.4	27.1	24.4	
March.....	.80	.95	1.10	2.85	29.6	32.2	37.3	33.1	
April.....	1.20	1.20	1.10	3.50	43.3	47.9	51.6	47.6	
May.....	1.20	1.20	1.35	3.75	55.5	60.0	63.8	59.9	
June.....	1.65	1.65	1.55	4.85	66.3	68.8	71.8	69.0	
July.....	1.65	1.27	1.20	4.12	73.7	74.1	73.8	73.9	
August.....	1.42	1.65	1.85	4.92	73.1	71.8	69.6	71.2	
September.....	1.80	1.55	1.25	4.60	66.4	62.9	59.4	62.9	
October.....	1.10	.95	.90	2.95	55.0	50.3	45.1	49.9	
November.....	.95	.82	.70	2.47	40.7	35.8	29.2	35.3	
December.....	.60	.50	.50	1.60	26.3	23.2	20.2	23.1	
Total for the year—mean.....								39.13	47.47

AVERAGE TEMPERATURE.

FOR A SERIES OF YEARS, BY MONTHS.

STATION.	Number of years.	MONTHS.												Annual.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
Algona.....	11	10.7	17.3	25.5	43.6	50.3	67.7	73.3	70.2	59.9	46.8	31.1	17.8	43.6
Davenport.....	20	20.8	26.1	34.5	49.8	61.0	70.4	75.0	72.5	64.2	52.1	37.3	28.0	49.3
Des Moines.....	13	17.9	24.6	31.2	50.6	60.6	69.9	74.4	72.1	63.6	52.0	36.9	26.5	48.3
Dubuque.....	18	18.1	23.3	32.4	48.6	60.2	68.9	74.2	71.5	62.7	50.8	35.4	26.1	47.7
Iowa City.....	16	18.9	23.9	33.3	48.1	60.1	68.8	74.1	71.3	63.0	50.3	35.3	27.8	47.6
Keokuk.....	20	28.6	29.1	37.2	51.9	62.8	72.1	77.1	74.4	68.1	54.1	40.0	32.8	49.0
Muscatine.....	52	20.2	24.7	35.0	46.9	59.8	68.1	73.0	70.5	62.4	50.3	35.1	24.3	43.0
Omaha.....	19	18.8	25.6	35.4	50.5	62.3	71.1	76.3	74.0	63.9	52.7	36.4	25.4	49.4

Average annual for the State, 46.5.

Average for the six growing months, 63.8.

Rain-fall for Forty-five Years.

RAIN-FALL FOR FORTY-FIVE YEARS.

The following is a record of the rain-fall in Iowa for a period of forty-five years, as observed at Muscatine, Iowa, by J. P. Walton, Rev. J. Ufford, S. Foster and Prof. T. S. Parvin, voluntary and Smithsonian observers:

Year.	Inches.	Year.	Inches.	Year.	Inches.	Year.	Inches.	Year.	Inches.	Year.	Inches.	Year.	Inches.	Year.	Inches.
1846	34.55	1851	74.50	1856	41.94	1861	44.35	1866	32.86	1871	36.11	1876	53.87	1881	45.66
1847	28.50	1852	59.38	1857	34.85	1862	55.16	1867	32.24	1872	35.44	1877	44.78	1882	46.67
1848	39.62	1853	44.92	1858	58.45	1863	26.83	1868	40.91	1873	28.42	1878	39.30	1883	41.12
1849	59.16	1854	23.66	1859	35.96	1864	33.77	1869	43.30	1874	34.78	1879	33.83	1884	45.40
1850	49.08	1855	31.13	1860	25.10	1865	34.21	1870	34.61	1875	37.59	1880	35.78	1885	33.14

Mean for the forty-five years, 39.27.

MEAN FOR EACH MONTH DURING THE FORTY-FIVE YEARS.

January.....	1.92	March.....	2.71	May.....	4.40	July.....	3.96	Sept.....	3.80	Nov.....	2.54
February.....	2.08	April.....	3.37	June.....	4.78	August.....	4.40	October.....	3.04	Dec.....	2.55

AVERAGE PRECIPITATION.

BY MONTHS FOR A SERIES OF YEARS—IN INCHES.

STATION.	Number of years.	MONTHS.												Annual.	
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.		
Algona.....	16	0.92	1.57	1.52	2.12	2.20	3.46	4.62	3.64	3.82	3.53	2.21	1.30	0.99	277.77
Davenport.....	20	1.74	1.63	2.16	2.75	4.40	4.36	3.81	3.83	3.17	2.96	2.66	1.23	34.70	
Des Moines.....	13	1.40	1.31	1.45	2.56	4.02	5.85	3.19	3.51	3.40	3.53	1.90	1.40	35.06	
Dubuque.....	18	1.09	1.56	2.31	2.77	3.96	5.08	4.57	3.49	4.01	3.05	2.14	1.85	37.00	
Iowa City.....	23	1.74	1.55	2.58	3.21	4.21	5.09	4.35	4.67	4.24	3.11	2.64	1.74	39.77	
Keokuk.....	20	1.73	1.80	2.16	2.96	4.04	4.92	4.19	3.19	3.53	3.15	2.63	1.96	35.87	
Muscatine.....	43	1.81	2.08	2.70	3.41	4.38	4.86	3.91	4.38	3.73	3.04	2.30	2.28	39.32	
Omaha.....	19	0.87	0.73	1.46	3.11	4.51	5.64	5.15	3.42	3.36	2.77	1.53	1.01	33.06	

Average for the State, 34.88 inches.

Average per month of crop season, 3.90 inches.

Total for six growing months, 23.25 inches.

Financial Statement.

FINANCIAL STATEMENT.

RECEIPTS.

Warrants on State Treasurer June 30, 1891, to June 30, 1892.....	\$ 4,978.68
Warrants on State Treasurer, June 30, 1892, to June 30, 1893.....	5,022.64
	\$ 10,001.32

EXPENDITURES.

Secretary's salary June 30, 1891, to June 30, 1892.....	\$ 1,200.00
Expenses board meetings June 30, 1891, to June 30, 1892.....	368.50
Contingent expenses June 30, 1891, to June 30, 1892.....	3,410.18
	\$ 4,978.68
Secretary's salary June 30, 1892, to June 30, 1893.....	\$ 1,200.00
Expenses board meetings June 30, 1892, to June 30, 1893.....	495.00
Contingent expenses June 30, 1892, to June 30, 1893.....	3,277.64
	\$ 5,022.64
	\$ 10,001.32

*Decisions of the Supreme Court.*DECISIONS OF THE SUPREME
COURT.NUISANCE—PUBLIC AND PRIVATE—POWERS OF LOCAL BOARDS
THEREIN.

PRIVIES.

KALSSSEN vs. WILSON.

Appeal from Benton District Court.

An action in mandamus to compel defendants, who constitute the school board of the Independent District of Belle Plaine, acting as a board of health, to remove a privy, situated on the school-house grounds.

The petition of plaintiff sets forth that the city council, sitting as a board of health, had declared the privy a nuisance, and ordered it to be removed. The proceedings are set forth in the name of the city council. The defendant demurred to the petition on the ground that a city council had no power to abate a nuisance, that the plaintiff had not established any right of action against the defendants, nor shown any proof of injury sustained by refusal of defendants to remove the privy; that the remedy of the plaintiff was in law, and not in equity proceedings. The court below sustained the demurrer generally.

BECK, J.—I. The petition alleges that the defendants constitute the school board of the Independent District of Belle Plaine, which maintains a large privy for the use of the school on, or near public streets of the city, and just across the street from plaintiff's residence, and in plain view thereof; that the city council, as a board of health, declared the privy to be a nuisance, and dangerous to the public health, and ordered its removal.

Plaintiff alleges that the privy is "unsightly," and that he has sustained injury resulting in damage by reason of the refusal of defendant to remove it. He does not allege that it is a nuisance in fact, nor point out the cause nor source of injury sustained by him on account of the failure of defendants to remove the privy.

Decisions of the Supreme Court.

II. Surely, the order of the city council, as a board of health, declaring the structure a nuisance and dangerous to the public health, is not conclusive, as between plaintiff and defendant, and bestows him no rights which he may enforce by action against defendant, without establishing such right by proof, showing the privy to be a nuisance working injury to plaintiff's property.

It must be remembered that neither the city board of health nor the school district, is attempting to enforce the order of the board of health, based upon its adjudication that the structure is "dangerous to the public health." Nor does the plaintiff in this case for the public seek to enforce the order of the board of health for the protection of the public health, but as we understand the abstract, he seeks to enforce the order on the ground that the objectionable structure is "unsightly" and situated "just across the street" from his own residence.

The grounds upon which plaintiff seeks to enforce the order are not for the protection of the public, but for the protection of his personal rights, and the recovery of damages for their violation. The board of health was not created by statute to protect and enforce private rights, and to provide a remedy to recover damages for the deprivation of such rights. Their orders are to be made and enforced for the protection of the public health.

Plaintiff mistakenly sought to enforce a remedy for an individual injury by this proceeding in mandamus; to require obedience to the order of the board of health.

The district court rightly sustained the demurrer to plaintiff's petition.

AFFIRMED.

80 Iowa, 229.

In the case of *Bushnell vs. Robinson*, 62 Iowa, 540, the supreme court says:

"One cannot erect a nuisance upon his land, adjoining land owned by another, and thus measurably control the use to which his neighbor's land may, in future, be subjected."

POLLUTION OF RIVERS.

STATE vs. W. S. SMITH.

MAY TERM, 1891.

Appeal from Tama District Court.

The defendant was tried and convicted for the crime of nuisance committed by polluting the water in Iowa river in Tama county, and from a judgment imposing a fine this appeal was taken.

J. L. Carney, for appellant.

John Y. Stone, Attorney-General.

J. R. Caldwell, County Attorney of Tama County.

Thomas A. Cheshire, for the State.

Decisions of the Supreme Court.

ROTHROCK, J.—I. The defendant demurred to the indictment. The demurrer was overruled. The sufficiency of the indictment is therefore the first question proper to be determined, and it is necessary to set out the instrument. It is in this language:

"The said W. S. Smith, on the first day of January, A. D. 1889, and on divers days and times since, and up to the time of the finding of this indictment, wrongfully and unlawfully did commit, place, deposit, discharge, and run into, and cause to be committed, deposited, discharged, and run into a certain creek and stream of water situated in the county of Marshall and State of Iowa, known as Linn creek, a large quantity, to-wit: one hundred tons of cattle manure, filth, offal, glucose, acids, sulphuric acid, sulphur and other poisonous substances, the names of which are unknown to the grand jury; and that by the natural and usual flow of the waters of the said Linn creek and stream, all of said manure, filth, offal, glucose, acid, sulphuric acid, sulphur, and other poisonous substances, the names of which are unknown to the grand jury as aforesaid, were at said time carried into the waters of the Iowa river, and by the natural and usual flowing of the waters of the Iowa river, all of the said manure, filth, offal, glucose, acids, sulphuric acid, sulphur, and other poisonous substances, the names of which are unknown to the grand jury, were at the said time carried into the waters of the Iowa river in the county of Tama, and State of Iowa, whereby, and by reason whereof, the waters of said Iowa river in the county of Tama, State of Iowa aforesaid, and at the time aforesaid, became and were corrupted, rendered unwholesome, and impure, to the injury and prejudice of A. B. Taplin, B. F. Hill, Nathan Hall, and other persons then residing along said river in said county of Tama, State of Iowa aforesaid, contrary to, and in violation of the law."

It is claimed by counsel for appellant that this instrument does not charge an indictable offense. It is said that the indictment is fatally defective because it does not charge that the offense committed was a public nuisance. That it does not appear that the acts of the defendant were injurious to any persons except the three individuals named in the indictment.

It is as sufficient to this objection to say that, by section 4089 of the Code, "The corrupting or rendering unwholesome or impure, the waters of any river, stream or pond," is a nuisance, and when it is charged that it is to the injury and prejudice of certain persons and others living along said stream, it is sufficient to constitute a public or common nuisance. This charge is directly made in the instrument in this case, and we think it fully meets the requirements of the rule, as stated in *State vs. Kurtee*, 35 Iowa, 221, and *State vs. Cloed*, 35 id., 570.

II. It is further claimed that the indictment shows upon its face that the district court of Tama county had no jurisdiction, for the reason that if the defendant was guilty of any offense it was committed in Marshall county. This is the question in the case, and it was made all through the trial, and is insisted upon now with great apparent confidence. The facts,

Decisions of the Supreme Court.

as disclosed by the evidence, correspond with the averments of the indictment so far as they relate to the place where the defendant committed the acts claimed to be an offense. It does not appear that he did any overt act in Tama county, but that if the water in the river was polluted by the defendant, it was the consequence of acts done by him in Marshall county. It is true, in a general way, that the local jurisdiction of the district court, in criminal cases, is confined to the county in which the court is held. But this is not true in all cases. It is provided by section 4156 of the Code, that "The local jurisdiction of the district court is of offenses committed within the county in which it is held, and of such other cases as are, or may be provided by law." And section 4159 provides "That when a public offense is committed part in one county, and part within another, or where the acts or effects constituting a requisite to the consummation of the offense occur in two or more counties, jurisdiction is in either county."

This provision of the statute appears to us to be decisive of the question of jurisdiction. It is plain that just such offenses as this are contemplated and provided for by this act, and the act has been in force many years. See Code of 1851, section 2806.

The case of *In re Eldred and Ford*, 46 Wis., 530, relied upon by counsel for appellant, is not in point. That was a complaint for maintaining a dam in a stream in one county which backed the water of the stream across the line into another county. It was held that an indictment would not lie in the county other than that in which the dam was located. But the decision in that case was placed upon the ground that there was no statute in Wisconsin providing for such a case.

On the other hand, in the case of *State vs. Lord*, 76 N. H., 357, it was held that where a dam was erected in a stream in the State of Maine, the back water from which obstructed a public highway in New Hampshire, an indictment for nuisance would lie in the last named State. See, also, *Comm. vs. McCloon et als.*, 701 Mass., 1 and 4 B; *B and Ald.*, 95, and *Thompson vs. Crocker*, 9th Pickering, 59.

III. The evidence tends to show that the defendant is employed by the Firmeinch Manufacturing Company, in and about a glucose factory, situated at the city of Marshalltown, and that the offal from said factory, and the waste from yards where large numbers of cattle were fed, were discharged into a small stream called Linn creek. This is tributary to the Iowa river, and empties into that stream within Marshall county, and some four miles from Marshalltown. The evidence shows quite conclusively that above the confluence of the two streams, the water in the river was pure, and free from obnoxious smells, and that below the junction of the streams, the water in the river was polluted, and so impure that many of the fish in the stream died, and that this pollution was plainly manifest as far down the river as Tama City in Tama county. It also appears in evidence that the sewers, from a large part of the city of Marshalltown, emptied the sewage from the city into Linn creek, above the glucose manufactory; and there were, also,

Decisions of the Supreme Court.

one or more slaughter-houses situated on said stream, the offal and refuse from which was thrown into the creek.

It is contended that the defendant is not liable if he merely contributed to the contamination of the water which emptied from the creek into the river. The court took the opposite view, and charged the jury that the defendant was guilty if he contributed to rendering the water impure, corrupt and unwholesome.

The evidence tends strongly to show that there was no observable impurity in the water in the river in Tama county until after the glucose factory commenced to waste the refuse from it and the cattle yards into Linn creek. But, however this may be, if the defendant contributed to the pollution of the water, it is a fundamental principle of the law, that he is guilty of the nuisance, otherwise no prosecution could be maintained against anyone for the offense.

IV. It is claimed that the defendant is not responsible for the pollution of the water in the river, because he was a mere employé of the manufactory and had no control thereof, as a superintendent, or otherwise, and that he had no knowledge of the effect of wasting the refuse in the creek. It is to be conceded that the testimony as to the defendant's control of the manufactory is not at all conclusive, but we think it was sufficient to sustain the verdict, and as to the knowledge, if that be conceded to be necessary, a point which we do not determine, we think that the pollution of the waters of the creek and the river, was so apparent that all persons engaged in emptying refuse matter therein, should be held to have notice of the effect of these acts.

V. It is said that the seventeenth paragraph of the charge to the jury is confused, and misleading. It is to be confessed that it is not as clear and concise as it might have been made, but we think, in view of the other paragraphs of the charge, it was not misleading, nor prejudicial. We need not set it out at length.

VI. Other questions are made by counsel relating to alleged errors in the admission and exclusion of evidence, and to the alleged misconduct of one of the counsel for the State in his address to the jury. We need not notice these objections in detail. It appears to us that they do not demand especial consideration. We do not discover any error in them. And the motion to strike appellee's abstract from the files will be overruled. The judgment of the district court is

AFFIRMED.

HOG PENS.

THE STATE OF IOWA, BY THE CITY OF CEDAR RAPIDS, vs. E. B. HOLCOMB.

Appeal from Linn District Court.

SEEVERS, J.—The agreed facts are, that the city of Cedar Rapids is a corporation organized under a special charter, and has a population of about

Decisions of the Supreme Court.

fifteen thousand, and the mayor and aldermen appointed a board of health, as provided in Chapter 168 of the Acts of the Nineteenth General Assembly, and said board of health adopted and published, according to law, the following rule or regulation: "There shall not be kept or maintained, within the corporate limits of the city of Cedar Rapids, any hog pen or enclosure wherein swine are kept and fed by the owner, lessee, or occupant of any property therein, save and except such pens as may be used for purposes of commerce only, and all such pens used for purposes of commerce shall be kept clean, and the owner, lessee, or manager thereof, shall see that the same do not become nuisances in any respect." The city duly enacted an ordinance providing that any person who shall knowingly violate or fail to comply with any rule or regulation of the board of health, should be deemed guilty of a misdemeanor and punished as provided in the ordinance. The defendant maintained in the corporate limits a pen in which was kept one hog, and for the purpose of commerce. Such pen was kept clean, and was not a nuisance by reason of filth therein, but was a nuisance, if at all, because of the rule or regulation of the board of health. These facts were agreed upon for the purpose of enabling the District Court to determine whether the regulation of the board of health is valid, and the question to be determined is, whether such board has the power and authority to adopt such order or regulation; and whether the same can be enforced by ordinance.

It is not insisted that the statute authorizing the city to create the board of health is unconstitutional, and as the parties have agreed that the only point to be determined is whether the board of health had the power and the authority to establish the rule or regulation that it did, it is immaterial whether the pen as kept was in fact a nuisance. The board had the authority to establish such reasonable rules and regulations as in its opinion would preserve the health of the inhabitants of the city. The only question, therefore, is whether the regulation is reasonable. It is said that while "ordinances which unnecessarily restrain trade or operate oppressively upon individuals will not be sustained, yet such as are reasonably calculated to preserve the public health are valid, although they may abridge individual liberty and individual rights in respect to property."

I Dillon Municipal Corporations. S. 320.

In *Commonwealth vs. Patch*, 97 Mass., 221, it was held that a similar regulation was reasonable and valid. The facts in that case were precisely like the facts in this case, except that the number of inhabitants in the town of Springfield does not appear. It was presumed, because the evidence was not before the court, that the regulation and ordinance operated upon the most thickly settled part of the city. We must assume that the pen in question was situated in a populous part of the city of Cedar Rapids; for the question to be determined is one of power and authority. The question therefore, is whether the regulation is valid when applied to cities containing

Decisions of the Supreme Court.

fifteen thousand inhabitants. In our opinion the ordinance is reasonable and cannot be said to be invalid when applied to such cities. Before an ordinance or regulation of a board of health can be said to be unreasonable, it should clearly so appear. The question should not remain doubtful, and the discretion necessarily reposed in the officers and boards of cities making regulations for the preservation of the health of the inhabitants cannot be declared invalid unless it clearly so appear. A legal restraint may be imposed on the few for the benefit of the many. We conclude that the regulation and ordinance cannot, as a matter of law, be said to be unreasonable.

AFFIRMED.

68 Iowa, 107.

CATTLE YARDS.

BAKER vs. BOHANNAN.

Appeal from Adams Circuit Court.

Action for damages alleged to have been sustained by reason of a nuisance caused by defendant. The plaintiff also prayed for an injunction to abate the nuisance. There was a trial to a jury which found the existence of the nuisance, and rendered a verdict for \$20 damages. The defendant appeals.

W. O. Mitchell, for appellant.*Anderson & Towner*, for appellee.

ADAMS, CH. J.—I. The defendant moved for an order requiring the plaintiff to state her cause of action more specifically, by stating whether the board of health had determined the question as to the existence of the nuisance. The court overruled the motion, and the defendant assigns the action of the court as error. It is provided in section 16, chapter 151, Laws of 1880, that local boards of health may make such regulations concerning nuisances as they shall judge necessary for the public health and safety; and if any person shall violate any such regulation he shall forfeit a sum not less than \$25, for every day he shall knowingly violate the regulations, to be recovered before a justice of the peace. It is contended by the defendant, that the intention was to confer upon the local boards of health the exclusive jurisdiction to determine what constitutes a nuisance and to abate nuisances. But we think otherwise. The alleged nuisance in the case at bar consisted in maintaining a yard for feeding cattle and hogs near the plaintiff's residence. Her action was brought to recover for damages sustained in the discomfort suffered. We cannot think that the statute in question was designed to exclude all remedy for such damages, nor to make a finding of a local board of health of the existence of the nuisance, a condition precedent to the maintenance of an action for damages.

II. It is contended that instructions 3, 4, 6 and 7 state too broadly the law in regard to nuisance. Wherein the law is stated too broadly appellant's counsel does not specifically point out. Such a general assertion made in

Decisions of the Supreme Court.

respect to four instructions together, does not, we think, render it proper for us to say more than that we have read the instructions complained of, and see no error.

III. The defendant asked certain instructions regarding the measure of damages, which the court refused. The rule as to the measure of damages, given by the court appears to be correct, and we think fully covers the ground.

IV. One James Bohannon, a son of the defendant, was called as a witness in his father's behalf, and testified in regard to the good condition in which he and his father kept the lots in question. He was then asked a question in these words: "About how are they in comparison to where he, Baker, plaintiff's husband, keeps his own hogs and cattle, in his own lot?" The court excluded the question, and the ruling is assigned as error. It is contended that the witness' answer would have shown that the plaintiff's husband kept his lot in a worse condition than the defendant did the lots in question and so plaintiff could not properly complain, under the rule in *Cassady vs. Cavenor*, 37 Iowa, 300. But suppose the fact had been shown as defendant claimed the fact to be, that certainly, without more, would not have aided the defendant, and there was no offer to prove more on that point. The mere fact that the plaintiff's husband's lot was in a worse condition would not have tended to show that his lot was a nuisance, or a source of any discomfort to the plaintiff. A hog lot does not become a nuisance by reason of its condition alone, but its *condition and location*. We think that the court did not err.

V. It is contended that the evidence does not sustain the verdict. There was, as usual in such cases, a great conflict in the evidence. Possibly, according to the preponderance of the evidence, the lots were not a nuisance, but we can not say that the evidence is such that we would be justified in disturbing the verdict.

VI. A decree was rendered enjoining the defendant from using the lots in question as feed lots. It is insisted that the injunction should not have gone further than to enjoin such use of the lots as constitute a nuisance, allowing the defendant to use the lots as feed lots, if he can so change the mode of use, or condition of the lots as to obviate the trouble complained of.

In *Shiras vs. Olinger*, 50 Iowa, 571, this court refused to enjoin absolutely the use of a livery stable found to be a nuisance, and enjoined only the particular mode of use thereof employed, which mode of use seemed to constitute substantially all the solid ground of complaint. But the case before us we regard as different. The trouble arose largely from the wet and mirey condition of the soil of the lots. We see no reason to suppose that any mode of use could be adopted which would obviate the trouble.

We think that the decree below should be

69 Iowa, page 60.

NOTE.—While a livery stable is not necessarily a nuisance, yet it may be so declared, if it is built in close proximity to existing residences, and

AFFIRMED.

Decisions of the Supreme Court.

becomes seriously detrimental to the health and comfort of the occupant.—*Shiras vs. Olinger*, 50 Iowa, p. 573.

CONCLUSIONS.

The statute, chapter 151, sections 16, 17, 18, 19, 20, laws of 1880, provides that boards of health shall make such regulations respecting nuisances, sources of filth, and causes of sickness, as they shall judge necessary for the public health and safety. If any nuisance, source of filth, or cause of sickness found on private property be not removed within twenty-four hours after notice given by the board, the board may then cause the same removed.

Chapter 59, laws of 1892, repeals section 16 of chapter 151, and provides a substitute therefore, to-wit:

SECTION 16. Local boards of health shall make such regulations respecting nuisances, sources of filth, causes of sickness, rabid animals, and quarantine, not in conflict with regulations made by the State Board of Health, and on board any boats in harbors or ports within their jurisdiction, as may be necessary for the public health and safety. Upon written notice given by any practicing physician, that small pox, diphtheria, scarlet fever, or any other contagious disease dangerous to the public health exists in any place, it shall be the duty of the mayor of any incorporated city or town, and the clerk of any district township, forthwith, without other authority, to establish quarantine in such cases, as may be required by regulations of the State Board of Health and said local boards, and to maintain and remove such quarantine in like manner. If any person shall violate any such regulation as herein provided, he shall be fined not less than twenty-five dollars for each and every day he knowingly disregards and violates the same, to be recovered before any court of competent jurisdiction. Notice shall be given of all regulations made by said local boards, by publishing the same in a newspaper published in their jurisdiction, or where there is no newspaper, by posting in not less than five public places.

It will be seen that the discretionary power given to local boards in chapter 151, is repealed, and it is now mandatory upon them to make such regulations regarding nuisances, sources of filth, etc., as are necessary to protect the public health, and that public notice of such regulations must be given by publication or posting. The statute, Code section 4089, has defined what are nuisances (see foot note 2), and those are subjects of regulation.

It is not to be presumed that the adoption of regulations is a prerequisite to the authority of a local board to remove a nuisance dangerous to the public health as provided in the subsequent sections 17, 18, 19 and 20. The notice provided in these sections is preliminary to an executive enforcement of the statute against an individual. Hence, in the absence of existing regulations, a nuisance may be proceeded against, and removed, as provided by sections 17 to 21.

In order that boards of health may act understandingly in the removal of nuisances which are injurious to the public health, it is essential that they

Decisions of the Supreme Court.

have a clearly defined idea of what nuisances are, which they may remove or cause to be removed. A nuisance is said to be anything wrongfully done, or permitted, which injures or annoys another in the enjoyment of his legal rights, (1). Every person has the legal right to the fullest enjoyment of his life and health. Anything, then, which injures or annoys the public in the enjoyment of life or health is a nuisance, which it is the duty of boards of health, as the guardians of the public health to abate, (2).

Any classification of nuisances will be necessarily imperfect; yet, for the purpose of this subject, it may be said that public health nuisances are of two kinds:

First. Those which are *per se*, or which are such from their very nature, and which cannot exist in the vicinity of habitations without causing offense to the senses and injury to the health, such, for instance, as the exposed and decaying carcasses of dead animals, or accumulation of offal, garbage and slops, or fecal matter in exposed places.

Second. Those which are *prima facie*, or which become nuisances by reason of the misuse or negligent care exercised of an otherwise harmless and perfectly lawful object, business or occupation; as for instance, slaughter-houses, rendering-establishments, mill-ponds, burying-grounds, or creameries.

(1). Cooley on Torts, page 565; *Res v. Watts*, 2 C. & P. 486, slaughter-house; *Rankett's Case*, 2 Rolle's Abr., 140, 141, melting stinking tallow; *Catlin v. Valentine*, 9 Paige's Ch. (N. Y.) 576, slaughter-houses; *Pickard v. Collins*, 23, Bard. (N. Y. S. C.) 444, barn; Wood on Nuisances, Sec. 494.

(2). Code of 1873, Sec. 4089: "The erecting, containing or using any building or other place for the exercise of any trade, employment or manufacture, which by occasioning noxious exhalations, offensive smells, or other annoyances, becomes injurious to the public health, comfort or property of individuals, or the public, *the causing or suffering any offal, filth or noisome substance to be collected or to remain in any place, to the prejudice of others*, the obstructing or impeding without legal authority, the passage of any navigable river, harbor or collection of water, or the corruption or rendering unwholesome, or impure the water of any river, stream or pond: * * * are nuisances.

"Where an indictment charged that the defendant 'unlawfully and injuriously did erect, continue and use a certain enclosure, or pen, in which cattle and hogs were confined, fed and watered, and the excrement, decayed food, slops and other filth were retained,' whereby were occasioned noxious exhalations and offensive smells, greatly infesting and corrupting the air; and other annoyances dangerous to the public health, comfort and property of the good people residing in that immediate neighborhood,' it was held, that the acts charged constituted a public indictable nuisance, both under this section (4089) of the statute, and at the common law." *The State v. Kaster*, 35 Iowa Supreme Court Reports, 221.

Any use of property, or any trade, that corrupts the atmosphere with smoke, noxious vapors, noisome smells, dust or other substances or gases producing injury to property or to health, or impairing the comfortable enjoyment of property, is a nuisance. Wood on Nuisance, p. 574, Sec. 531.

Where defendant erected stock yards so near plaintiff's dwelling, and so kept them that the odors therefrom were not only an annoyance, but were unwholesome, threatening the health of plaintiff and his family, held, that the defendant could not escape liability on the ground that the yards were necessary to the operations of the road, and that the odors could not be avoided. *Shively v. Cedar Rapids, I. F. & N. W. R. Co.*, 74 Iowa, 170.

Decisions of the Supreme Court.

The methods of procedure to be adopted for the removal of any unhealthy nuisance will vary according as the nuisance to be abated comes within one or the other of these classifications.

If a board of health finds any decomposing or offensive matter upon private property, which, in their opinion, is injurious to health, they must first order the owner or occupant to remove it within twenty-four hours. If he neglects to do so, they may proceed summarily to cause such nuisance to be removed. If the danger to public health is imminent, and safety requires immediate suppression or abatement of the nuisance, the board of health would be protected if they proceeded at once to remove it, for the safety of the people is the highest law, (3). If any unhealthy nuisance is found in a public place, it is the duty of the board of health to cause its immediate removal.

If a pond, a slaughter-house, or a burial-ground, or anything of a kindred nature, becomes offensive and unhealthy to the community it is the duty of the board of health to proceed at once to abate the same. Whether a business or a thing, not in itself a nuisance, is so managed or suffered to exist as to be a nuisance, is a fact which must be determined by the board, upon investigation made by them. In this way alone can the board of health legally determine whether such a business is a nuisance so as to authorize them to abate it. But any collection of offal or filth in or about the slaughter-

(3). *Meeker v. Reusselaar*, 14 Wend., 397.

In the case of *City of Salem v. Eastern Railroad Company*, the Supreme Court of Massachusetts (98, p. 443), under statute which is a verbatim copy of the Iowa statute, held that the adjudication of the board that a nuisance exists is conclusive, and no appeal lies therefrom. The board should keep an accurate record of their proceedings, and all adjudications should appear therein in clear and distinct language. It is not the purpose of the order to direct in what mode the person should proceed to remove the nuisance. It should direct the end to be accomplished, leaving the person to adopt any effectual mode he may choose. If the owner or occupant neglects to remove the nuisance the board are permitted to enter upon private property where it exists and take such measures as they may see fit for its removal.

The court further says, in relation to boards of health: "Their action is intended to be prompt and summary. They are clothed with extraordinary powers for the protection of the community from noxious influences affecting life and health, and it is important that their proceedings should be embarrassed and delayed as little as possible by the necessary observance of formalities. Although notice and opportunity to be heard upon matters affecting private interest ought always to be given when practicable, yet the nature and object of those proceedings are such that it is deemed to be most for the general good that notice should not be essential to the right of the board to act for the public safety. Delay for the purpose of giving notice, involving either of public notice or of inquiry to ascertain who are the parties whose interests will be affected, and further delay of such hearings as the parties may think necessary for the protection of their interests, might defeat all beneficial results from an attempt to exercise the powers conferred upon boards of health. The necessity of the case, and the importance of the public interests at stake, justify the omission of notice to the individual."

"Notice must be given of general regulations prescribed by the board before parties can be held in default for a disregard of their requirements. No previous notice to parties so to be affected by them is necessary. They belong to that class of police regulations to which all individual rights of property are held subject, whether established directly by enactments of the legislature, or by its authority through boards of local administration."

Decisions of the Supreme Court.

house may be removed by the board of health, and the place may be required to be kept clean under the authority conferred by sections 17 and 18, chapter 151, laws of 1880, but the suppression of the business itself can only follow a judicial determination that it is conducted so as to be injurious to the public health, (4). Although slaughter-houses are regarded as *prima facie* nuisances, (5) a person engaged in carrying on the business of slaughtering animals cannot be compelled to discontinue that business upon the judgment of any tribunal except that of a court of competent jurisdiction.

As to whether or not animals affected with a contagious disease may be summarily destroyed, the general rule seems to be that so long as the owner restrains the animals upon his own premises, no person has a right to kill them (except as provided by Regulations of the State Veterinary Surgeon under the provisions of chapter 189, laws of 1884); but if they are suffered to go at large, or if they escape the owner's custody, the owner of the premises upon which they escape may kill them if necessary for the protection of his own animals, (6). In the case of a horse or other animal affected with glanders, which is recognized by the courts as an incurable disease, (7) and one which may communicate all its loathsomeness and fatality to human beings, there is no question but what a board of health would be protected in destroying them wherever found, after due notice given to the owner, if in their opinion it was necessary for the public health.

From the foregoing it will be seen boards of health are armed with power to suppress unhealthy nuisances, which they should be prompt to exercise in all cases where the public health is, or will be jeopardized.

The success of boards of health depends very much upon the firmness with which they enforce needful sanitary regulations.

The statute has not given the State Board of Health supervision over nuisances affecting the public health, but has conferred it upon local boards, and it is their duty to prevent them.

EXPENSES OF SMALL POX.

L. O. SANDERSON *vs.* CERRO GORDO COUNTY.*Appeal from Cerro Gordo District Court.*

The plaintiffs are the trustees and the clerk of Grant township, in the defendant county, and by virtue of their offices they constitute the board of health of said township. The petition shows that in August, 1886, certain inhabitants in said township were infected with small pox, to the extent

(4). *Shuster v. Met. Board of Health*, 49 Barb. (N. Y. S. C.) 450; Wood on Nuisances, Secs. 494, 504, 525.

(5). A slaughter-house in a city or public place, or near a highway, or where numerous persons reside, is *prima facie* a nuisance. *Bushnell v. Robeson & Co.*, 62 Iowa, 540.

(6). Wood on Nuisances, Sec. 837.

(7). Hanover's Law of Horses, p. 76.

Decisions of the Supreme Court.

that the public health of the township was in danger; that to make suitable provisions against such danger, the plaintiffs, as a board of health, appointed one J. R. Jones as a physician for the board, and directed him to take charge of the matter, and adopt such measures as he thought suitable to prevent the spread of the disease; that said Jones, in the performance of said duty, rendered services to the value \$170.50; that the plaintiffs in their capacity as trustees and clerk of said township, levied a tax of \$300 on the taxable property of the township, in September, 1886, for the use of said board of health in small pox matters, which was collected by the treasurer of the county, and paid over to said Grant township; that on November 1, 1886, the board of health paid from the money so raised the amount due said Jones, that the claim therefor was filed with the board of supervisors.

The petition avers that the plaintiffs are entitled to recover the amount for the use of the board of health of said township, and asks judgment accordingly.

To the petition a demurrer was filed, and among other grounds, it is urged that the plaintiffs are not proper parties to maintain the suit.

The district court sustained the demurrer, and from a judgment for the defendant, the plaintiff appeals.

GRANGER, J.—We deem it unnecessary to refer to more than one ground of demurrer, as it seems decisive of the case.

There is no pretense, but—in fact it is expressly urged—that the suit is by the plaintiffs in their official capacity for the "use and benefit of the township, or for the local board of health."

The action is at law, and we must look to the provisions of the statute for a recognition of their right to bring the suit. Appellants do not attempt to point out a section of the statute, or a decision, as authority for this proceeding, except the case of *Long vs. Emsley*, 57 Iowa, 13, wherein it was held that a township clerk could maintain a suit to recover money to which he was entitled by virtue of his office, such as road funds, but the facts in this case are widely different. We know of no law giving the plaintiffs the right to receive and hold the funds in question, conceding the liability of the county for its payment.

Code section 2543, provides that every action must be prosecuted in the name of the real party in interest, except as provided in the next section.

It is plain the plaintiffs are prosecuting the suit in a representative capacity, and we inquire if they come within the exceptions of section 2544. It provides: "An executor, or administrator, a guardian, a trustee of an express trust, a party with whom, or in whose name, a contract is made for the benefit of another, or a party expressly authorized by statute, may sue in his own name, without joining with him the party for whose benefit the suit is prosecuted."

With all that appellants claim, the township, or the board of health must be held as the real party in interest. Appellants say that the local

Decisions of the Supreme Court.

board * * * have a trust capacity, which entitles them to act. If it is true that they have, as to the funds in question—which we must not be understood as holding—still, it is not an express trust, but one clearly arising by implication, and the plaintiffs are not within the provisions of the statute.

We think it unnecessary to elaborate, and the judgment of the district court is

AFFIRMED.

S. J. Iowa, 89.

THE CITY OF CLINTON vs. THE COUNTY OF CLINTON.

Appeal from Clinton Circuit Court.

Action to recover for expenses alleged to have been incurred in providing for certain persons infected with small pox, and in providing for the safety of the inhabitants. There was a trial to the court, and judgment was rendered for the plaintiff.

A. R. Cotton, for appellant.

A. R. McCoy, for appellee.

ADAMS, J.—One of the persons provided for was one Christina Shutt, who, at the time she was taken sick with small pox, had come to Clinton a few days before with the intention of making that city her home. She was a native of Denmark and had not gained settlement elsewhere. The statute upon which the plaintiff relies, sections 21 and 22, chapter 151, of the Laws of the Eighteenth General Assembly, McClain's Statutes, 455, provides, where relief is furnished as in this case, for charging the county to which the sick or infected person belongs.

The defendant insists that a person belongs only to the county in which he has a settlement, and if the sick or infected person has no settlement in the State, no county can be charged.

The statute, however, above cited, makes it the imperative duty of the local board of health to provide for such person, regardless of his settlement, and if no county can be charged, there is no provision in the statute in question for the payment of their expenses. It appears to us that where there is no settlement the sick or infected person must be deemed to belong to the county where the relief becomes necessary.

We proceed next to examine certain items, which the defendant insists ought to have been rejected. One is for food and clothing furnished persons other than the sick. Under the statute above cited it becomes the duty of the local board of health to provide for the removal of the sick person, if he can be removed, and, if not, to provide for him where he may be, and also to provide for the safety of the inhabitants.

In the case at bar the sick persons were not removed, but were provided for in the houses respectively where they happened to be. No question is raised as to the proper exercise of the discretion of the board in this respect. Only two families were afflicted, and the means adopted for the safety of

Decisions of the Supreme Court.

the inhabitants was the confinement of the members of these two families within their respective houses, with the view of securing as complete isolation as might be practicable. The prompt arrest of the contagion, and extinguishment of the disease, demonstrated the wisdom of the board.

The isolation, however, was necessarily continued through several weeks, and during at least a part of this time it was found necessary to supply the two families with food. Not all the members were sick, and yet all necessarily shared in the food.

The defendant insists that it cannot be charged, under the statute in question, for food furnished to well persons. It insists that a county can be charged with only those expenses for which the sick person is primarily liable; and it contends that neither of the sick persons in this case could be charged with food furnished to either of the well persons. But in our opinion its position cannot be sustained. The well persons, without doubt, constituted the nurses and attendants of the sick ones; if so, the food furnished constituted a part of the expenses of the sickness. But it constituted a part of the expenses in another and more important sense. It was a part of the expense of isolation; and while that was adopted for the safety of the inhabitants, it was made necessary by the sickness. Section 21 of the statute provides expressly for the removal of the sick person for the safety of the inhabitants, and for charging the expenses to the sick person. The expense of isolation is of precisely the same character.

It is true that we find isolation provided for only by the general words: "Such other measures as may be deemed necessary for the safety of the inhabitants," and we find that provision only in section 22, which contains no provision whatever for expense. The only provision for expenses is to be found in section 21; but sections 21 and 22 should be taken together. Whatever expenses are incurred under either section are, we think, to be charged of alike. In our opinion, they are to be construed as if the provisions of both sections had been embraced in one section, and the provision as charging had been placed at the close. If we are correct, then the sick person is properly chargeable with all the expenses which may properly be incurred under either section, including the expenses of removal, if that is adopted, and the expense of isolation, if that is adopted; and we think that the county is ultimately liable for the same, if the sick person, and those liable for his support, are unable to pay.

The board caused the clothing worn by the members of the families to be burned, and supplied other clothing. The burning of the clothing was necessary for the safety of the inhabitants. The payment therefor or supply of other clothing, was an expense necessarily incident to the sickness. It was, we think, primarily chargeable to the sick person, and those liable for his support, and secondarily to the county.

The court allowed a recovery of \$185, as money paid the attending physician, Dr. Smith. The defendant insists that in this the court erred. Its objection is based upon the ground that Dr. Smith had been employed and paid by the year, by the county, to attend to all such poor persons as he

Decisions of the Supreme Court.

should be required to attend, under the direction of the overseer of the poor. Its objection is based upon the further ground that Dr. Smith was employed by the year by the board of health. As to the first ground, it is to be said that the services in question were not rendered under the direction of the overseer of the poor, and perhaps could not have been properly, so long as the board assumed exclusive control. As to the second, it is to be said that while Dr. Smith was employed by the board of health, at \$300 per year, the court found that \$185 was such proportion of \$300 as the services in question bore to the year's services. Possibly it should have appeared in evidence, if it did not, that the aggregate charges, amounting to \$185 were all reasonable. But the evidence is not set out, and no question is raised by the appellant on this point.

We see no error, and the judgment is
61 Iowa, 205.

AFFIRMED.

STAPLES vs. PLYMOUTH COUNTY.

DECEMBER TERM, 1883.

Appeal from Plymouth District Court.

Action to recover the value of certain lumber furnished by plaintiff upon the request of the board of health of the city of Le Mars and the overseer of the poor, which was used in building a pest house necessary for the proper care of persons found in the city afflicted with small pox. A demurrer to the petition was sustained, and the plaintiff standing upon the petition, judgment was rendered against him. He now appeals.

G. W. Argo and T. P. Murphy, for appellant.
J. C. Kelly, for appellee.

BECK, J.—I. The petition alleges that a large number of persons residing in Le Mars being sick of small pox, and others being exposed to the contagion, and the welfare and safety of the people demanding that they should be removed to a building apart from the other inhabitants, to prevent the spread of the contagion, the board of health of the city, being unable to procure such a building, proceeded to erect a suitable hospital wherein the small pox patients should be kept and treated. The lumber in question was furnished by plaintiffs upon request of the board of health and the overseer of the poor, and used in erecting the hospital. It is shown that the account or the lumber was approved by the board of health and presented to the supervisors of the county and rejected by them.

The demurrer is upon the grounds: 1. That the defendant is not authorized by law to erect hospitals and cannot be made responsible therefor. 2. That the board of health of the city and the overseer of the poor are not authorized by law to bind defendant by a contract for the lumber. 3. That defendant is not authorized by law to own or become indebted for hospitals or pest houses. 4. That the city, being alone authorized to erect

Decisions of the Supreme Court.

such buildings, is liable for the cost thereof. No other grounds of error are stated.

II. Under chapter 151, Laws of the Eighteenth General Assembly, section 13, the mayor and council of each incorporated town constitute a board of health, and are clothed with authority prescribed by this act. This provision supersedes and repeals Code section 525, which authorized the city councils to establish boards of health. The authority of the board of health is prescribed by this act, which as to these matters, repeals Code sections 415-418, specifying the powers of boards of health under the Code. We must, therefore, determine the authority of boards of health by consulting the act above cited. Section 21 provides that "When any person coming from abroad, or residing within any city, town or township within this State, shall be infected, or shall lately have been infected with small-pox, or other sickness dangerous to the public health, the board of health of the city, town or township where said person may be, shall make effectual provision, in the manner in which they shall judge best, for the safety of the inhabitants, by removing such sick or infected persons to a separate house, if it can be done without damage to his health, and by providing nurses and other assistance and supplies, which shall be charged to the person himself, his parents or other person who may be liable for his support, if able, otherwise at the expense of the county to which he belongs."

This statute authorizes and requires the board of health to "make effectual provision, in the manner in which they shall judge best, for the safety of the inhabitants, by removing such infected persons to a separate house." The law contemplates the isolation of infected persons and directs that "effectual provisions" therefor shall be made by the board of health. This is demanded by humanity, and has long been known to be the effectual method of arresting the spread of contagion. Public policy demands that the spirit of the statute shall be regarded and enforced. The board of health is authorized to do whatever is necessary in order to make "effectual provisions" for the isolation of infected persons. *The City of Clinton vs. The County of Clinton, 61 Iowa, 205.* In order to isolate the patient he may be removed to a separate house. If no suitable house may be had, or if a temporary pest-house or hospital may be erected at less cost than the rent of such a house, the board of health in the exercise of wise discretion, may provide such temporary buildings. This they would be authorized to do in the exercise of these general powers under the section, for it is incidental thereto. They could not otherwise make "effectual provision for the safety of the inhabitants."

The expense of providing a place for isolating the infected person is a part of the expense incurred in rendering "effectual provision for the safety of the inhabitants," which the statute directs and requires, and, under the express language of the section quoted, such expenses are chargeable to the county.

III. It will be observed that such expenses are primarily chargeable to the infected person, and the county is only liable in case of his inability to pay them. The petition does not allege the inability of the person sent to the hospital to answer for the expenses incurred. Counsel for defendant

Decisions of the Supreme Court.

now insist that the petition is void on account of the absence of such allegation. But no such objection was raised by the demurrer, or in any other manner made, in the district court. It cannot first be presented here.

IV. A question may arise under the statute, as to the liability of a solvent infected person to pay the expenses of erecting a hospital, or pest-house. As it is not presented in this case, we do not consider it. We may, however, suggest that such expense, which is incurred for the benefit of the inhabitants of the city by providing for the isolation of an uncertain number of infected persons, would, with difficulty be apportioned to such as would be liable therefor, if indeed it could be done at all. Besides it would be a great hardship upon the unfortunate subjects of infection to impose upon them the expense incurred, not for their own benefit, but for the benefit of the people. It would be quite as just to include in the estimates of the cost of keeping paupers or the insane, the expense of erecting poor houses or hospitals.

V. Counsel for defendant insists that chapter 107, Acts of the Eleventh General Assembly, section 8, which authorizes boards of health to establish pest-houses and hospitals, is not repealed by chapter 151 of the acts of the Eighteenth General Assembly, above referred to, and is, therefore, still in force. We think differently. The last named act in express language (section 25) repeals all prior acts in conflict with its provisions. The first charges the cities with the expense of providing pest-houses; the last, as we have seen, holds the counties liable therefor. Here is direct conflict. The last act prevails, and the first is repealed. But, further than this, the subject of the Act of the Eleventh General Assembly, which pertains to the establishment of boards of health, and their duties and powers, was revised by the Code of 1873, and the provisions of the eighth section are not re-enacted. It is therefore repealed. Code section 47. See also, sections 415, 420, 525.

It is our conclusion that the district court erred in sustaining the demurrer. Its judgment is therefore reversed, and the cause is remanded for further proceedings in harmony with this opinion.

62 Iowa, 269.

REVERSED.

YOUNG vs. THE COUNTY OF BLACK HAWK.

JUNE TERM, 1885.

Appeal from Black Hawk District Court.

The plaintiff, who is a physician, seeks to recover of the defendant upon an account for medical services rendered to certain persons who were afflicted with small pox in the township of Union, in Black Hawk county. There was a trial by jury; when the plaintiff had introduced his evidence, the defendant moved the court to instruct the jury that there was no evidence upon which to found a verdict for the plaintiff. The motion was sustained, and the jury were instructed to return a verdict for the defendant, which was done. Plaintiff appeals.

Decisions of the Supreme Court.

H. C. Hemmenway, for appellant.

M. S. Owens and *J. L. Husted* for appellee.

ROTHROCK, J.—It appears from the evidence that the village of Finchford is in Union township, Black Hawk county. It is a small place of some fifteen or twenty houses. A woman named Newell went there and was taken sick. She was treated by Dr. Lowell, the village physician, and, after some four or five days, it was discovered that her ailment was small pox. It was not discovered however, until several other persons had contracted the disease, and people became alarmed, and sent for the township trustees. Two of the trustees, and the township clerk, responded to the call, and a meeting of the citizens was held with the trustees at the school-house. The township clerk was appointed secretary of the meeting, and kept minutes of the proceedings. After a statement of the object of the meeting, and an interchange of views, the two trustees held a consultation, and appointed Dr. Lowell, and two other persons, a committee to take such measures as they thought necessary to arrest the spread of the disease, and to attend the wants of those who were sick. The township trustees did not live in the village. The village was at once quarantined by the committee appointed by the trustees, and the necessary precautions were taken. In a few days Dr. Lowell was attacked with the disease and was unable to give medical attention to those who were sick.

As we understand the evidence, the plaintiff resides at Cedar Falls, and was sent to Finchford by the chairman of the Cedar Falls board of health to investigate the matter. He found four sick, and no physician to attend them, no wood, and nothing to eat. One of the committee appointed by the trustees requested plaintiff to treat the sick, and, after being assured that the committee were authorized by the township trustees to employ a physician, he consented to give the necessary medical attention to the sick. The plaintiff testified as a witness, as follows:

"I asked them (the committee), where they got the power. They said they got it from the township trustees. And, after I visited the patients, I went to the trustee to know if he had given this committee that power. He told me they had. Told me to go on and do the best I could for these people, and under these statements, I did so. The trustee I saw was Mr. Pashby, the chairman of the board. Saw him next day after that. Afterward I saw him again, and at different times reported, upon his asking how the cases were getting along. Also saw Mr. James (a trustee), frequently, who inquired about it. They directed me to do my duty the best I could for them; to try and stop the disease. I told Mr. Pashby one day that the expenses were getting heavy on the county, and he went among the neighbors and met me with supplies, which I carried in. No other persons went out and in the lines from February 5th until quarantine was lifted, March 23d. I think the last visit, I carried the supplies from Cedar Falls."

On the 31st day of March, 1883, the three township trustees met at Cedar Falls, which is outside of Union township, at the request of those who had

Decisions of the Supreme Court.

bills to present, for allowance and approval for expenses attending the small pox sickness and quarantine. The plaintiff then and there presented his account for his services, and the same was approved by all of the trustees.

On this state of facts it is claimed by the defendant that the county is not liable for medical attendance and services rendered to such of the small pox patients as were unable to pay the plaintiff. Chapter 151 of the Eighteenth General Assembly provides as follows:

SEC. 13. The mayor and aldermen of each incorporated city, the mayor and council of any incorporated town or village in the State, or the trustees of any township, shall have and exercise all the powers and perform all the duties of a board of health within the limits of the * * * townships of which they are officers.

SEC. 14. Every local board of health shall appoint a competent physician to the board, who shall be health officer within the jurisdiction. * * * The clerks of the townships * * * shall be the clerks of the local boards. The local boards shall also regulate all fees and charges of persons employed by them in the execution of the health laws and their own regulations.

SEC. 21. When any person coming from abroad, or residing within any city, town or township within this State, shall be infected, or shall lately have been infected with small pox, or other sickness dangerous to the public health, the board of health of the city, town or township where said person may be, shall make effectual provision, in the manner in which they shall judge best, for the safety of the inhabitants, by removing such sick or infected person to a separate house, if it can be done without damage to his health, and by providing nurses and other assistance and supplies which shall be charged to the person himself, his parents or other person who may be liable for his support, if able, otherwise at the expense of the county to which he belongs.

SEC. 22. If any infected person cannot be removed without damage to his health, the board of health shall make provision for him, as directed by the preceding section, in the house in which he may be, and in such case they may cause the persons in the neighborhood to be removed, and may take such other measures as may be deemed necessary for the safety of the inhabitants.

SEC. 24. Local boards of health shall meet for the transaction of business on the first Monday of May and the first Monday in November of each year, and at any other time that the necessities of the health of their respective jurisdictions may demand. * * *

It will be observed that this statute provides that local boards of health shall appoint a competent physician to the board, who shall be the health officer within its jurisdiction. And the board is authorized to regulate all fees and charges of persons employed by them in the execution of the health laws and of their own regulations. The evidence shows that the plaintiff

Decisions of the Supreme Court.

was not employed by the board of health; he was employed by a committee appointed by a majority of the board. We are, therefore, required to determine the question whether the board of health could delegate the power to employ a physician to a committee, none of whom were members of the board. We think it is very clear that the discretion as to what physician shall be employed must be exercised by the board, and that it can not be delegated to a committee. And, although the plaintiff, after he entered upon the employment, saw two of the trustees, who, as individuals, directed him to attend the small pox patients, and do what appeared to be necessary in the premises, we do not think this can be regarded as an employment by the board.

In *Herrington vs. District Township of Liston*, 47 Iowa, 11, it is said: "The question is here presented whether a corporation, whose business is transacted by a board of directors, can be bound by the assent of a majority of the directors to a contract expressed otherwise than at a duly convened meeting. We are of the opinion that it cannot. While it is true that a majority of the board will govern in the absence of a provision by statute, or in the articles of incorporation requiring the concurrence of a greater number, yet their determination is valid only after the minority have had an opportunity to be heard. A board must act as a unit, and in the manner prescribed. The determination of the members individually is not the determination of the board: citing *McCullough vs. Moss*, 5 Denio, 577; *Livingstone vs. Lynch*, 4 Johns., chapter 595; *Rice vs. Plymouth County*, 43 Iowa, 136. And see *Taylor vs. District Township of Wayne*, 25 Iowa, 477.

Our conclusion is, that the plaintiff, not having shown an appointment by the board of health, cannot recover in this action. The facts show that this determination works an apparent hardship in this case. But we cannot allow hardships in individual cases to lead to the establishment of a rule which would work a great mischief to the public at large. If we were to overturn what we regard as a well established rule, to prevent hardship in this case, we would turn loose upon the local school boards and other local bodies in this State, all sorts of solicitors, who could obtain the individual assent of members of the boards to all manner of contracts and expenditures, which could not be obtained from the board, acting as a unit. The statute providing for a board of health provides for meetings of the board at any time that the necessities of the health of their respective jurisdictions may demand, and the board in this case should have met as a board, when it was known that the plaintiff's services were required, and made the proper appointment as a board. They could not by their separate acts and declarations ratify the acts of the committee appointed by them. They should have ratified it as a board of health before the service was performed.

We think the judgment of the district court must be

66 Iowa, 460.

AFFIRMED.

Decisions of the Supreme Court.

GILL vs. APPANOOSE COUNTY.

DECEMBER TERM, 1885.

Appeal from Appanoose Circuit Court.

Action to recover for care, nursing and service rendered by plaintiff to certain persons sick of small pox. There was a judgment for plaintiff upon a verdict for a sum less than her claim. She now appeals to this court.

A. J. Baker, for appellant.

Vermillion & Evans, for appellee.

BECK, CH.—I. The plaintiff brings this action to recover for services rendered to these persons, sick of the small-pox; one of them, a woman, being sent to the pest-house by the board of health, and the others permitted to remain in their own house. The services to all these persons were rendered at the instance, and upon the request of the board of health. The plaintiff recovered for the service rendered to the woman sent to the pest-house; the petition alleging that she was a pauper, and there was evidence introduced tending to show the fact. But there was no such allegation or proof as to the other persons, and for that reason the court directed the jury to find for the defendant, upon the claims for services rendered to them. Questions involving the correctness of this ruling are the only ones presented in this case.

II. If the defendant is chargeable at all in this action, its liability arises under chapter 151, section 21, Acts of Eighteenth General Assembly, which is as follows:

SEC. 21. When any person coming from abroad, or residing within any city, town or township within this State, shall be infected, or shall lately have been infected with small pox, or other sickness, dangerous to the public health, the board of health of the city, town or township where said person may be, shall make effectual provision, in the manner in which they shall judge best, for the safety of the inhabitants, by removing such sick or infected person to a separate house, if it can be done without damage to his health, and by providing nurses and other assistance and supplies, which shall be charged to the person himself, his parents or other persons who may be liable for his support, if able, otherwise at the expense of the county to which he belongs.

This provision will bear no other interpretation than that the county is liable for the care of the sick persons contemplated in the statute only in case they, or the persons liable for their support, are not able to make compensation therefor. It is not necessary to inquire as to the operation of the statute. It plainly provides that the county shall be liable only upon the conditions specified. Upon these conditions the county's liability depends, and it cannot be established until it is shown that the facts exist which are contemplated by the statute. It is therefore very plain that the burden of

Decisions of the Supreme Court.

proving these facts rests upon the plaintiff. If they are not shown, plaintiff fails to establish a cause of action.

III. But counsel for plaintiff insists, that as it was shown that the county allowed plaintiff a part of her claim it cannot now deny indebtedness for the balance; being estopped by such partial payment. This position is not sound. As it was not shown that the county is liable under the conditions of the statute, the payment made was simply a gratuity or was rather made in violation of law. The county cannot be bound by such unlawful act of its officers. There is no estoppel in the case, because plaintiff did not change her condition, assume any obligation, or do or suffer anything which ought to preclude the defendant from denying its liability. Surely the county cannot be estopped by the unlawful act of its supervisors.

The foregoing considerations dispose of all questions in the case.

68 Iowa, 20.

AFFIRMED.

LIABILITY OF PHYSICIANS TO MAKE RETURN OF BIRTHS AND DEATHS TO COUNTY CLERK.

J. E. ROBINSON, CLERK OF THE COURTS, APPELLANT, vs. D. M. HAMILTON.

Appeal from Mills District Court.

Action in law to recover a statute penalty. A demurrer to the petition was sustained and judgment was rendered thereon for defendants. Plaintiff appeals.

Watkins & Williams for appellant.

No appearance for appellee.

BECK J.—I. The petition is in ten counts and claims to recover ten dollars on each as a penalty for the failure of defendant, who is a physician, to render a report of a death or birth specified in the count, as requested by the State Board of Health, under provisions of chapter 151, Acts of the Eighteenth General Assembly, McClain's Statutes, page 451, Miller's Code, page 421¹.

¹SEC. 5. It shall be the duty of all physicians and midwives in this State to register their names and postoffice addresses with the clerk of the district and circuit courts of the county where they reside; and said physicians and midwives shall be required, under penalty of ten dollars (\$10), to be recovered in any court of competent jurisdiction in the State at suit of the clerk of the courts, to report to the clerk of the courts, within thirty (30) days from the date of their occurrence, all births and deaths which may come under their supervision, with a certificate of the cause of death, and such other facts as the board may require, in the blank forms furnished as herein provided.

SEC. 6. When any birth or death shall take place, no physician or midwife being in attendance, the same shall be reported by the parent to the clerk of the district and circuit courts, within thirty days from the date of its occurrence, and if a death, the supposed cause of death, or, if there be no parent, by the nearest of kin not a

Decisions of the Supreme Court.

The petition shows that defendant was required by the regulations of the State Board of Health to report in each case of death referred to, the sex, nationality, place of birth, period of residence in this State, and the place and date of burial of the decedent, and the complications connected with the cause of death, and to report in each case of birth, "the number of the child of the mother," the nationality, place of birth, and age of each parent; the maiden name of the mother, and her place of residence. It is also alleged in the petition that defendant was furnished with blanks prescribed by the State Board of Health for his reports, as required by law, and that he "knowingly and wilfully failed and neglected and refused to make his report in each case for more than thirty days."

The demurrer to the petition was sustained upon the ground that the statute, so far as it authorizes the Board of Health and the plaintiff to require the defendant to report the information demanded of him, is in conflict with the Constitution of the United States, and of this State, and is unjust and oppressive, and contains requirements which were impossible for defendant to perform.

We have not been favored with the argument on behalf of the defendant and are therefore not informed of the grounds upon which the statute in question was assailed in the court below, and is claimed to be unconstitutional. It cannot be expected that we shall consider arguments of which we have not heard, or that we will imagine objections and discuss them. Our consideration of the case will therefore be brief.

It is proper to remark that under the statute brought in question, the defendant may be required to report the information sought in the manner prescribed by the Board of Health.

II. 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 will look for remedies for disease, and for means tending to preserve health. The objects of the statute are within the authority of the State and may be attained in the exercise of its police power. Similar objects are contemplated by States requiring a census to be periodically taken, the constitutionality of which we have never heard questioned.

III. We need not inquire whether the provisions 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.

minor; or, if none, by the resident householder where the birth or death shall have occurred, under penalty provided in the preceding section of this act.—*Chap. 151 Laws 1880.*

"A practicing physician should report births and deaths to the clerk of the county where the same occurs, without reference to where he is registered, or where he lives."
—*Attorney-General, Jan. 4, 1881.*

Decisions of the Supreme Court.

IV. 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 citizen, and is imposed as an obligation by the ethics of the useful and honorable profession of which he is a member.

In our opinion the demurrer to the plaintiff's petition was erroneously sustained.

61 Iowa, 134.

REVERSED.

Decisions of the Attorney-General.

DECISIONS OF THE ATTORNEY GENERAL.

POLLUTION OF RIVERS.

OFFICE OF ATTORNEY-GENERAL, }
DES MOINES, July 30, 1889. }

DR. J. F. KENNEDY, *Secretary State Board of Health:*

SIR—I am in receipt of your communication and accompanying papers concerning the pollution of the waters of the Iowa river, caused by emptying refuse matter from a factory in Marshalltown, into that stream, the effect of which is imperiling the health and lives of persons living on or near that river. I note your inquiry as to what means should be adopted to put a stop to this condition of things.

The legislature of Iowa, under its admitted powers, has made ample provision for an emergency such as this. Below I quote from chapter 151, of the acts of the twentieth general assembly.

SEC. 2. The State Board of Health shall have the general supervision of the interests of the health and life of the citizens of the State. They shall have charge of all matters pertaining to quarantine, they shall supervise a State registration of marriages, births and deaths, as hereinafter provided; they 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 or improvement of the public health; and it shall be the duty of all police officers, sheriffs, constables, and all other officers of the State, to enforce such rules and regulations, so far as the efficiency and success of the board may depend upon their official coöperation.

SEC. 13. The mayor and aldermen of each incorporated city, the mayor and council of any incorporated town or village in the State, or the trustees of any township, shall have and exercise all the powers and perform all the duties of a board of health within the limits of the cities, towns and townships of which they are officers.

SEC. 16. Local boards of health shall make such regulations respecting nuisances, sources of filth and causes of sickness within their jurisdiction, and on board any boats in their ports or harbors, as they may judge necessary for the public health and safety; and if any person shall violate any such regulations he shall forfeit a sum of not less than twenty-five dollars (\$25) for every day during which he knowingly violates or disregards said rules and regulations, to be recovered before any justice of the peace or other court of competent jurisdiction.

Decisions of the Attorney-General.

SEC. 17. The board of health of any city or incorporated town or village shall order the owner of any property, place or building (at his own expense) to remove any nuisance, source of filth or cause of sickness found on private property, within twenty-four (24) hours, or such other time as is deemed reasonable after notice served as hereinafter provided; and if the owner or occupant neglect to do so, he shall forfeit a sum not exceeding twenty dollars (\$20) for every day during which he knowingly and willfully permits such nuisance or cause of sickness to remain after the time prescribed for the removal thereof.

SEC. 18. If the owner or occupant fails to comply with such order, the board may cause the nuisance, source of filth or cause of sickness to be removed, and all expenses incurred thereby shall be paid by the owner, occupant or other person who caused or permitted the same, if he has had actual notice from the board of health of the existence thereof, to be recovered by civil action in the name of the State before any court having jurisdiction.

SEC. 20. Whenever the board of health shall think it necessary for the preservation of the lives or health of the inhabitants to enter a place, building or vessel in their township, for the purpose of examining into and destroying, removing or preventing any nuisance, source of filth or cause of sickness, and shall be refused such entry, any member of the board may make complaint, under oath, to any justice of the peace of his county, whether such justice be a member of the board or not, stating the facts of the case, so far as he has knowledge thereof. Such justice shall thereupon issue a warrant, directed to the sheriff or any constable of the county, commanding him to take sufficient aid, and being accompanied by two or more members of said board of health, between the hours of sunrise and sunset, repair to the place where such nuisance, source of filth, or cause of sickness complained of may be, and the same destroy, remove, or prevent, under the direction of such members of the board of health.

It will thus appear from these sections, which are so clear as to need no interpretation, that the local board of health, composed of the mayor and aldermen of the city of Marshalltown, where this factory is situated, have ample power to bring to a sudden termination the causes which are producing this wide-spread danger along the Iowa river. If this local board of health at one of its meetings should, upon investigation, find and determine that the emptying of this refuse matter into the river, or into any passage way which conducted it into the river, was causing a nuisance dangerous to health and life, or that such refuse matter was being disposed of in any other such way as to cause a nuisance, and the board should make a record of that fact, and should order the owner of the property, place or building to remove the nuisance or cause of sickness within twenty-four hours, or such other time as it deemed reasonable, after notice was served in accordance with the statute, and the owner or occupant should fail to comply with such order, then the board could lawfully make another order directing the removal of the nuisance or cause of sickness, and provide that the expense thereof should be paid by the owner, occupant, or other person, who caused or permitted the objectionable conditions. This local board could then take such reasonable steps as it deemed proper to summarily and promptly execute this order, and the expense of the same could afterward be recovered against the party whose duty it was in the first instance to remove the nuisance or cause of sickness.

Decisions of the Attorney-General.

Of course, it would readily occur to the board that this work of removal or prevention should be executed with as little damage as possible to the owner of the property or others, consistent with the imperative demand of safety to the lives and health of the inhabitants. But the controlling motive must be this safety, and to the extent that the objectionable conditions threaten it. To that extent they must be removed or prevented, whatever the consequences to individuals may be.

A close examination of the sections I have quoted, and particularly sections thirteen, seventeen, and eighteen, will point out to the local board the line of their duty, and the method of its execution. It is undoubtedly the intention of the provisions contained in section seventeen, above quoted, to leave it to the owner or occupant to cause this removal or prevention with as little injury to himself as possible, and to leave it to him to determine what method he will adopt, requiring only that this method shall be effectual. If he fails to act within the time designated, then the board must act.

In construing a Massachusetts statute, precisely similar to ours, the supreme court of that State, in the case of *The City of Salem vs. Eastern Railway Company*, 98, Mass., 443, in speaking of the powers of the boards of health, say:

Their action is intended to be prompt and summary. They are clothed with extraordinary powers for the protection of the community from noxious influences affecting life and health, and it is important that their proceedings should be embarrassed and delayed as little as possible by the necessary observance of formalities. Although notice and opportunity to be heard upon matters affecting private interests ought always to be given when practicable, yet the nature and object of those proceedings are such that it is deemed to be most for the general good that notice should not be essential to the right of the board to act for the public safety. Delay for the purpose of giving notice, involving either of public notice or of inquiry to ascertain who are the parties whose interests will be affected, and further delay for such hearings as the parties may think necessary for the protection of their interests, might defeat all beneficial results from an attempt to exercise the powers conferred upon boards of health. The necessity of the case, and the importance of the public interests at stake, justify the omission of notice to the individual.

The adjudication of the board that the nuisance exists is conclusive, and no appeal lies therefrom.

The board of health should be careful to keep a full and accurate record of its proceedings. All jurisdictional requirements should be stated in the record, and the finding of facts should be clearly stated therein. The adjudications of the board should be stated in unmistakable language.

The power of the board of health is extraordinary, and its exercise may result disastrously to individual interest; but the emergencies that confront the board are very great, involving the destruction of health and life. In this conflict, individual interest must yield, and the public welfare have sway.

Other legal methods can be employed that would correct the evil in time, but the one pointed out in this opinion is the most prompt and efficacious of all.

JOHN Y. STONE,
Attorney-General.

Decisions of the Attorney-General.

REMOVAL OF NUISANCE.—NOTICE.

COUNCIL BLUFFS, IOWA, July 7, 1893.

Secretary State Board of Health, Des Moines, Iowa:

DEAR SIR:—I am in receipt of yours of July 2nd, asking my opinion as to whether the substitute for section 16 of chapter 151, acts of the eighteenth general assembly, enacted by chapter 59, acts of the twenty-fourth general assembly, repeals or supersedes sections 17, 18, 19 and 20 of chapter 151, acts of the eighteenth general assembly in relation to the notice to be given to occupants or owners of premises on which nuisances or causes of sickness exist. I am also in receipt of yours of July 3rd and July 6th in regard to the same subject. I have given the subject careful consideration and it is my best judgment, taking all the sections together, that chapter 59, acts of the twenty-fourth general assembly, was intended simply as a substitute for section 16, and not intended to repeal or supersede the following sections. There is a marked distinction between a regulation or general rule laid down by competent authority to govern a class of cases and a particular exercise of executive authority. Section 16, it seems to me, provides for the adoption of regulations by local boards of health in regard to nuisances, etc. The notice provided for therein is a prerequisite to the establishment of these regulations. The notice provided for in section 17 is preliminary to an executive enforcement of law against a particular individual. I am unable to see—at least so far as my present investigations have gone—that in adopting the substitute for section 16, the legislature intended to repeal the following sections. Repeals by implication are not favored and laws should be so construed that all parts of them should be given effect.

Yours truly,

JOHN Y. STONE,
Attorney-General.

RABID DOGS.

STATE OF IOWA, OFFICE OF ATTORNEY-GENERAL, }
DES MOINES, July 10, 1891. }

MR. W. G. ROSS, *County Attorney, Fairfield, Iowa:*

DEAR SIR:—I am in receipt of yours of the 23d ult., in which you ask my opinion on the following question:

Have township trustees acting as local boards of health, or otherwise, power to require all dogs found in the township to be muzzled or kept on the premises of the owner, under penalty of being shot?

The portions of the statute which define the powers and duties of the local boards of health are section 16 of chapter 151 of the acts of the eighteenth general assembly, and section 415 of the Code, first adopted by chapter 107, acts of the eleventh general assembly. This latter section reads as follows:

Decisions of the Attorney-General.

The township trustees shall have power to make whatever regulations they may deem necessary for the protection of the public health, and respecting nuisances, sources of filth, and causes of sickness within their respective townships.

By this act, the township trustees are not created local boards of health by that name, although they are given powers as such. Chapter 151, eighteenth general assembly, is the one which creates the State Board of Health, giving that body general and paramount jurisdiction of health matters (Sec. 2), creating by name city and town councils and township boards, local boards of health (Sec. 13) subordinate to the State Board (Sec. 15) and defining their powers as follows (Sec. 16): "Local boards of health shall make such regulations respecting nuisances, sources of filth, and cause of sickness within their jurisdiction, * * as they shall judge necessary for the public health and safety."

Section 25 of the act repeals all laws in conflict with it.

Such being the law, what are the powers of a board of township trustees with reference to protecting citizens within their jurisdiction from mad dogs by reasonable regulations? I think it may be questioned whether section 12 of chapter 151, acts of eighteenth general assembly gives them any such power. By it they may make regulations "respecting nuisances, sources of filth and causes of sickness," but concerning nothing else. At a casual glance it might be seen that mad dogs, being "causes of sickness," viz.: of the disease rabies, might be regulated, but this position is questionable, for it is a well known rule in the interpretation of statutes that when general words follow a list of particular ones, the meaning of the general words is restricted to things of the same genus or kind as those before enumerated. (Sutherland on Statutory Construction, Sec. 268).

The particular words being "nuisances and sources of filth," the "causes of sickness" that local boards of health have power to regulate are only those which are of the same general kind. Mad dogs are not nuisances in the ordinary legal acceptance of the term.

Section 415, however, gives, in my opinion, unquestionably the authority to restrain and regulate mad dogs to township boards. Its provisions are amply broad, the first clause giving board of trustees the power "to make whatever regulations they deem necessary for the protection of the public health." The remaining part of the section is virtually the same as the later statute, section 16, above quoted. Certainly such a regulation of dogs as you suggest, would be a regulation which might be deemed necessary for the protection of the public health. I am, therefore, of the opinion that township trustees may adopt and put in force such a regulation. A substantially similar power is given city and town councils by another statute, section 459 of the Code.

It is true, that it maybe contended that since chapter 151, twenty-first general assembly is manifestly intended to cover the whole subject of health regulations, that, therefore, the previously existing statutes on the subject, including section 415, have been supplanted and repealed by it. But repeals by implication are not favored. Statutes passed at different times and refer-

Decisions of the Attorney-General.

ring to the same subject are, if possible, construed together as one statute, and all the provisions of such given effect. The fact that there is an express repealing clause in chapter 151, does not affect the matter, for it provides only that "acts in conflict with this act are repealed." The general provision of section 415, that "township boards may pass whatever regulations they may deem necessary for the protection of the public health," is in conflict with no part of chapter 151. Further it seems to me, that manifest reasons of public utility and safety would forbid the interpretation that the legislature intended to leave country districts without the power to protect themselves that is expressly granted to cities and towns.

Yours truly,

JOHN Y. STONE,

Attorney-General.

COUNCIL BLUFFS, IOWA, August 10, 1891.

O. C. Brown, Esq., County Attorney, Indianola, Iowa:

DEAR SIR:—I am in receipt of yours of July 30th, in which you state that a mad dog has bitten a number of cattle and horses in your county, some of which have gone mad, and others have been quarantined; that the owners are unwilling to kill the suspected animals, and asking what the powers and duties of the State Board of Health and the township trustees, acting as a local board of health, are in the premises.

There is no provision in the statute providing for the destruction of such animals and the compensation of the owners therefor, as there is in the case of glandered horses. The State Veterinary Surgeon is in all probability right in thinking that he has no jurisdiction. If then, the power to remedy this evil is vested in any office or body, it is in the State Board of Health, or the local board of health, under the following quoted provisions of the law: The State Board of Health has, by virtue of chapter 151 of the acts of the eighteenth general assembly, the charge of all matters pertaining to quarantining, and "authority to make such rules and regulations as they may deem necessary for the preservation and improvement of the public health." The police officers of the State are required to aid in the enforcement of such rules and regulations. The township boards of trustees, acting as local boards of health, are by virtue of section 415 of the Code, given substantially similar power. "They have the power to make whatever regulations they may deem necessary for the preservation of the public health." Sections 418 and 419 provide that the board shall have power to employ persons to carry into effect regulations adopted by them, and that a violation of any of the rules shall constitute a misdemeanor and be punishable as such.

These powers are general and broad, and there seems to be no limit to their exercise, providing they do not trench upon or conflict with the constitution or laws of the State. Any rule or regulation which the State Board, or the local board might, in their exercise of their official discretion, deem

Decisions of the Attorney-General.

necessary for the preservation of the public health, would, I think, be *prima facie* valid at least. The question as to whether any particular regulation, such as the one aimed at the evil referred to in your letter, is necessary and therefore valid, would be a matter for the official discretion of the board passing the regulation.

The further question as to whether there would be any review by the courts, or otherwise, of this discretion, is one that in the present state of judicial decisions, I am unable to venture an opinion on. The law seems to have vested the State Board with wider powers in such matters than the local boards, but has not provided as efficient means for the enforcement of the regulations adopted by it as it has in the case of the local boards¹.

Yours truly,

(Signed)

JOHN Y. STONE,
Attorney-General.

¹Since these opinions were given the legislature has, by chapter 59, laws of the twenty-fourth general assembly, given local boards power to make regulations for protection against rabid animals.

Powers of the State Board.

POWERS OF THE STATE BOARD.

OFFICE OF THE IOWA STATE BOARD OF HEALTH, }
DES MOINES, February 4, 1889. }

JOHN Y. STONE, *Attorney-General:*

Where the State Board of Health, by virtue of the power and authority vested therein, has made and published rules and regulations for the restriction and prevention of contagious disease within this State, among which is the quarantine of the premises whereon such disease may exist, and the isolation of the sick for a period of forty days; and further, where in a given case quarantine has been established for a period of nine days, has a local board of health power or authority to set aside and annul such rules and regulations of said State Board by raising the quarantine, and releasing the persons and premises from such restrictions before the expiration of the quarantine term of forty days?

J. F. KENNEDY, *Secretary of the Board.*

THE STATE OF IOWA, OFFICE OF ATTORNEY-GENERAL, }
DES MOINES, February 8, 1889. }

To the State Board of Health:

SIR—I am in receipt of your communication stating in effect that in one of the towns in this State three clearly defined cases of Diphtheria developed some time ago, and that in accordance with regulations adopted by your honorable Board, and perhaps by the local board of health in the locality, the patients had been isolated and were under treatment. It is further stated that after the continuance of this isolation and treatment for nine days, the restrictions were raised and communication permitted between the patients and other persons who might come in contact with them.

As I understand the matter, the restrictions were raised by the local board of health of the town. You now ask whether this local board of health had authority to change the status that had been established under the regulations above mentioned. Section two, chapter one hundred and fifty-one, of the acts of Eighteenth General Assembly, provides as follows:

"The State Board of Health shall have the general supervision of the interests of the health and life of the citizens of the State. They shall have charge of all matters pertaining to quarantine. * * * They shall have authority to make such rules and regulations * * * as they

Powers of the State Board.

may from time to time deem necessary for the preservation or improvement of public health; and that it shall be the duty of public officers, sheriffs, constables and other public officers of the State to enforce such rules and regulations, so far as the efficiency and success of the Board may depend upon their official co-operation."

My attention is called to the regulation adopted in relation to cases of Scarlet Fever and Diphtheria by your Board, and which is as follows:

"Isolation—separation of the sick from the well. Whenever a child has sore throat and fever, and especially when this is accompanied by a rash on the body, the child must be immediately isolated as completely as possible from others of the household and from other persons until a physician has determined whether it is Scarlet Fever or Diphtheria. All persons known to be sick with either disease must be promptly and thoroughly isolated from the public for not less than forty days."

The adoption of the foregoing regulation is undoubtedly within the power of the State Board. I think it is the purpose of the law to give the State Board superior control over all matters relating to public health. Local boards have the power and are required within their respective jurisdictions in case epidemic disease is developed to take such measures as may be deemed necessary for the safety of the inhabitants. See section twenty-two, chapter one hundred and fifty-one of the acts of the Eighteenth General Assembly. But even the local board has no authority to do away with the restrictions that have been previously established by the State Board, nor any right or authority to change a condition with respect to a patient that had been established under the regulations of the State Board. The object of this law is to furnish methods, means or agencies for preserving and protecting life and health. The State Board is invested with power in this matter extending over the whole State. It is the duty of all persons to observe the regulations it has established, because in legal contemplation, as well as in fact, they have been established for the public good. Local boards act within their respective localities, but they have no power to take action in conflict with the action or regulations of the State Board.

I am, therefore, of the opinion that the act complained of as stated in the first part of this communication was without authority, and that it is the duty of the public officers, sheriffs and constables in the locality where this infraction has occurred, to enforce the order of the State Board of Health, and to see to it that the regulations of said Board are carried out.

Respectfully yours,

JOHN Y. STONE,
Attorney-General.

Health Laws.

HEALTH LAWS.

ADULTERATION OF FOOD, DRINK, AND MEDICINE.

[Chapter 170, Laws Nineteenth General Assembly.]

AN ACT to Prevent and Punish the Adulteration of Articles of Food, Drink, and Medicine, and the sale thereof when adulterated.

SECTION 1. *Be it enacted by the General Assembly of the State of Iowa,* That no person shall mix, color, stain, or powder, or order, or permit any other person to mix, color, stain, or powder any article of food with any ingredient or material so as to render the article injurious to health with the intent that the same may be sold, and no person shall sell or offer for sale any such article so mixed, colored, stained, or powdered.

SEC. 2. No person shall, except for the purpose of compounding, in the necessary preparation of medicine, mix, color, stain, or powder, any drug or medicine with any ingredients or material so as to affect injuriously the quality or potency of such drug or medicine, with intent to sell the same, or shall offer for sale any such drug or medicine so mixed, colored, stained, or powdered.

SEC. 3. No person shall mix, color, stain, or powder any article of food, drink, or medicine, or article which enters into the composition of food, drink, or medicine, with any other ingredient or material, whether injurious to health or not, for the purpose of gain or profit, or sell or offer for sale, the same, or order or permit any other person to sell or offer for sale any article so mixed, colored, stained, or powdered, unless the same be so manufactured, used or sold, or offered for sale under its true and appropriate name, and notice that the same is mixed or impure is marked, printed or stamped upon each package, roll, parcel, or vessel containing the same, so as to be and remain at all times readily visible, unless the person purchasing the same is fully informed by the seller of the true names of the ingredients (if any than such as are known by the common name thereof) of such articles of food, drink, or medicine, at the time of making the sale thereof, or offering to sell the same. *Provided,* nothing in this section shall prevent the use of harmless coloring material used in coloring butter and cheese.

SEC. 4. No person shall mix any glucose, or grape sugar with syrup or sugar intended for human food; any cheese manufactured from skim milk, or from milk that is partly skimmed, shall be branded as skimmed milk cheese, when the same is offered for sale; or any oleomargarine, suine, beef fat, lard, or any other foreign substance, with any butter or cheese intended

Health Laws.

for human food; or shall mix or mingle any glucose, grape sugar, or oleomargarine with any article without distinctly marking, stamping or labeling the article or the package containing the same, with the true and appropriate name of such article, and the percentage in which glucose or grape sugar, oleomargarine, or suine enters into its composition. Nor shall any person sell, or offer for sale, or permit to be sold or offered for sale, any such food, into the composition of which glucose, or grape sugar, oleomargarine, or suine has entered, without at the same time informing the buyer of the fact, and the proportions in which glucose or grape sugar, oleomargarine, or suine has entered into the composition.

SEC. 5. Any person or persons convicted of violating any of the provisions of any of the foregoing sections of this act, shall for the first offense be fined not less than ten dollars (\$10), nor more than fifty dollars (\$50). For the second offense they shall be fined not less than twenty-five dollars (\$25), nor more than one hundred dollars (\$100), or confined in the county jail not more than thirty days. And for the third, and all subsequent offenses, they shall be fined five hundred dollars (\$500), nor more than one thousand dollars (\$1,000), and imprisonment [ed] in the State prison not less than one year nor more than five years.

SEC. 6. All acts or parts of acts inconsistent with the provisions of this act are hereby repealed.

Approved, March 25, 1882.

SEC. 4036. If any person fraudulently adulterate for the purpose of sale any drug or medicine, in such manner as to lessen the efficacy, or change the operation of such drugs or medicine, or to make them injurious to the health, or sell them knowing that they are thus adulterated, he shall be punished by imprisonment in the county jail not exceeding one year, or by fine not exceeding five hundred dollars, and such adulterated drugs and medicines shall be forfeited and destroyed.—*Code of 1873.*

SEC. 4037. If any person fraudulently adulterate, for the purpose of sale, any substance intended for food, or any wine, spiritous or malt liquor, or other liquor intended for drinking, he shall be punished by imprisonment in the county jail not more than one year, or by a fine not exceeding three hundred dollars, and the article so adulterated shall be forfeited and destroyed.—*Code of 1873.*

SEC. 4038. If any apothecary, druggist or other person, sell and deliver any arsenic, corrosive sublimate, prussic acid, or any poisonous liquid or substance, without having the word "poison" and the true name thereof written or printed upon the label attached to the vial, box or parcel containing the same, he shall be punished by imprisonment in the county jail not more than thirty days, or by fine not exceeding one hundred dollars. Any person who may dispose of at retail, any poisonous substance or liquid to any one, for any purpose, is hereby required to enter in a book, to be kept by such apothecary, druggist or other person so disposing, the name of the poison, when bought, by whom and for what purpose; and if the person who calls for such poison is not personally known to the vender, then such person

Health Laws.

shall be identified by some one known to the vender, whose name shall also be entered in such book. Any failure to comply with the requirements of this provision shall subject the party so failing to imprisonment in the county jail not more than thirty days, or a fine not exceeding one hundred dollars.—*Code of 1873.*

SEC. 4040. If any person willfully sell, or keep for sale intoxicating malt or vinous liquors, which have been adulterated or drugged by admixture with any deleterious or poisonous substance, he shall be deemed guilty of a felony, and upon conviction thereof, he shall be punished by a fine not exceeding five hundred dollars, or by imprisonment in the penitentiary not exceeding two years.—*Code of 1873.*

FRAUDULENT BUTTER AND CHEESE.

[Chapter 22, Laws of 1886.]

AN ACT to prevent deception in the manufacture and sale of imitations of Butter and Cheese.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That for the purposes of this act every article, substance or compound other than that produced from pure milk or cream from the same made in the semblance of butter and designed to be used as a substitute for butter made from pure milk or cream from the same is hereby declared to be imitation butter; and that for the purposes of this act every article, substance or compound other than that produced from pure milk or cream from the same made in the semblance of cheese and designed to be used as a substitute for cheese made from pure milk or cream from the same is hereby declared to be imitation cheese; *provided*, that the use of salt, rennet, and harmless matter for coloring the product of pure milk or cream, shall not be construed to render such product an imitation.

SEC. 2. Each person who manufactures imitation butter or imitation cheese, shall mark by branding, stamping or stenciling upon the top and sides of each tub, firkin, box or other package in which such article shall be kept, and in which it shall be removed from the place where it is produced, in a clear and durable manner, in the English language, the name of the contents thereof, as herein designated, in printed letters of plain Roman type, each of which shall be not less than one inch in length, by one-half of one inch in width. Every person who by himself or another violates the provisions of this section shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined not to exceed two hundred and fifty dollars or by imprisonment in the county jail not to exceed sixty days.

SEC. 3. No person by himself or another shall knowingly ship, consign, or forward by any carrier, whether public or private, any imitation butter or imitation cheese, unless the same be marked, as provided by section two of

Health Laws.

this act; and no carrier shall knowingly receive for the purpose of forwarding or transporting any imitation butter or imitation cheese, unless it shall be marked as hereinbefore provided, consigned, and by the carrier receipted for by its name as designated by this act; provided that this act shall not apply to any goods in transit between foreign States and across the State of Iowa.

SEC. 4. No person shall knowingly have in his possession or under his control any imitation butter or imitation cheese unless the tub, firkin, box or other package containing the same be clearly and durably marked as provided by section two of this act; *provided*, that this section shall not be deemed to apply to persons who have the same in their possession for the actual consumption of themselves or family.

SEC. 5. No person by himself or another shall knowingly sell or offer for sale imitation butter or imitation cheese under the name of, or under the pretense that the same is pure butter or pure cheese; and no person by himself or another shall knowingly sell any imitation butter or imitation cheese unless he shall have informed the purchaser distinctly at the time of the sale, that the same is imitation butter or imitation cheese as the case may be and shall have delivered to the purchaser at the time of sale a statement clearly printed in the English language which shall refer to the article sold and which shall contain in prominent and plain Roman type the name of the article sold as fixed by this act and shall give the name and place of business of the maker.

SEC. 6. No keeper of a hotel, boarding house, restaurant or other public place of entertainment shall knowingly place before any patron for use as food any imitation butter or imitation cheese unless the same be accompanied by a placard containing the name in English of such articles as fixed by this act, printed in plain Roman type. Each violation of this section shall be deemed a misdemeanor.

SEC. 7. No action can be maintained on account of any sale or other contract made in violation of or with intent to violate this act by or through any person who was knowingly a party to such wrongful sale or other contract.

SEC. 8. Every person having possession or control of any imitation butter or imitation cheese which is not marked as required by the provisions of this act shall be presumed to have known during the time of such possession or control the true character and name as fixed by this act of such imitation product.

SEC. 9. Whoever shall deface, erase, cancel or remove any mark provided for by this act, with intent to mislead, deceive or to violate any of the provisions of this act, shall be deemed guilty of a misdemeanor.

SEC. 10. Whoever shall violate any of the provisions of the third, fourth and fifth sections of this act shall, for the first offense, be punished by a fine of not less than fifty dollars nor more than one hundred dollars, or by imprisonment not exceeding thirty days, and for each subsequent offense shall be punished by a fine of not less than two hundred and fifty dollars nor more than five hundred dollars, or by imprisonment in the county jail not less than thirty days nor more than six months, or by both such fine and imprisonment in the discretion of the court.

Health Laws.

SEC. 11. The governor shall within thirty days from the taking effect of this act, by and with the *advise* [advice] and consent of the executive council, appoint an officer who shall be known as the State Dairy Commissioner, who shall have practical experience in the manufacture of dairy products; the term of office of such commissioner shall commence on the first day of May, A. D. 1898, and shall continue two years. Said commissioner shall give an official bond conditioned for the faithful performance of the duties of his office in the sum of ten thousand dollars with sureties to be approved by the governor. He may be removed from office by the governor, with the approval of the executive council, for the neglect or violation of duty. Any vacancy shall be filled by the appointment of the governor, by and with the advice and consent of the executive council.

SEC. 12. The State dairy commissioner shall receive a salary of fifteen hundred dollars per annum, payable monthly, and the expenses necessarily incurred in the proper discharge of the duties of his office; *provided*, that a complete itemized statement of all expenses shall be kept by the commissioner, and by him filed with the auditor of state, after having been duly verified by him before receiving the same. He shall be furnished a room in the agricultural department of the capitol at Des Moines, in which he shall keep his office, and all correspondence, documents, records and property of the State, pertaining thereto, all of which shall be turned over to his successor in office. He may, if it is found to be necessary, employ a clerk whose salary shall not exceed the sum of fifty dollars per month. Said salaries and expenses to be paid from the appropriation provided for in section seventeen of this act. The commissioner provided for by this act shall hold no other official position under the laws of Iowa, or a professorship in any of the State institutions.

SEC. 13. It shall be the duty of the State dairy commissioner to secure, so far as possible, the enforcement of this act. He shall collect, arrange and present in annual report to the governor on or before the first day of November of each year, a detailed statement of all matters relating to the purposes of this act, which he shall deem of public importance, including the receipts and disbursements of his office. Such reports shall be published with the reports of the State agricultural society.

SEC. 14. The State dairy commissioner shall have power in all cases where he shall deem it important for the discharge of the duties of his office to administer oaths, to issue subpoenas for witnesses, and to examine them under oath, and to enforce their attendance to the same extent and in the same manner as a justice of the peace may now do, and such witnesses shall be paid by the commissioner the same fees now allowed witnesses in justice's courts.

SEC. 15. Whoever shall have possession or control of any imitation butter or imitation cheese contrary to the provisions of this act shall be construed to have possession of property with intent to use it as means of committing a public offense within the meaning of chapter 50 of title XXV, of the Code; *provided*, that it shall be the duty of the officer who serves a search warrant

Health Laws.

issued for imitation butter or imitation cheese, to deliver to the State dairy commissioner, or to any person by such commissioner authorized in writing to receive the same, a perfect sample of each article seized by virtue of such warrant, for the purpose of having the same analyzed and forthwith to return to the person from whom it was taken, the remainder of each article seized as aforesaid. If any sample be found to be imitation butter or imitation cheese it shall be returned to and retained by the magistrate as, and for the purpose contemplated by section 4648 of the Code, but if any sample be found not to be imitation butter or imitation cheese, it shall be returned forthwith to the person from whom it was taken.

SEC. 16. It shall be the duty of the court in each action for the violation of this act to tax as costs in the cause, the actual and necessary expense of analyzing the alleged imitation butter or imitation cheese which shall be in controversy in such proceeding provided that the amount so taxed shall not exceed the sum of twenty-five dollars. It shall be the duty of the district or county attorney upon the application of the dairy commissioner, to attend to the prosecution in the name of the State of any suit brought for violation of any of the provisions of this act within his district, and in case of conviction he shall receive twenty-five per cent of the fines collected, which shall be in addition to any salary he may receive to be taxed as costs in the case.

SEC. 17. There is hereby appropriated for the purposes of this act the sum of twenty thousand dollars, or so much thereof as shall be necessary, not more than one-half of which shall be drawn from the State treasury prior to the first day of July, A. D. 1887. The amount hereby appropriated shall be expended only under the direction and with the approval of the executive council. And all salaries, fees, costs and expenses of every kind incurred in the carrying out of this law shall be drawn from the sum so appropriated.

SEC. 18. Chapter 39, of the acts of the Eighteenth General Assembly of Iowa, and all acts and parts of acts in conflict with this act are hereby repealed.

SEC. 19. This act, being deemed of immediate importance, shall take effect, and be in force from and after its publication in the Iowa State Register and Iowa Homestead, newspapers published at Des Moines, Iowa.

Approved March 27, 1886.

NEW DAIRY LAW.

AN ACT to repeal section 4042 of the Code of 1873, and provide a substitute therefor, and to enlarge the duties and powers of the State Dairy Commissioner, and to provide an appropriation therefor.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That section 4042 of the Code of 1873 is hereby repealed and the following is enacted in lieu thereof: If any person shall sell or exchange, or expose for sale or exchange, deliver or bring to another for domestic use

Health Laws.

or to be converted into any product of human food whatsoever, any unclean, impure, unhealthy, adulterated, unwholesome or skimmed milk, or milk from which has been held back what is commonly known as strippings, or milk taken from an animal having disease, sickness, ulcers, abscesses or running sore, or was taken from an animal fifteen days before, or less than five days after parturition, shall, upon conviction thereof, be fined not less than twenty-five dollars (\$25.00) nor more than one hundred dollars (\$100.00), and be liable in double the amount of damages to the person or persons upon whom such fraud shall be committed. Provided, that the provisions of this act shall not apply to skimmed milk where it is sold as such.

SEC. 2. For the purposes of this act milk which is proved by any reliable method of test or analysis, to contain less than three pounds of butter fat to the one hundred pounds of milk, shall be regarded as skimmed or partially skimmed milk.

SEC. 3. It is hereby made the duty of the Dairy Commissioner to enforce the provisions of the foregoing sections.

SEC. 4. The State Dairy Commissioner is hereby authorized to appoint agents in every city having over ten thousand inhabitants in the State of Iowa, who are to collect the samples of milk as sold in such cities, and it shall be their duty to forward such samples to the office of the Commissioner in Des Moines in such manner as he shall direct. The compensation of such agents at any one time shall not be more than three dollars (\$3.00) for collecting and delivering the same to the express companies.

SEC. 5. The number of times samples are collected in each city of more than ten thousand inhabitants shall not exceed an average of thirty times during any one year.

SEC. 6. The State Dairy Commissioner, if it shall be found necessary, may increase the clerk hire of his office twenty-five dollars (\$25.00) per month.

SEC. 7. Every milk dealer who runs a milk wagon, milk depot, or sells milk from a store in the cities that have over ten thousand inhabitants, in the State of Iowa, shall obtain a permit from the State Dairy Commissioner's office, for which he shall pay the sum of one dollar (\$1.00) annually. The Commissioner shall keep a book in which shall be registered the name, location and number of each dealer in milk, and a record of each analysis. Whoever violates the provisions of this section, upon conviction thereof, shall be fined not less than ten dollars (\$10.00) nor more than twenty-five dollars (\$25.00).

SEC. 8. The Dairy Commissioner or his agents shall have power and authority to open any can or vessel containing milk which is offered for sale, and may inspect the contents thereof and may take therefrom samples of milk for analysis.

SEC. 9. That there is hereby appropriated out of any money in the State Treasury not otherwise appropriated, the sum of twenty-five hundred dollars, or so much as may be necessary for the purpose of carrying out the provisions of this act.

Health Laws.

REGULATION PASSED BY THE STATE BOARD OF HEALTH.

The attention of all who handle milk is directed to the following regulation made by the State Board of Health, and which is binding upon all the people. It is known that very few substances absorb the germs of contagious diseases so quickly as milk. The purpose of this regulation is to prevent the spread of such diseases through this media. It is supplemental to the statute which prohibits the sale of impure milk.

When Asiatic Cholera, Small Pox, Diphtheria, Scarlet Fever (Scarlatina, Scarlet Rash), Typhoid Fever, Typhus Fever, Membranous Croup, Measles, or any other contagious disease exists in any house or dwelling place of a dealer in, or seller of milk, he shall discontinue, and cease to give or sell, or distribute milk to any person, or to creameries or butter factories, or in anywise handle such milk, until a permit is granted therefor by the mayor (or clerk), countersigned by the health officer. And no person who attends cows, and the milking, or who has the care of milk vessels or the sale or distribution of milk shall be permitted to enter any premises or place wherein exists any of the diseases named herein, nor have any communication, direct or indirect, with any person who resides in, or is an occupant of, such infected place; nor shall any milk or butter be given away, sold or distributed from such infected place.

HEALTH OF FEMALE EMPLOYÉS.

[Chapter 47, Laws of Twenty-fourth General Assembly.]

AN ACT for the Preservation of the Health of Female Employes.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That it shall be the duty of all employers of females in any mercantile or manufacturing business or occupation, to provide and maintain suitable seats, when practicable, for the use of such female employes, at or beside the counter or work-bench where employed, and to permit the use of such seats by such employes to such an extent as the work engaged in may reasonably admit of.

SEC. 2. That any neglect or refusal to comply with section one of this act by any employer or employers, shall be punished by a fine not exceeding ten dollars, at the discretion of the court, and the costs of the suit.

SEC. 3. It is hereby made the duty of the county attorney to prosecute all violations of this act upon the filing of an information by any citizen as required by section 4661, chapter 11, of the Code of Iowa.

SEC. 4. All acts or parts of acts inconsistent with this act are hereby repealed.

Approved April 6, 1892.

Health Laws.

FRAUDULENT CANNED GOODS.

[Chapter 174, Laws of Twenty-first General Assembly.]

AN ACT in Relation to Canned or Preserved Food.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. It shall hereafter be unlawful in this State for any packer of, or dealer in, hermetically sealed, canned or preserved fruits, vegetables, or other articles of food, to knowingly offer such canned or preserved articles for sale for consumption in this State, after October 1, 1886, unless the cans or jars which contain the same shall bear the name, address and place of business of the person, firm or corporation that canned or packed the articles so offered, or the name of the wholesale dealer in the State who sells or offers the same for sale, together in all cases with the name of the state, city, town or village, where the same were packed, plainly printed thereon, preceded by the words, "packed at," such name, address and place of business shall be plainly printed on the label, together with a mark or term indicating clearly the grade or quality of the articles contained therein.

SEC. 2. All packers of, and dealers in soaked goods, or goods put up from products dried or cured before canning, shall in addition to complying with provisions of section one of this act, cause to be plainly branded on the face of the label in good, legible type, one-half of an inch in height, and three-eighths of an inch in width, the word "soaked."

SEC. 3. All goods packed prior to the passage of this act are exempted from the provisions of this act.

SEC. 4. Any packer or dealer who shall violate any of the provisions of this act shall be deemed guilty of a misdemeanor and punished by a fine of not more than fifty dollars for each offense in the case of retail dealers, and in the case of wholesale dealers and packers, by a fine not less than five hundred dollars nor more than one thousand dollars for each offense. The terms "Packer," and "Dealer," as used in this act, shall be deemed to include any firm or corporation doing business as a dealer in or packer of the articles mentioned in this act. It shall be the duty of any board of health in this State cognizant of any violation of this act, to inform the district attorney whose duty it shall be to institute proceedings against any person who is charged with a violation of the provisions of this act, and in case of conviction shall receive twenty-five per cent of the fines actually collected which shall be in addition to any salary he may receive under the law.

SEC. 5. The provisions of this act shall not apply to canned or condensed milk or cream.

SEC. 6. This act shall take effect October first, eighteen hundred and eighty-six.

Approved April 13, 1886.

Health Laws.

TO PREVENT FRAUD IN THE SALE OF LARD.

[Chapter 79, Laws of 1888.]

AN ACT to Prevent Fraud in the Sale of Lard, and to Provide Punishment for the Violation thereof.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. No manufacturer or other person or persons shall sell, deliver, prepare, put up, expose or offer for sale, any lard, or any article intended for use as lard, which contains any ingredient but the pure fat of healthy swine, in any tierce, bucket, pail, package or other vessel or wrapper, or under any label bearing the words, "pure," "refined," "family," or either of said words alone, or in combination with other words of like import, unless every tierce, bucket, pail, package or other vessel, wrapper or label, in or under which said article is sold, delivered, prepared, put up, exposed or offered for sale, bears on the top or outer side thereof, in letters not less than one-half inch in length, and plainly exposed to view, the words "Compound Lard," and the name and proportion in pound and fractional parts thereof of each ingredient contained therein.

SEC. 2. Any person who violates any provision hereof shall be deemed guilty of a misdemeanor for each violation, and upon conviction thereof shall be fined for the first offense not less than twenty dollars nor more than fifty dollars, and every subsequent offense under this act shall be fined not less than fifty dollars nor more than one hundred dollars.

Approved March 10, 1888.

[Chapter 137, Laws of 1880.]

AN ACT to Prevent Fraud in the Sale of Lard in Certain Cases.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That all persons or associations who shall engage in the business of selling lard rendered from swine that have died of hog cholera, or other diseases, shall, before selling, or offering to sell any such lard, plainly stamp, print or write upon the cask, barrel or other vessel containing such lard, the words, "lard from hogs which have died from disease;" or, if sold without such cask, barrel or other receptacles, the purchaser shall be informed that the lard is from hogs which have died of disease.

SEC. 2. For a violation of the provisions of the foregoing section, the offender shall, on conviction thereof, be punished by a fine of not less than five dollars, nor exceeding one hundred dollars, or imprisonment in the county jail not exceeding thirty days.

Health Laws.

PROTECTION OF PUBLIC HEALTH.

[Code of 1873.]

SECTION 4085. If any person knowingly sell any kind of diseased, corrupted, or unwholesome provisions, whether for meat or drink, without making the same fully known to the buyer, he shall be imprisoned in the county jail not more than thirty days, or by fine not exceeding one hundred dollars.

SEC. 4039. If any person inoculate himself or any other person, or suffer himself to be inoculated with small pox within this State, or come within the State with the intent to cause the prevalence, or spread of this infectious disease, he shall be punished by imprisonment in the penitentiary not more than three years, or by fine not exceeding one thousand dollars and imprisonment in the county jail not exceeding one year. [Or if any person shall place, or put, or aid or abet in placing or putting any person upon any railroad car, steamboat, or other public conveyance, knowing such person to be infected with diphtheria, small pox, or scarlet fever, he shall be punished by a fine of not more than one hundred dollars, or by imprisonment in the county jail not more than thirty days.] - *Code of 1873 as amended by Chapter 102, Laws of 1884.*

SEC. 4041. If any person throw, or cause to be thrown, any dead animal into any river, well, spring, cistern, reservoir, stream or pond, he shall be punished by imprisonment in the county jail not less than ten nor more than thirty days, or by fine not less than five nor more than one hundred dollars. - *Code of 1873.*

SEC. 1539. It shall be unlawful for any person to sell, give away, by agent or otherwise, any spiritous or other intoxicating liquors, including wine or beer, to any minor for any purpose whatever, unless upon the written order of his parent, guardian or family physician, or sell the same to any intoxicated person, or to any person who is in the habit of becoming intoxicated. - *Code of 1873.*

SEC. 4064. If any person run any threshing machine in this State without having two lengths of tumbling rods next the machine, together with the knuckles, or joints and jacks of the tumbling rods safely boxed and secured while the machine is running, he shall be deemed guilty of a misdemeanor, and be punished by fine of not less than ten nor more than fifty dollars for every day or part of a day he shall violate this section; and any person who shall knowingly permit either his own grain, or any that may be in his possession, or under his control, to be threshed by a machine the rods, knuckles, or joints of which are not boxed in accordance with the requirements of this section, shall be liable to a like fine as that prescribed for the person running such machine, both of which fines may be recovered in an action brought before a court of competent jurisdiction. - *Code of 1873.*-(1)

(1) This statute does not change the rule that a plaintiff cannot recover for injuries resulting from the negligence of another person, if his own negligence in any degree contributed directly to the injury. *32 Iowa, 146.*

Health Laws.

No person shall place in any of the waters of this State any lime, ashes, drug, or medicated bait, with intent thereby to injure, poison, or catch fish. Any person violating the provisions of this section shall be fined not less than five nor more than fifty dollars for the first offense, and for the second, or any subsequent offense, not less than twenty dollars, and shall stand committed until such fine is paid.—Section 8, Chapter 50, Laws 1874.

SEC. 1. It shall be the duty of any person owning or operating steam boilers in this State to provide such boilers with steam gauge, safety-valve, and water gauge, and keep the same in good order.

SEC. 2. Any person neglecting to comply with the provisions of this act shall be deemed guilty of a misdemeanor and shall be punished by a fine not less than fifty, nor more than five hundred dollars.—Chapter 14, Laws of 1874.

SEC. 3869. If any person, with intent to produce the miscarriage of any pregnant woman, willfully administer to her any drug, or substance whatever, or with such intent use any instrument, or other means whatever, unless such miscarriage shall be necessary to save her life, he shall be imprisoned in the State prison for a term not exceeding five years, and be fined in a sum not exceeding one thousand dollars. (1.)—Code of 1873, as amended by Chapter 19, Laws of the Nineteenth General Assembly.

SEC. 3877. If any person mingle any poison with any food, drink, or medicine, with intent to kill or injure any human being, or willfully poison any spring, well, cistern, or reservoir of water, he shall be punished by imprisonment in the penitentiary not exceeding ten years, and by fine not exceeding ten thousand dollars.—Code of 1873.

SEC. 4. Any tramp who shall wantonly, or maliciously, by means of violence, threats, or otherwise, put in fear any inhabitant of this State, or who shall enter any public building, house, barn or out-building belonging to any other person, with intent to commit some unlawful act, or who shall carry any fire-arm or other dangerous weapon, or who shall indecently expose his person, or who shall be found drunk and disorderly, or shall commit any offense against the laws of this State for which no greater punishment is provided, shall be guilty of a misdemeanor and on conviction thereof, shall be punished by imprisonment at hard labor in the county jail not exceeding thirty days, or by imprisonment in such jail in solitary confinement not exceeding ten days, nor less than three days.—Chap. 43, Laws of 1890.

SEC. 8. The trustees [township] shall cause the noxious weeds growing on the highways in their township to be cut twice a year, if deemed necessary to exterminate the same, and have them cut at such times as to prevent their going to seed; and, for this purpose, the trustees may allow any land owner a reasonable compensation for destroying such weeds on the highways abutting his lands and have him credited for the same on his road tax for that year.—Chap. 200, Laws of 1884.

(1) To cause death by abortion is in this State murder, independent of as well as under the statute, though there was no intent to cause the death of the woman.

The crime of attempting to produce miscarriage of a pregnant woman, is complete if the attempt is made any time during pregnancy.

The jurisdiction is with the county in which the medicine intended to produce the miscarriage was administered, and not in that where the miscarriage took place. 25 Iowa, 128; 36 Iowa, 112; 40 Iowa, 230.

Health Laws.

TOY PISTOLS.

[Chapter 78, Laws of Twentieth General Assembly.]

AN ACT to Prohibit the Selling or Giving Fire Arms to Miners.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That it shall be unlawful for any person to knowingly sell, present or give any pistol or revolver, or toy pistol to any minor.

SEC. 2. Any violation of this act shall be punishable by a fine of not less than twenty-five, nor more than one hundred dollars, or by imprisonment in the county jail of not less than ten, nor more than thirty days.

Approved, March 29, 1884.

EFFECTS OF ALCOHOL AND STIMULANTS UPON THE HUMAN SYSTEM.

[Chapter 1, Laws of 1886.]

AN ACT to Provide for the Teaching and Study of Physiology and Hygiene with special reference to the Effects of Alcoholic Drinks, Stimulants and Narcotics upon the Human System, in the Public Schools and Educational Institutions of the State.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That physiology and hygiene, which must in each division of the subject thereof include special reference to the effects of alcoholic drinks, stimulants and narcotics upon the human system, shall be included in the branches of study now and hereafter required to be regularly taught to and studied by all pupils in common schools and in all normal institutes, and normal and industrial schools and the schools at the Soldiers' Orphans' Home, and the Home for Indigent Children.

SEC. 2. It shall be the duty of all boards of directors of schools and of boards of trustees, and of county superintendents in the case of normal institutes, to see to the observance of this statute and make provision therefor, and it is especially enjoined on the county superintendent of each county that he include in his report to the superintendent of public instruction the manner and extent to which the requirements of section one of this act are complied with in the schools and institutes under his charge, and the secretary of school boards in cities and towns is especially charged with the duty of reporting to the superintendent of public instruction as to the observance of said section one hereof, in their respective town and city schools, and only such schools and educational institutions reporting compliance, as above required, shall receive the proportion of school funds or allowance of public money to which they would be otherwise entitled.

SEC. 3. The county superintendent shall not after the 1st day of July, 1887, issue a certificate to any person who has not passed a satisfactory examination in physiology and hygiene with especial reference to the effects of alcoholic drinks, stimulants and narcotics upon the human system, and it shall be the duty of the

Health Laws.

county superintendent as provided by section 1771 to revoke the certificate of any teacher required by law to have a certificate of qualification from the county superintendent if the said teacher shall fail or neglect to comply with section one of this act, and said teacher shall be disqualified for teaching in any public school for one year after such revocation, and shall not be permitted to teach without compliance.

Approved February 17, 1886.

BARBED WIRE AROUND SCHOOL HOUSES.

[Chapter 103, Laws of 1884.]

AN ACT to Prohibit the Use of Barbed Wire in Enclosing Public School Grounds.
Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. It is hereby made the duty of the board of directors of every independent district, and of every district township, to remove before the first day of September, 1884, any barb wire fence enclosing in whole or in part any public school grounds in such district, and it is also made the duty of any person owning or controlling any barbed wire fence within ten feet of any public school grounds to remove the same within the time herein named.

SEC. 2. Hereafter barbed wire shall not be used in enclosing in whole or in part any public school building or the grounds upon which the same may stand; and no barbed wire shall be used for a fence or other purpose within ten feet of any public school grounds.

SEC. 3. For failure or neglect on the part of any board of directors of any independent district or of any district townships to carry out the provisions of this act any member of such board shall be fined on conviction not exceeding twenty-five dollars, any person violating the provision of this act shall on conviction thereof, be fined not exceeding twenty-five dollars.

Approved March 29, 1884.

TO PREVENT RAILROAD ACCIDENTS.

[Chapter 148, Laws of 1876.]

AN ACT to Diminish Liability to Railroad Accidents, and to Punish Interference with, and Injury to, the Property of Railroad Companies.

SECTION 1. *Be it enacted by the General Assembly of the State of Iowa:* If any person shall throw any stone, or any substance of any nature whatever, or shall present or discharge any gun, pistol or other fire-arm at any railroad train, cars or locomotive engine, he shall be deemed guilty of a misdemeanor and be punished accordingly.

SEC. 2. If any person not employed thereon, or not an officer of the law in the discharge of his duty, without the consent of the person having the same in charge, shall get upon, or off, any locomotive engine or car of any railroad com-

Health Laws.

pany, while said engine or car is in motion; or elsewhere than at the established depots of such company, or shall get upon, cling to, or otherwise attach himself to any such engine or car, for the purpose of riding upon the same, intending to jump therefrom when such engine or car is in motion, he shall be guilty of a misdemeanor, and be punished by fine not exceeding one hundred dollars, or by imprisonment not exceeding thirty days.

[Chapter 112, Laws of 1882.]

AN ACT to Further Diminish Liability to Railroad Accidents, etc.

SECTION 1. *Be it enacted by the General Assembly of the State of Iowa:* If any person shall willfully and maliciously uncouple or detach the locomotive or tender, or any of the cars of any railroad train, or shall in any manner aid, abet or procure the doing of the same, such person shall be punished by imprisonment in the State penitentiary not exceeding five years, or by fine not exceeding one thousand dollars, or both, at the discretion of the court.

SEC. 2. If any person shall unlawfully seize upon any locomotive, with, or without any express, mail, baggage, or other car attached thereto and run the same upon any railroad, or shall aid, abet or procure the doing of the same, such person shall be punished by imprisonment in the State penitentiary not exceeding ten years, or by fine not exceeding two thousand dollars, or both, at the discretion of the court.

SEC. 3. If any person shall, without permission from the proper authority, wrongfully take, or run any hand car upon any railroad in this State, he shall be deemed guilty of a misdemeanor, and on conviction thereof shall be fined not more than one hundred dollars, or imprisoned not more than thirty days at the discretion of the court; *provided*, that if by such unlawful use of any hand car, any locomotive or car is thrown from the track, or a collision be produced, or any person injured thereby, he shall on conviction, be imprisoned in the penitentiary for a term of not more than five years; *and provided further*, that if by reason of such unlawful use of any hand car, any person is killed, such person so offending shall be deemed guilty of manslaughter.

SEC. 4. If any person not an employe upon the railroad shall wrongfully interfere with any automatic brake or bell rope upon any railroad car, or use the same for the purpose of stopping or in any way controlling the movement of the train [he] shall be subject to the penalty provided in section three of this act for the unlawful running of a hand car on any railroad; and any railroad conductor or brakeman on a railroad train shall have power to arrest such person so offending, and deliver him to some peace officer on the line of the railroad.

[Chapter 104, Laws of 1884.]

AN ACT Concerning Bells and Steam Whistles on Locomotives.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That a bell and a steam whistle shall be placed on each locomotive engine operated on any railway in this State, and said whistle shall be

Health Laws.

twice sharply sounded at least sixty rods before a highway crossing is reached, and after the sounding of the whistle the bell shall be rung continuously until the crossing is passed; *provided*, that at street crossings within the limits of incorporated cities or towns, the sounding of the whistle may be omitted, unless required by the council of the city or town, and the company shall also be liable for all damages which shall be sustained by any person by reason of such neglect.

SEC. 2. Every officer or employe of any railroad company who shall violate any of the provisions of this act shall be punished by fine not exceeding one hundred dollars for each offense.

Approved March 29, 1884.

[Chapter 163, Laws of 1884.]

AN ACT to Prevent Accidents at Railway Crossings.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. All trains run upon any railroad in this State, which intersects or crosses, or is intersected or crossed, by any other railroad upon the same level, shall be brought to a full stop at a distance not less than two hundred feet, nor more than eight hundred feet, from the point of intersection or crossing of such road, before such intersection or crossing is passed by any such train.

SEC. 2. Every engineer violating the provisions of the preceding section shall for each offense forfeit one hundred dollars to be recovered in an action in the name of the State of Iowa, for the benefit of the school fund, and the corporation on whose road such offense is committed, shall forfeit for each offense so committed, the sum of two hundred dollars to be recovered in a like manner.

Approved April 5, 1884.

[Chapter 18, Laws of 1890.]

AN ACT Requiring all Railroads, Corporations, Companies and Persons, Operating a Railroad and Doing Business in Iowa, to Equip all their Engines and Cars with Proper, Efficient and Safe Automatic Couplers and Brakes, and for Prescribing Penalties for Failure thereof.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That it shall be unlawful for any corporation, company or person operating any line of railroad in this State, any car manufacturers or transportation company using or leasing cars, to put in use in this State any new cars or any cars that have been sent into the shop or shops for general repairs, or whose draft rigging has to be repaired with a new draw-bar or bars, that are not equipped with safety or automatic couplers to draw-bars, such as will not necessitate the going between the ends of the cars to couple or uncouple them, but operated from the side of the car.

SEC. 2. That after January 1, 1895, it shall be unlawful for any corporation, company or persons operating a railroad, or any transportation company using or leasing cars of any description and used in the commerce of the country, or in the

Health Laws.

construction of railroads, to have upon any railroad in Iowa, for use in the transportation of freight or passengers, any car that is not equipped with such safety automatic coupler as provided for in section 1 of this act.

SEC. 3. That it shall be unlawful for any corporation, company or person operating any line of railroad in this State, to use any locomotive engine upon any railroad or in any railroad yard in this State after the First Day of January, 1892, that is not equipped with a proper and efficient power brake, commonly called a "driver brake."

SEC. 4. That it shall be unlawful for any corporation, company or person operating a line of railroad in this State, to run any train of cars after the First Day of January, 1893, that shall not have in that train a sufficient number of cars with some kind of efficient automatic or power brakes so that the engineer upon the locomotive can control the train without requiring brakemen to go between the ends or on the top of the cars to use, as now, the common hand brake.

SEC. 5. Every railroad corporation, company or person operating a railroad in this State, and every person or persons using or leasing cars in the transportation business, or in building railroads, shall, and are by this act required to include in their annual report to the State railroad commissioners the number of locomotive engines and cars used in this State and what number is equipped with automatic power brakes and what number of cars equipped with automatic safety couplers and the kind of brakes and couplers used and the number of each kind, when more than one kind is used.

SEC. 6. Any corporation, company or person operating a railroad in this State, and using a locomotive engine, or running a train of cars, or using any freight, way or other car, contrary to the provisions of this act, shall be deemed guilty of a misdemeanor, and shall be subject to a fine of not less than five hundred dollars, or not more than one thousand dollars, for the benefit of the school fund, for each and every offense, provided the penalties on this section shall not apply to companies in hauling cars belonging to railroads other than those of this State, which are engaged in inter-state traffic, and any railroad employe who may be injured by the running of such engine, or train, or car contrary to the provisions of this law, shall not be considered as waiving his right to recover damage by continuing in the employ of such corporation, company or person running such engine or trains, or cars contrary to this law.

Approved, April 5, 1890.

REGULATING THE PRACTICE OF MEDICINE.

[Chapter 104, Laws of 1886.]

AN ACT to Regulate the Practice of Medicine and Surgery in the State of Iowa.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That every person practicing medicine, surgery or obstetrics in any of their departments, within this State, shall possess the qualifications required by this act. If a graduate in medicine, such person shall present his or her diploma.

Health Laws.

to the State board of examiners, for verification as to its genuineness. If the diploma is found genuine, and is issued by a medical school legally organized and of good standing, of which the State board of examiners shall determine, and if the person presenting and claiming such diploma be the person to whom the same was originally granted, then the State board of examiners shall issue its certificates to that effect, signed by not less than five physicians thereof, representing one or more physicians of the schools on the board, and such certificate shall be conclusive as to the right of the lawful holder to practice medicine, surgery and obstetrics within this State. If not a graduate, the person practicing medicine or surgery within this State, unless he or she shall have been in continuous practice in this State for a period of not less than five years, of which he or she shall present to the State board of examiners satisfactory evidence in the form of affidavits, shall appear before said State board of examiners, and submit to such examination as said board may require. All examinations shall be conducted in writing, and all examination papers, together with the reports, and action of the examiners thereon, shall be preserved as the records of said board for a period of five years, during which time they shall remain open for inspection at the office of said State board of examiners. Such examinations shall be in anatomy, physiology, general chemistry, pathology, therapeutics and the principles and practice of medicine, surgery and obstetrics. *Provided*, that each applicant upon receiving from the secretary of the board an order for an examination shall receive also a confidential number, which he or she shall place upon his or her examination papers, so that when said papers are passed upon by the examiners, the latter shall not know by what applicant said papers have been prepared. That upon each day of examination all candidates be given the same set or sets of questions. It is further provided that the examination papers shall be marked upon the scale of one hundred (100), and that in order to secure a license it shall be necessary for the applicant to attain such average as shall hereafter be determined by the State board of examiners, and if such examination be satisfactory to at least five physicians of said board, representing the different schools of medicine on the board, the board shall issue a certificate which shall entitle the lawful holder thereof to all the rights and privileges herein provided, and the physicians and the secretary of the State Board of Health shall constitute and be deemed a board of examiners for the purpose of this act.

SEC. 2. The State board of examiners shall procure a seal within sixty days after the passage of this act, and through the secretary of said board shall receive applications for certificates and examinations. The president, or any member of the board, shall have the authority to administer oaths and take testimony in all matters relating to their duties as examiners aforesaid. The board shall provide three forms of certificates; one for persons in possession of genuine diplomas, one for candidates examined by the board, and one for persons who have practiced medicine or surgery in any of its departments for five years as provided in this act. Said certificates shall be signed by not less than five physicians of the board, and this number may act in the capacity of an examining board in the absence of the full board: *Provided* that one or more members of the different schools of medicine represented in the State Board of Health shall also be represented in the board of examiners. The board of examiners shall hold meetings at

Health Laws.

such places as will best accommodate applicants residing in different portions of the State, and at any such time as they shall deem best, and due notice of the time and place of such meetings shall be published.

SEC. 3. The board shall examine all diplomas submitted to them for such purpose to determine their genuineness and the rightful ownership of the person presenting the same. The affidavit of the applicant and holder of any diploma that he or she is the person therein named, and is the lawful possessor thereof, shall be necessary to verify the same, with such other testimony of [as] the board may require. Diplomas and accompanying affidavits may be presented in person or by proxy. If the diploma shall be found genuine, and in possession of the person to whom it was issued, the State board of examiners shall, upon the payment of a fee of two dollars, to the secretary of the board, issue a certificate to the holder of such diploma, and no further fee or sum shall be demanded or collected from said applicant by said board for such certificate. If the diploma shall be found to be fraudulent, or not lawfully in possession of the holder or owner thereof, the person presenting such diploma or holding or claiming possession thereof, shall be deemed guilty of a misdemeanor, and on conviction thereof, before any court of competent jurisdiction, be fined not less than twenty dollars nor more than one hundred dollars.

SEC. 4. Every person holding a certificate issued by the State board of examiners, shall, within sixty days after the date of such certificate, have the same recorded in the office of the county recorder in the county wherein he resides, and should he remove from one county to another to practice medicine, surgery or obstetrics, his certificate must be recorded in the county to which he removes. The county recorder shall endorse upon the certificate the date of record, and he shall be entitled to charge and receive a fee of fifty cents for his services, the fee to be paid by the applicant.

SEC. 5. The county recorder shall record in a book provided for that purpose, a complete list of the certificates presented for record, and the date of their issue by the State board of examiners. If the certificate is issued by reason of a diploma, the name of the medical college conferring the same, and the date when conferred shall be recorded; and when such certificate shall have been granted upon the examination of the board, or because of five years' practice in the State, such fact shall be recorded. Said records shall be open for inspection during business hours.

SEC. 6. Candidates for examination shall pay in advance to the secretary of the State board of examiners, a fee of ten dollars, which fee, together with the fees received for certificates, shall defray the entire expense of the aforesaid board of examiners, and the balance shall be turned over to the State treasurer for the benefit of the school fund, except such an amount as will pay each member of the board ten dollars (\$10) per day during the time he is in actual attendance upon the session of the said board for the purpose of performing the duties required of him under this act, and, as will pay the secretary of the board such a salary as they may allow, not to exceed five dollars per day during the time he is actually engaged in performing the work of the board under this act, and each member of the board of examiners shall also receive a sufficient amount to defray his actual and necessary expenses while in discharge of the duties herein provided. Any one failing to pass the required examination shall be entitled to a second examination

Health Laws.

within twelve months without fee, *provided*, that any applicant for examination by notice in writing to the secretary shall be entitled to an examination within three months from the time of said notice and a failure to give such opportunity, shall entitle such applicant to practice without the certificate required by this act until the next regular meeting of said board. [*Provided further*, the board may also issue certificates to persons, who upon application present a certificate of having passed a satisfactory examination before any other State board of medical examiners, upon the payment of the fee provided in section three.]*

SEC. 7. The State board of examiners may refuse to grant a certificate to any person who has been convicted of a felony committed in the practice of his profession, or in connection therewith, or may revoke certificates for like cause, or for palpable evidence of incompetency, and such refusal or revocation shall prohibit such person from practicing medicine, surgery or obstetrics, provided, such refusal or revocation of a certificate can only be made with the affirmative vote of at least five physicians of the State board of examiners, in which number shall be included one or more members of the different schools of medicine represented in said board; and provided further, that the standing of a legally chartered medical college, from which a diploma may be presented, shall not be questioned, except by a like vote.

SEC. 8. Any person shall be deemed as practicing medicine, surgery or obstetrics or to be a physician within the meaning of this act, who shall publicly profess to be a physician, surgeon or obstetrician, and assume the duties, who shall make a practice of prescribing or of prescribing and furnishing medicine for the sick, or who shall publicly profess to cure or heal, by any means whatsoever, but nothing in this act shall be construed to prohibit students of medicine, surgery or obstetrics from prescribing under the supervision of preceptors, or gratuitous service in case of emergency, nor shall this act extend to prohibit women who are at this time engaged in the practice of midwifery nor to prevent the advertising, selling or prescribing natural mineral waters flowing from wells or springs nor shall this act apply to surgeons of the United States army or navy, marine hospital service, nor to physicians as defined herein who have been in practice in this State for five consecutive years, three years of which time shall have been in one locality; *provided*, such physician shall furnish the State board of examiners satisfactory evidence of such practice, and shall procure the proper certificate, as provided in this act, and for which certificate such physician shall pay the secretary of the State board of examiners a fee of two dollars, and said board shall issue to the applicant such certificate, nor shall this apply to registered pharmacists when filling prescriptions, nor shall it be construed to interfere with the sale of patent or proprietary medicines in the regular course of trade.

SEC. 9. Any person who shall practice medicine or surgery within this State, without having complied with the provisions of this act, and who is not embraced in any of the exceptions, or after being prohibited from so doing as provided in section 7 of this act, shall be deemed guilty of a misdemeanor, and shall on conviction thereof, be punished by a fine of not less than fifty nor more than one hundred dollars, or by imprisonment in the county jail not less than ten days nor more than thirty days.

*Amended by Chapter 66, Laws of 1888.

Health Laws.

SEC. 10. Any person who shall file, or attempt to file, with the State board of examiners, as his or her own, the diploma of another person, or who shall file, or attempt to file with the county recorder the certificate of another person, as his or her own, or who shall file or attempt to file a diploma or certificate with the true name erased therefrom and the claimant's name inserted, or who shall file or attempt to file any forged affidavit or identification, shall be deemed guilty of the crime of forgery.

SEC. 11. The penalties, as provided by this act; or violation thereof, shall not be enforced prior to the first day of January, A. D. 1877.

SEC. 12. All acts and parts of acts in conflict with this act are hereby repealed.

TO REGULATE THE PRACTICE OF DENTISTRY.

[Chap. 36, Laws of 1882.]

AN ACT to Insure the Better Education of Practitioners of Dentistry in the State of Iowa.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That it shall be unlawful for any person who is not at the time of the passage of this act engaged in the practice of dentistry in the State, to commence such practice unless such person shall have received a license from the board of examiners, or some member thereof as hereinafter provided, or a diploma from the faculty of some reputable dental college, duly authorized by the laws of the State, or by some other of the United States, or by the laws of some foreign country in which college or colleges there was at the time of the issue of such diploma annually delivered a full course of lectures and instructions in dental surgery.

SEC. 2. A board of examiners is hereby created, whose duty it shall be to carry out the purpose and enforce the provisions of this act. The members of such board shall be appointed by the governor, and shall consist of five practicing dentists, who shall have been engaged in the continuous practice of dentistry in the State for five years or over, at the time of or prior to the passage of this act. The term for which the members of said board shall hold their office shall be five years, except that the members of the board first appointed under this act shall hold their office for the term of one, two, three, four and five years, respectively, and until their successors shall be duly appointed. In case of vacancy occurring in said board, such vacancy may be filled by the governor.

SEC. 3. Said board shall choose one of its members president, and one the secretary thereof; and it shall meet at least once in each year, and as much oftener and at such time and place as it may deem necessary. A majority of said board shall at all times constitute a quorum, and the proceedings thereof shall at all reasonable times be open to public inspection.

SEC. 4. It shall be the duty of every person who is engaged in the practice of dentistry in this State, within six months of the taking effect of this act, to cause his or her name and residence, or place of business, to be registered with the said board of examiners, who shall keep a book for that purpose, and every person who

Health Laws.

shall so register with said board as a practitioner of dentistry, may continue to practice the same as such without incurring any of the liabilities or penalties of this act.

SEC. 5. No person whose name is not registered on the books of said board as a regular practitioner of dentistry, within the limits prescribed in the preceding section, shall be permitted to practice dentistry in this State until such person shall have been duly examined by said board and regularly licensed in accordance with the provisions of this act.

SEC. 6. Any and all persons, who shall so desire, may appear before said board at any regular meetings and be examined with reference to their knowledge and skill in dental surgery, and if such person shall be found, after having been so examined, to possess the requisite qualifications, said board shall issue a license to such person to practice dentistry in accordance with the provisions of this act. But said board shall at all times issue to any regular graduate of any reputable dental college without examination, upon the payment by such graduate to said board of a fee of one dollar. All licenses issued by said board shall be signed by the members thereof and be attested by the president and secretary; and such license shall be *prima facie* evidence of the right of the holder to practice dentistry in the State of Iowa.

SEC. 7. Any member of said board shall issue a temporary license to any applicant upon the presentation by such applicant of evidence of the necessary qualification to practice dentistry; and such temporary license shall remain in force until the next regular meeting of said board occurring after the date of such temporary license, and no longer.

SEC. 8. Any person who shall violate any of the provisions of this act shall be liable to prosecution before any court of competent jurisdiction, upon information, and upon conviction shall be fined not less than twenty-five dollars nor more than fifty dollars for each offense.

SEC. 9. In order to provide the means for carrying out and maintaining the provisions of this act, the said board of examiners may charge each person applying to, or appearing before them for examination for license to practice dentistry, a fee of two dollars, and out of the funds coming into the possession of the board from the fee so charged, the members of said board may receive as compensation the sum of five dollars for each day actually engaged in the duties of their office. And no part of the salary or other expenses of the board shall ever be paid out of the State treasury. All moneys received in excess of said per diem allowance shall be held by the secretary of said board, he giving such bond as the board shall from time to time direct. The said board shall make an annual report of its proceedings to the governor, by the fifteenth of November of each year, together with an account of all moneys received and disbursed by them pursuant to this act.

SEC. 10. Any person who shall be licensed by said board to practice dentistry, shall cause his or her license to be registered with the county clerk of any county in which such person may desire to engage in the practice of dentistry; and the county clerks of the several counties in the State shall charge for registering such license a fee of twenty-five cents for each registration. Any failure, neglect or refusal on the part of any person holding such license, to register the same with the county clerk as above directed, for a period of six months, shall work a forfeiture

Health Laws.

of the license; and no license, when once forfeited, shall be restored except upon the payment to the said board of examiners of the sum of twenty-five dollars as a penalty for such neglect, failure or refusal.

SEC. 11. Nothing in this act shall be construed to prevent persons from extracting teeth.

IOWA PHARMACY LAW.

CHAPTER 75.

ACTS OF THE EIGHTEENTH GENERAL ASSEMBLY AS AMENDED BY CHAPTER 137, ACTS OF THE NINETEENTH GENERAL ASSEMBLY, CHAPTER 83, ACTS OF THE TWENTY-FIRST GENERAL ASSEMBLY, CHAPTERS 71, 81, AND 106, ACTS OF THE TWENTY-SECOND GENERAL ASSEMBLY, AND CHAPTER 36, ACTS OF THE TWENTY-THIRD GENERAL ASSEMBLY, TO REGULATE THE SALE OF MEDICINES AND POISONS.

AN ACT to Regulate the Practice of Pharmacy, and the Sale of Medicines and Poisons.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That from and after the passage of this act it shall be unlawful for any person, not a registered pharmacist within the meaning of this act, to conduct any pharmacy, drug store, apothecary shop or store for the purpose of retailing, compounding or dispensing medicines or poisons, and any person violating the provisions of this section shall be liable to pay a penalty of five dollars for each day of such violation and cost of prosecution. Suits brought to recover any of the penalties provided for in this act (chapter 71, laws of 1888) or the acts to which it is amendatory, shall be instituted in the name of the State of Iowa by the county attorney, or under the direction and by the authority of the Commissioners of Pharmacy for the State of Iowa. In all cases brought under this act (chapter 71, laws of 1888), or the acts to which it is amendatory, the prosecution need not prove that the defendant has not the required pharmacy certificate of registration; if the defendant has such certificate he must produce it.

SEC. 2. That it shall be unlawful for the proprietor of any store or pharmacy to allow any person except a registered pharmacist to compound or dispense the prescriptions of physicians, or to retail or dispense poisons for medical use, except as an aid to, and under the supervision of, a registered pharmacist. Any person violating the provisions of this section shall be deemed guilty of a misdemeanor, and, on conviction thereof, shall be liable to a fine of not less than twenty-five dollars, nor more than one hundred dollars, for each and every such offense.

SEC. 3. The Governor, with the advice of the Executive Council, shall appoint three persons from among the most competent pharmacists of the State, all of whom shall have been residents of the State for five years, and of at least five years' practical experience in their profession, who shall be known and styled as Commissioners of Pharmacy for the State of Iowa; one of whom shall hold his office for one year, one for two years, and the other for three years, and each until his successor shall be appointed and qualified; and each year thereafter another Commissioner shall be so appointed for three years, and until a successor be appointed and

Health Laws.

quashed. If a vacancy occur in said Commission, another shall be appointed, as aforesaid, to fill the unexpired term thereof. Said Commissioners shall have power to make by-laws and all necessary regulations for the proper fulfillment of their duties under this act, without expense to the State. Except that the Secretary of State is authorized to furnish said Commissioners with stationery and blanks necessary for their office. And said Commissioners are authorized to administer oaths and take and certify the acknowledgements of instruments in writing.

SEC. 4. The Commissioners of Pharmacy shall register in a suitable book, the names and places of residence of all persons to whom they issue certificates, and dates thereof. Druggists and pharmacists who were registered without examination shall not forfeit their registration when they have voluntarily sold, parted with, or severed their connections with the drug business for a period of two years at the place designated in certificate of registration. Should such party wish to re-engage in the practice of pharmacy, he will not be required to be registered by examination as per section 5. Provided, that registered pharmacists who remove to another locality and re-engage in the practice of pharmacy within a period of two years, and have paid to the Commission of Pharmacy the sum of one dollar on or before the 22d day of March of each year, as provided in this chapter, such registered pharmacists shall not be required to register by examination, but his former registration shall be in full force and effect. Every registered pharmacist who desires to continue his profession shall, on or before the 22d day of March of each year, pay to the commission of pharmacy the sum of one dollar, for which he shall receive a renewal of his certificate, unless his name has been stricken from the register for violation of law. It shall be the duty of each registered pharmacist, before changing the locality as designated in his certificate of registration, to notify the secretary of the Commission of Pharmacy of his new place of business, and for recording the same and certification thereto the secretary shall be entitled to receive fifty cents for each certificate. It shall be the duty of every registered pharmacist to conspicuously post his certificate of registration in his place of business. Any person continuing in business, who shall fail or neglect to procure his annual renewal of registration, or who shall change his place of business without complying with this section, or who shall fail to conspicuously post his certificate of registration in his place of business, shall for each such offense be liable to a fine of ten dollars for each calendar month during which he is so delinquent.

SEC. 5. That the said Commissioners of Pharmacy shall, upon application, and at such time and place and in such manner as they may determine, examine, either by a schedule of questions to be answered and subscribed to under oath, or orally, each and every person who shall desire to conduct the business of selling at retail, compounding or dispensing drugs, medicines or chemicals for medicinal use, or compounding or dispensing physicians' prescriptions as pharmacists, and if a majority of said Commissioners shall be satisfied that said person is competent and fully qualified to conduct said business of compounding or dispensing drugs, medicines or chemicals for medicinal use, or to compound and dispense physicians' prescriptions, they shall enter the name of such person as a registered pharmacist in the book provided for in section 4 of this act; and that all graduates in pharmacy, having a diploma from an incorporated college or school of pharmacy that requires a practical experience in pharmacy of not less than four years before granting a

Health Laws.

diploma, shall be entitled to have their names registered as pharmacists by said Commissioners of Pharmacy without examination.

SEC. 6. That the Commissioners of Pharmacy shall be entitled to demand and receive from each person whom they register and furnish a certificate as a registered pharmacist, without examination, the sum of two dollars; and from each and every person whom they examine orally, or whose answers to a schedule of questions are returned subscribed to under oath, the sum of five dollars, which shall be in full for all services. And in case the examination of said person shall prove defective and unsatisfactory, and his name not be registered, he shall be permitted to present himself for re-examination within any period not exceeding twelve months next thereafter, and no charge shall be made for such re-examination.

SEC. 7. Every registered pharmacist shall be held responsible for the quality of all drugs, chemicals and medicines he may sell or dispense, with the exception of those sold in the original packages of the manufacturer, and also those known as "patent medicines," and should he knowingly, intentionally and fraudulently adulterate, or cause to be adulterated, such drugs, chemicals or medical preparations, he shall be deemed guilty of a misdemeanor, and, upon conviction thereof, be liable to a penalty not exceeding one hundred dollars, and in addition thereto, his name be stricken from the register.

SEC. 8. Pharmacists whose certificates of registration are in full force and effect, shall have the sole right to keep and to sell under such regulations as have been or may be established from time to time by the Commissioners of Pharmacy, all medicines and poisons, excepting intoxicating liquors.

SEC. 9. It shall be unlawful for any person, from and after the passage of this act, to retail any poisons enumerated in schedules "A" and "B," except as follows:

SCHEDULE A.

Arsenic, and its preparations, corrosive sublimate, white precipitate, red precipitate, biniodide of mercury, cyanide of potassium, hydrocyanic acid, strychnia, and all other poisonous vegetable alkaloids, and their salts, essential oil of bitter almonds, opium and its preparations, except paregoric and other preparations of opium containing less than two grains to the ounce.

SCHEDULE B.

Aconite, belladonna, colchicum, conium, nux vomica, henbane, savin, ergot, cotton root, cantharides, creosote, digitalis, and their pharmaceutical preparations, croton oil, chloroform, chloral hydrate, sulphate of zinc, mineral acids, carbolic acid and oxalic acid, without distinctly labeling the box, vessel or paper in which the said poison is contained, and also the outside wrapper or cover, with the name of the article, the word, "poison," and the name and place of business of the seller. Nor shall it be lawful for any person to sell or deliver any poison enumerated in schedules "A" and "B" unless, upon due inquiry, it be found that the purchaser is aware of its poisonous character, and represents that it is to be used for a legitimate purpose. Nor shall it be lawful for any registered pharmacist to sell any poisons included in schedule "A" without, before delivering the same to the purchaser,

Health Laws.

causing an entry to be made, in a book kept for that purpose, stating the date of sale, the name and the address of the purchaser, the name of the poison sold, the purpose for which it is represented by the purchaser to be required, and the name of the dispenser, each book to be always open for inspection by the proper authorities, and to be preserved for at least five years. The provisions of this section shall not apply to the dispensing of poisons, in not unusual quantities or doses, upon the prescriptions of practitioners of medicine. Nor shall it be lawful for any licensed or registered druggist or pharmacist to retail, or sell, or give away, any alcoholic liquors or compounds as a beverage, and any violations of the provisions of this section shall make the owner or principal of said store or pharmacy liable to a fine of not less than twenty-five dollars, and not more than one hundred dollars, to be collected in the usual manner; and, in addition thereto, for repeated violations of this section, his name shall be stricken from the register.

SEC. 10. Any itinerant vender of any drug, nostrum, ointment or appliance of any kind, intended for the treatment of diseases or injury, who shall, by writing or printing, or any other method, publicly profess to cure or treat diseases, or injury, or deformity, by any drug, nostrum, or manipulation, or other expedient, shall pay a license of one hundred dollars per annum, to be paid to the treasurer of the Commission of Pharmacy. Whereupon the secretary of said Commission shall issue such license for one year. Any person violating this section shall be deemed guilty of a misdemeanor, and shall, upon conviction, pay a fine of not less than one hundred nor more than two hundred dollars all moneys received for license to be reported to the Auditor of State. The sum of two thousand dollars per year, or as much thereof as may be necessary, is hereby appropriated out of the moneys so received for licenses for the expenses of said Commission, all exceeding said amount to be paid into the State treasury.

SEC. 11. That any person who shall procure, or attempt to procure, registration for himself or for another under this act, by making, or causing to be made, any false representations, shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof, be liable to a penalty of not less than twenty-five nor more than one hundred dollars, and the name of the person so fraudulently registered shall be stricken from the register. Any person, not a registered pharmacist, as provided for in this act, who shall conduct a store, pharmacy, or place for retailing, compounding or dispensing drugs, medicines or chemicals, for medicinal use, or for compounding or dispensing physicians' prescriptions, or who shall take, use or exhibit the title of registered pharmacist, shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be liable to a penalty of not less than fifty dollars nor more than two hundred dollars.

SEC. 12. Physicians dispensing their own prescriptions only, are not required to be registered pharmacists. Provided, that nothing in this act (chapter 83, laws 1886) shall prevent any person not a registered pharmacist or not holding a permit, from keeping and selling proprietary medicines, and such other domestic remedies as do not include any intoxicating liquors or poisons. Nor from selling concentrated lye and potash, provided, however, that if any person sell or deliver said concentrated lye or potash, without having the word "poison" and the true name thereof written or printed upon a label attached to the vial, box, or parcel containing the same, shall be punished by imprisonment in the county jail not more than

Health Laws.

thirty days, or by fine not exceeding one hundred dollars, but they shall not be compelled to register the sales of said lye and potash as required by section 4038, Code of 1873.

SEC. 13. This act, being deemed of immediate importance, shall take effect from and after its publication in the Iowa State Register and Iowa State Leader, newspapers published at Des Moines, Iowa.

SEC. 14. All acts and parts of acts in conflict with this act are hereby repealed. Original act, chapter 75, approved March 22, 1880, published in the Iowa State Leader, March 27, 1880, and in the Iowa State Register, March 31, 1880.

IOWA MINING LAWS.

[Chapter 140, Laws of 1886.]

PROVIDING FOR MINE INSPECTORS, THEIR APPOINTMENT, DUTIES AND COMPENSATION.

AN ACT to Repeal Sections 1, 2, 3, 4, 5 and 6, of Chapter 21, Acts of the Twentieth General Assembly, and enact substitutes therefor providing for Mine Inspectors, their manner of appointment, compensation and defining their duties and terms of office.

Be it enacted by the General Assembly of the State of Iowa.

SECTION 1. That there shall be appointed by the Governor with the advice and consent of the Senate three Inspectors of Mines, who shall hold their offices for two years, the said Inspectors subject however to be removed by the Governor for neglect of duty or malfeasance in office. Said term of office shall commence on the first day of April of each even numbered year. Said Inspectors shall have a theoretical and practical knowledge of the different systems of working and ventilating coal mines and of the nature and properties of the noxious and poisonous gases of mines and of mining engineering, and said Inspectors before entering upon the discharge of their duties shall take an oath or affirmation to discharge the same faithfully and impartially, which oaths or affirmations shall be endorsed upon their commissions, and their commissions so endorsed shall be forthwith recorded in the office of the Secretary of State, and such Inspectors shall each give bonds in the sum of two thousand (2,000) dollars, with sureties, to the approval of the Governor, conditioned for the faithful discharge of their duties.

The State shall be divided into districts. The Governor shall divide the State into inspection districts and shall assign the Inspectors to duty in such place or district as he shall deem proper.

SEC. 2. Said Inspectors shall give their whole time and attention to the duties of their offices respectively, and shall examine all the mines in this State as often as their duties will permit, to see that the provisions of this act are obeyed, and it shall be lawful for such Inspectors to enter, inspect and examine any mine in this State and the works and machinery belonging thereto, at all reasonable times by night or day, but so as not to unnecessarily obstruct or impede the working of the mines, and to make inquiry and examination into the state and condition of the mine as to ventilation and general security as required by the provisions of this act. The Inspectors shall make a record of all examinations of mines inspected by them showing the date when made, the condition in which the mines are found, the extent to which the laws relating to

Health Laws.

mines and mining are observed or violated, the progress made in improvement and secured by the provisions of this chapter, number of accidents, injuries or deaths in or about the mines, the number of mines visited, the number of persons employed in or about the mines, together with all such facts and information of public interest concerning the condition of mines as they may think useful and proper, or so much thereof as may be of public interest to be included in their biennial report. The owner and agents of all coal mines are hereby required to furnish the means necessary for such inspection, and it shall be the duty of the

In case of accident to give notice to Inspector and to coroner of county.

persons having charge of mines whenever any loss of life shall occur by accident connected with the workings of such mine to give notice forthwith by mail or otherwise to the Inspector of mines of his district and to coroner of the county in which such mine is situated, and the coroner shall hold an inquest on the body of the person or persons whose death has been caused, and inquire carefully into the cause thereof, and shall return a copy of the verdict and all testimony to the said Inspector. No person having a personal interest in or employed in the mine where a fatal accident occurs shall be qualified to serve on the jury empaneled on the inquest, and the owner or agent of all coal mines shall report to the Inspector all accidents to miners in and around the mines, giving cause of same, such report to be made in writing and within ten days from the time any accident occurs.

SEC. 3. Said Inspectors while in office shall not act as agents or managers or mining engineers or be interested in operating any mine, and the Inspector shall

Inspector to make report to Governor.

biennially on or before the 15th day of August preceding the regular session of the General Assembly make a report to the Governor of their proceedings and the condition and operation of the mines in this State, enumerating all accidents in or about the same, and giving all such information as they may think useful and proper, and making such suggestions as they may deem important as to future legislation on the subject of mining.

SEC. 4. The inspectors provided for in this act shall each receive a salary of twelve hundred dollars (\$1,200) per annum, payable monthly, and shall be furnished with necessary stationery and actual traveling expenses, not to exceed five hundred dollars (\$500) per annum, provided that each Inspector shall file at the end of each quarter of his official year with the Auditor of State a sworn statement of his actual traveling expenses incurred in the performance of his official duty for such quarter, the said salary and expenses to be paid by the State as the salaries and expenses of other State officers are provided for. They shall have and keep an office in the Capitol at Des Moines, in which shall be kept all records, correspondence, papers, apparatus and property pertaining to their duties belonging to the State, and which shall be handed over to their successors in office. And each Inspector

Each Inspector to have a residence and office in his district.

shall, during his term of office have and keep a residence in the district to which he is assigned without expense to the State, also have and keep an office at a place designated by the Governor, accessible to railroad and telegraph in their respective districts where at reasonable times and when not actually engaged elsewhere such Inspectors shall be found.

SEC. 5. Any vacancy occurring in the office of Inspector when the Senate is not in session, either by death or resignation, removal by the Governor or otherwise, shall be filled by appointment by the Governor, which appointment shall hold good until his successor is appointed and qualified.

Health Laws.

SEC. 6. There shall be provided for such Inspectors all instruments necessary for the discharge of their duties under this act, which shall be paid for by the State on the certificate of the Inspectors and shall be the property of the State.

TO REGULATE COAL MINES.

[Chapter 21, Laws of 1884, as amended by Chapter 46, Laws of 1886; Chapter 52 Laws of 1888; and Chapter 46, Laws of 1890.]

AN ACT to Repeal Sections 1, 2, 3, 4, 5 and 6, of Chapter 21, Acts of the Twentieth General Assembly, and enact substitutes therefor, providing for Mine Inspectors, their manner of appointment, compensation, and defining their duties and terms of office.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That there shall be appointed by the governor, with the advice and consent of the senate, three inspectors of mines, who shall hold their offices for two years, the said inspectors subject, however, to be removed by the governor for neglect of duty, or malfeasance in office. Said term of office shall commence on the first day of April of each even numbered year. Said inspectors shall have a theoretical and practical knowledge of the different systems of working and ventilating coal mines, and of the nature and properties of the noxious and poisonous gases of mines and mining engineering, and said inspectors before entering upon the discharge of their duties shall take an oath or affirmation to discharge the same faithfully and impartially, which oaths or affirmations shall be endorsed upon their commissions, and their commissions so endorsed shall be forthwith recorded in the office of the Secretary of State, and such inspectors shall each give bonds in the sum of two thousand (2,000) dollars, with sureties, to the approval of the governor, conditioned for the faithful discharge of their duties. The governor shall divide the State into inspection districts and shall assign the inspectors to duty in such place or district as he shall deem proper.

SEC. 2. Said inspectors shall give their whole time and attention to the duties of their offices respectively, and shall examine all the mines in the State as often as their duties will permit, to see that the provisions of this act are obeyed, and it shall be lawful for such inspectors to enter, inspect and examine any mine in the State and the works and machinery belonging thereto, at all reasonable times by night or by day, but so as not to unnecessarily obstruct or impede the working of the mines, and make inquiry and examination into the state and condition of the mine as to ventilation and general security as required by the provisions of this act. The inspectors shall make a record of all examinations of mines inspected by them showing the date when made, the condition in which the mines are found, the extent to which the laws relating to mines and mining are observed or violated, the progress made in improvements and secured by the provisions of this chapter, number of accidents, injuries or deaths in or about the mines, the number of mines visited, the number of persons employed in or about the mines, together with all such facts and information of public interest concerning the condition of

Health Laws.

the mines as they may think useful and proper, or so much thereof as may be of public interest to be included in their biennial report. The owner and agents of all coal mines are hereby required to furnish the means necessary for such inspection, and it shall be the duty of the persons having charge of mines whenever any loss of life shall occur by accident connected with the workings of such mine to give notice forthwith by mail or otherwise to the inspector of mines of his district and to the coroner of the county in which such mine is situated, and the coroner shall hold an inquest on the body of the person or persons whose death has been caused, and inquire carefully into the cause thereof, and shall return a copy of the verdict and all testimony to the said inspector. No person having a personal interest in or employed in a mine where a fatal accident occurs shall be qualified to serve on the jury empaneled on the inquest, and the owner or agent of all coal mines shall report to the inspector all accidents to miners in and around the mines, giving cause of same, such report to be made in writing and within ten days from the time any accident occurs.

SEC. 3. Said inspectors, while in office, shall not act as agents or managers or mining engineers, or be interested in operating any mine, and the inspector shall biennially on or before the 15th day of August preceding the regular session of the general assembly, make a report to the governor of their proceedings and the condition and operation of the mines in this State, enumerating all accidents in or about the same, and giving all such information as they may think useful and proper, and making such suggestions as they may deem important as to future legislation on the subject of mining.

SEC. 4. The inspectors provided for in this act shall each receive a salary of twelve hundred dollars (\$1,200) per annum, payable monthly, and shall be furnished with necessary stationery and actual traveling expenses, not to exceed five hundred dollars (\$500) per annum, provided that each inspector shall file at the end of each quarter of his official year, with the auditor of state, a sworn statement of his actual traveling expenses incurred in the performance of his official duty for such quarter, the said salary and expenses to be paid by the State, as the salaries and expenses of other State officers are provided for. They shall have and keep an office in the capitol at Des Moines, in which shall be kept all records, correspondence, papers, apparatus and property pertaining to their duties belonging to the State, and which shall be handed over to their successors in office. And each inspector shall, during his term of office, have and keep a residence in the district to which he is assigned, without expense to the State; also, have and keep an office at a place designated by the governor, accessible to railroad and telegraph, in their respective districts, where at reasonable times, and when not actually engaged elsewhere, such inspectors shall be found.

SEC. 5. Any vacancy occurring in the office of inspector when the senate is not in session, either by death or resignation, removal by the governor or otherwise, shall be filled by appointment by the governor, which appointment shall hold good until his successor is appointed and qualified.

SEC. 6. There shall be provided for such inspectors all instruments necessary for the discharge of their duties under this act, which shall be paid for by the State, on the certificate of inspectors, and shall be the property of the State.

SEC. 7. The agent or owner of every coal mine shall make or cause to be made

Health Laws.

an accurate map or plan of the working of such mine on a scale of not less than one hundred feet to the inch, showing the area mined or excavated. Said map or plan shall be kept at the office of such mine. The agent or owner shall, on or before the first day of September of each year, cause to be made a statement and plan of the progress of the workings of such mine up to said date, which statement and plan shall be marked on the map or plan herein required to be made; in case of refusal on the part of said owner or agent for two months after the time designated to make the map or plan, or addition thereto, the inspector is authorized to cause an accurate map or plan of the whole said mine, to be made at the expense of the owner thereof, the cost of which shall be recoverable against the owner in the name of the person or persons making said map or plan, and the owner or agent of all coal mines hereafter wrought out and abandoned, shall deliver a correct map of said mine to the inspector, to be filed in his office.

SEC. 8. It shall be unlawful for the owner or agent of any coal mine worked by a shaft to employ or permit any person to work therein, unless there are to every seam of coal worked in such mine, at least two separate outlets, separated by natural strata of not less than one hundred feet in breadth, by which shafts or outlets distinct means of ingress or egress are always available to the persons employed in the mine, but in no case shall a furnace shaft be used as an escape shaft, and if the mine is a slope or drift opening, the escape shall be separated from the other openings by not less than fifty feet of natural strata, and shall be provided with safe and available traveling ways, and the traveling ways to the escapes in all coal mines shall be kept free from water, and falls of roof, and all escape shafts shall be fitted with safe and convenient stairs, at an angle of not more than sixty degrees descent, and with landings at easy and convenient distances, so as to furnish easy escape from such mine; and all air shafts used as escapes where fans are employed for ventilation shall be provided with suitable appliances for hoisting the underground workmen, said appliances to be always kept at the mine ready for immediate use, and in no case shall any combustible material be allowed between any escape shaft and hoisting shaft, except such as is absolutely necessary for the operation of the mine, provided that where a furnace shaft is large enough to admit of being divided into an escape shaft and furnace shaft, there may be a partition placed in said shaft, properly constructed so as to exclude the heated air and smoke from the side of the shaft used as an escape shaft, such partition to be built of incombustible material for a distance of not less than fifteen feet up from the bottom thereof, and, provided that where two or more mines are connected underground, each owner may make joint provisions with the other for the use of the other's hoisting shaft or slope as an escape, and in that event the owners thereof shall be deemed to have complied with the requirements of this section, and, provided further, that in any case where the escape shaft is now situated less than one hundred feet from the hoisting shaft there may be provided a properly constructed underground traveling way from the top of the escape shaft, so as to furnish the proper protection from fire for a distance of one hundred feet from the hoisting shaft, and in that event the owner or agent of any such mine shall be deemed to have complied with the requirements of this section; and, provided further, that this act shall not apply to mines operated by slopes or drifts, openings where not more than five persons are employed therein; and, provided further, that any escapement

Health Laws.

shaft that is hereafter sunk and equipped, before said escapement shaft shall be located, or the excavation for it begun, the district inspector of mines shall be duly notified to appear and determine what shall be a suitable distance for the same. The distance from main shaft shall not be less than three hundred feet without the consent of the inspector, and no building shall be put nearer the escape shaft than one hundred feet, except the house necessary to cover the fan.

SEC. 9. In all mines there shall be allowed one year to make outlets as provided in section 8, when such mine is over two hundred feet in depth; but not more than twenty men shall be employed in such mine at any one time until the provisions of section eight are complied with; [provided that in the case of mines of over two hundred feet in depth, there shall be allowed three years on the condition that during the third year not more than ten men shall be employed in such mine at any one time, and provided further, that in cases where the two years shall already have expired, a third year shall be allowed after the taking effect of this act;] and after the expiration of the period above mentioned should said mines not have the outlets aforesaid, they shall not be operated until made to conform to the provisions of section eight. And provided further, that this act shall not apply to mines where the escape way is lost or destroyed by reason of the drawing of pillars preparatory to the abandonment of the mine; provided that not more than twenty persons shall be employed in said mine at the same time; and provided further, that ten men or less may be lawfully employed in any coal mine without reference to the provisions of this or any other act.—*Chapter 46, Laws of 1890.*

SEC. 10. The owner or agent of any coal mine, whether it be operated by shaft, slope or drift, shall provide and maintain for every such mine an amount of ventilation of not less than one hundred cubic feet of air per minute for each person employed in such mine, and not less than five hundred cubic feet of air per minute for each mule or horse employed in the same, which shall be distributed and circulated throughout the mine in such manner as to dilute, render harmless and expel the poisonous and noxious gases from each and every working place in the mine, and whenever the inspector shall find men working without sufficient air or under any unsafe conditions he shall first give the operator or his agent a reasonable notice to rectify the same and upon refusal or neglect so to do the inspector may himself order them out until said portion of said mine shall be put in proper condition, and all mines governed by the provisions of this act shall be provided with artificial means for producing ventilation, such as exhaust or forcing fans, furnaces or exhaust steam or other contrivances of such capacity and power as to produce and maintain an abundant supply of air for all the requirements of the persons employed in the mine; but in case a furnace is used for ventilating purposes it shall be built in such manner as to prevent the communication of fire to any part of the works by lining the upcast with incombustible material for a sufficient distance up from said furnace to insure safety.

SEC. 11. The owner or agent of every coal mine operated by a shaft or slope, in all cases where the human voice can not be distinctly heard, shall forthwith provide and maintain a metal tube, or other suitable means for communication from the top to the bottom of said shaft or slope, suitably calculated for the free passage of sound therein, so that communication can be held between persons at the bottom and top of the shaft, or slope, and there shall be provided a safety

Health Laws.

catch of approved pattern and a sufficient cover overhead on all carriages used for lowering and hoisting persons, and on the top of every shaft an approved safety gate, and also an approved safety spring on top of every slope, and an adequate brake shall be attached to every drum or machine used for raising or lowering persons in all shafts or slopes, and a trail shall be attached to every train used on a slope, all of said appliances to be subject to the approval of the inspector.

SEC. 12. No owner or agent of any coal mine operated by shaft or slope shall knowingly place in charge of any engine used for lowering into or hoisting out of such mine persons employed therein, any but experienced, competent, and sober engineers, and no engineer in charge of such engine shall allow any person except such as may be deputed for that purpose by the owner or agent, to interfere with it, or any part of the machinery, and no person shall interfere, or in any way intimidate the engineer, in the discharge of his duties, and the maximum number of persons to ascend out of, or descend into, any coal mine on one cage shall be determined by the inspector, but in no case shall such number exceed ten, and no person shall ride upon or against any loaded cage or car in any shaft or slope except the conductor in charge of the train.

SEC. 13. No boy under twelve years of age shall be permitted to work in any mine, and parents and guardians of boys shall be required to furnish an affidavit as to the ages of their boys when there is any doubt in regard to their age, and in all cases of miners applying for work the agent or owner of the mines shall see that the provisions of this section are not violated.

SEC. 14. In case any coal mine does not, in its appliances for the safety of the persons working therein, conform to the provisions of this act, or the owner or agent disregards the requirements of this act for twenty days after being notified by the inspector, any court of competent jurisdiction, while in session, or the judges in vacation, may, on application of the inspector, by civil action in the name of the State, enjoin or restrain by writ of injunction the said agent or owner from working or operating such mines with more persons at once than are necessary to make the improvements needed, except as provided in section eight and nine, until it is made to conform with the provisions of this act, and such remedies shall be cumulative, and shall not take the place of, or effect any other proceedings against such owner or agent authorized by law, for the matter complained of in such action, and for any willful failure or neglect to comply with the provisions of this law by any owner, lessee or operator of any coal mine or opening whereby anyone is injured, a right of action shall accrue to the party so injured for any damage he may have sustained thereby, and in case of loss of life by reason of such willful neglect or failure aforesaid, a right of action shall accrue to the widow, if living, and if not living, to the children of the person whose life shall be lost, for like recovery of damages for the injury they shall have sustained.

SEC. 15. Any miner, workman or other person who shall knowingly injure or interfere with any air-course or brattice, or obstruct or throw open doors or disturb any part of the machinery, or disobey any order given in carrying out the provisions of this act, or ride upon a loaded car or wagon in a shaft or slope, except as provided in section twelve, or do any act whereby the lives and health of the persons or the security of the mines and machinery is endangered, or if any miner or person employed in any mine governed by the provisions of this act shall neglect or

Health Laws.

refuse to securely prop or support the roof and entries under his control, or neglect or refuse to obey any order given by the superintendent in relation to the security of the mine, in the part of the mine under his charge or control, every such person shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding one hundred dollars or imprisonment in the county jail not exceeding thirty days.

SEC. 16. Whenever written charges of gross neglect of duty or malfeasance in office against any inspector shall be made and filed with the governor, signed by not less than fifteen miners or one or more operators of mines, together with a bond in the sum of five hundred dollars payable to the State and signed by two or more responsible freeholders and conditioned for the payment of all cost and expenses arising from the investigation of such charges, it shall be the duty of the governor to convene a board of examiners to consist of two practical miners, one mining engineer and two operators, at such time and place as he may deem best, giving ten days' notice to the inspector against whom charges may be made, and also the person whose name appears first in the charges, and said board when so convened and having first been duly sworn or affirmed truly to try and decide the charges made, shall summon any witness desired by either party and examine them on oath or affirmation which may be administered by any member of the board and depositions may be read on such examination, as in other cases, and report the result of their investigations to the governor; and if their report shows that said inspector has grossly neglected his duties or is incompetent or has been guilty of malfeasance in office, it shall be the duty of the governor forthwith to remove said inspector and appoint a successor; and said board shall award the cost and expenses of such investigation against the inspector or person signing said bond.

SEC. 18. The owner, agent or operator of any coal mine shall keep a sufficient supply of timber, to be used as props, so that the workmen may at all times be able to secure the workings from caving in, and it shall be the duty of the owner, agent or operator to send down all such props when so required.

SEC. 19. Any person willfully neglecting or refusing to comply with the provisions of this act when notified by the mine inspector to comply with such provisions, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding five hundred dollars or imprisonment in the county jail not exceeding six months, except when different penalties are herein provided.

* * * * *

SEC. 22. The executive council shall appoint a board of examiners, composed of two practical miners, two mine operators and one mining engineer, who shall have at least five years' experience in his profession. The members of said board shall be of good moral character, and citizens of the United States, and State of Iowa, and they shall before entering upon their duties take the following oath (or affirmation): I,, do solemnly swear (or affirm) that "I will perform the duties of examiner of candidates for the office of mine inspector to the best of my ability, and that in recommending any candidate I will be governed by the evidence of qualification to fill the position under the law creating the same, and not by any consideration of political or personal favors; that I will grant cer-

Health Laws.

tificates to candidates according to their qualifications and the requirements of the law."

They shall hold their office for two years.

SEC. 23. Said board shall meet biennially on the first Monday in April of each even numbered year, except that for the year 1888 said board shall meet on the second Monday, in the office of State Mine Inspector in the Capitol, and they shall publish in at least one newspaper published in each mining district of the State the date fixed by them for the examination of candidates. They shall be furnished with the necessary stationery and other necessary material for said examination, in the same manner as other State officers are now provided. They shall receive as compensation the sum of \$5.00 per day for the time actually employed in the duties of their office, and actual traveling expenses. The said compensation and expenses shall be paid in the same manner as the salaries and expenses of other State officers are now paid; *provided*, that in no case shall the per diem received by any member exceed \$50.00 for each biennial session.

SEC. 24. Certificates of competency shall be granted only to citizens of the United States and State of Iowa, of good moral character, not less than twenty-five years of age, who shall have at least five years' experience in the mines, and who shall not have been acting as agent or superintendent of any mine for at least six months prior to their appearance for examination.

SEC. 25. The examination of candidates for the office of Mine Inspector shall consist of oral and written questions in theoretical and practical mining and mine engineering, on the nature and properties of noxious and poisonous gases found in mines, and on the different systems of working and ventilating of coal mines. The candidates shall not be allowed to have in their possession at the time of their examination any books, memoranda or notes, to be used as aids in said examination. The board of examiners shall give to all persons examined, who in their judgment possess the requisite qualifications, certificates of such qualification, and from the persons holding such certificates the Governor shall appoint the State Mine Inspector.

Approved April 12, 1888.

DRAINS, DITCHES AND WATER COURSES.

[Chapter 96, Laws of 1888.]

AN ACT to Repeal Chapter 188, Laws of the Twentieth (20th) General Assembly and to Enact a Substitute Therefor Relating to Drainage.

Be it enacted by the General Assembly of the State of Iowa: SECTION 1. That Chapter 188, laws of the twentieth general assembly be repealed and the following enacted in lieu thereof: that whenever any person who is the owner of any swamp, wet or marsh land, which, on account of its condition, may endanger the public health or is not for that reason in a proper condition for cultivation shall desire to construct any tile or other underground drain through the land of another and shall be unable to agree with the owner or owners of such land as to the same,

Health Laws.

he may file with the clerk of the township, where said land is situated, an application therefor, giving a description of the land or lands through which he may desire to construct the same, and the township clerk shall forthwith notify the township trustees of said township of said application, who shall fix a time and place for the hearing of same, which time shall not be more than twenty days distant, and they shall cause said clerk to notify the applicant and land owner of the time and place of said hearing, at least ten days before the time fixed for the hearing of same, which notice shall be in writing, signed by said clerk, and shall be served on said applicant and land owner, if within the county, in the same manner as is now provided by law for the service of original notices, and in case that neither said party nor his agent are residents within said county, then the same shall be served by posting written notices in three public places in said township, one of which shall be upon said land at least fifteen days before said hearing.

SEC. 2. That upon the day fixed for hearing, if said trustees are satisfied that the provisions of the prior section have been complied with, they may proceed to hear and determine the same and shall have power to adjourn from time to time until same is completed. Provided that no adjournment shall be for more than fifteen days.

SEC. 3. The said trustees may fix the point or points of entrance and exit or outlet of said tile or other under-ground drain on said land, the general course of same through said land, the size and depth of same, when the same shall be constructed, how kept in repair, what connections may be made with same, what compensation, if any, shall be made therefor, and any other question arising in connection with same; and they shall reduce their findings to writings which shall be filed with the clerk of said township, who shall record it in full in his book of records of said township, and said finding and decision shall be final unless appealed therefrom as hereinafter provided for.

SEC. 4. Wherever any water course or natural drainage line crosses the boundary line between two adjoining land owners and both parties desire to drain the land along such water course or natural drainage line, but are unable to agree upon the conditions as to the juncture or connection of the lines of tile or other drainage at the boundary line aforesaid, then and in such case the township trustees shall have full authority to hear and determine all questions arising relative thereto between such land owners and to render such judgment thereupon as shall to them seem just.

SEC. 5. Any person shall have the right to go upon any public highway to construct an outlet to a drain provided he shall leave the highway in as good condition as it was before the drain was constructed, to be determined by the supervisor of highways in the district where the work is done.

SEC. 6. That whenever any railroad crosses the land of any person or persons who desire to drain their land for any of the purposes set forth in Section one (1) of this Act, the party or parties desiring such drain or drains shall notify the railroad company by leaving a written notice with the nearest station agent, stating in such notice the starting point, route or termination of such drain or drains, and if the railroad company refuse or neglect for the space of thirty days to dig across their right of way a drain of equal depth and size of the one dug by the party who wishes [wishes] to drain his land, then the party who desires to drain the land may

Health Laws.

proceed to dig such drain and the railroad company shall be liable for the cost of the construction of such drain, to be collected in any court having jurisdiction.

SEC. 7. Either party may appeal to the district court of the county from all the findings of the township trustees, within ten days after the findings have been filed with the clerk, and the party appealing shall cause a notice in writing of the taking of said appeal upon the opposite party for the same time and in the same manner as now provided by law for service of original notice in the district court; and if the appellant is the party petitioning for the drain, he must furnish a bond conditioned to pay all the costs of appeal assessed against him, said bond to be approved by the township clerk; and the matter shall be tried *de novo* in said court; provided, that if the applicant does not recover a more favorable finding or judgment in the district court, than he did before the trustees, he will pay all costs of the appeal.

SEC. 8. In case of appeal the township clerk shall certify to the district court a transcript of the proceedings before said trustees, which shall be filed in said court with the appeal bond, the party appealing paying for said transcript and the docketing of said appeal, as in other cases, and upon appeal the party claiming damages shall be plaintiff and the applicant defendant.

SEC. 9. The applicant shall pay the costs of the trustees, clerk and serving of notices on the hearing before the trustees, and shall pay all damages awarded before entering upon the construction of said tile or other drain through the lands of the other.

SEC. 10. In case any dispute shall arise as to repair of any tile or other under-ground drain the same shall be determined by said trustees in same manner as in the original construction of same.

[Chapter 55, Laws of 1886.]

AN ACT to allow Underground Tile Drain across Public Highway, and Defining the duties of Road Supervisors relative to the same, and Repeal Section 1225, Chapter 2, Title 10, of Code of Iowa.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. When any water course or natural drain crosses any public highway in the State of Iowa, and the adjoining or abutting land owner wishes to cross said highway with an underground tile drain for an outlet, or to connect with another underground tile drain, they shall notify the road supervisor having supervision over that public highway to be crossed, in writing, specify the depth of drain and size of tile to be used in crossing said highway, and give the road supervisor twenty days' time to construct said underground tile drain.

SEC. 2. When the road supervisor receives said written notice, he shall order said underground tile drain constructed across said highway, and pay for the tile and construction of the same out of any money or fund in his command.

SEC. 3. If the supervisor fails to construct said underground tile drain within the twenty days' time, then the abutting or adjoining land owner may go upon the highway and construct said underground tile drain across said highway, and he shall receive pay for constructing the same, including tile used in crossing said highway, out of any money or fund belonging to such road district, provided he

Health Laws.

shall leave the highway in as good condition as it was before the drain was constructed.

SEC. 4. That section 1225, chapter 2, title 10, of the Code of Iowa, is hereby repealed.

Approved March 30, 1886.

[Chapter 139, Laws of 1886.]

AN ACT to Repeal Section 1214, Chapter 2, Title 10 of the Code, in relation to Drains and Ditches and to Enact a substitute therefor.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That section 1214 of chapter 2, title 10 of the Code, be and the same is hereby repealed and the following enacted in lieu thereof:

SEC. 1214. Whenever any such ditch, drain or change in the direction of any water-course, shall have been located and established, as provided in the preceding section, or when it shall be necessary to cause any such ditch, drains or water-courses to be reopened and repaired, the auditor shall commission and appoint six disinterested freeholders of the county, not interested in a like question, who shall within twenty days after such appointment personally inspect and classify as "dry," "low," "wet" or "swamp," all land benefitted by the location and construction of such ditch, drain or water-course, or the repairing or reopening of the same, and shall make an equitable apportionment of the cost, expenses, cost of construction, fees and compensation for property appropriated or damages sustained by the construction of any such ditch, drain, change of direction of such water-course or of repairing and reopening the same, and make report thereof in writing to the board of supervisors, which apportionment shall accrue and be assessed among the owners of the land benefitted by the location, construction or the reopening and repairing of such ditch, drain or water-course, in proportion to the benefit to each of them through, along the line or in the vicinity of whose lands the same may be located, constructed or reopened and repaired, respectively, and the same may be levied upon the lands of the owners so benefitted, in said proportions, and collected in the same manner that other taxes are levied and collected for county purposes, and the amounts so assessed and collected shall be paid out of the county treasury, from the funds collected for that purpose, on the order of the county auditor, and said commissioners shall receive for each day's service, when so engaged, two dollars, to be paid out of the funds so collected. Any such ditch, drain or water-course, which is now or may hereafter be constructed, so as to prevent the surplus and overflow waters from the adjacent land from entering the same, is hereby declared a nuisance and the same may be abated, as provided in title 20, chapter 5, of the Code of Iowa, and the diverting, obstructing, impeding or filling up of such drains, ditches or water-courses in any manner by any person, without legal authority, is hereby declared a nuisance, and any person convicted of such a crime shall be punished as provided in title 24, chapter 15, of the Code for the punishment of nuisances. Nothing in this chapter contained shall be construed so as to prohibit any land owner from appealing from the order of the board in assessing his land, for any of the purposes mentioned in this action, to the circuit court of the county, in the same manner that appeals are taken in the location of

Health Laws.

highways, nor shall the same be construed so as to prohibit the maintenance of an action for the recovery of any taxes erroneously or wrongfully assessed, for any of the purposes mentioned in this section, and in order to show that such assessment was erroneous or wrongful, it shall only be necessary to prove that such lands so assessed were not benefitted by the location, construction or maintenance of such ditch, drain or water-course.

SEC. 1207. The board of supervisors of any county having a population of five thousand inhabitants, as shown by the last preceding census, may locate and cause to be constructed ditches or drains, or change the direction of any water-course in such county, whenever the same will be conducive to the public health, convenience or welfare.—*Code of 1873.* [This section was amended by the Seventeenth General Assembly so as to authorize the drains to pass through two or more counties, and the appointment of commissioners from each county. The Eighteenth General Assembly further amended the law, providing that the work should be done under the supervision of a competent engineer. The Nineteenth General Assembly again changed the law, providing for the reclamation of bodies of wet land in a county by ditches, drains levees and embankments, to promote the public health, convenience or welfare, the work to be done by the county.]

INSPECTION OF KEROSENE OIL.

[Chapter 185, Acts of Twentieth General Assembly.]

AN ACT to provide for the inspection and to regulate the sale of petroleum and its products, and to repeal Chapter 172 of the Acts of the Seventeenth General Assembly, and Section 3901 of the Code as amended by Chapter 149, Laws of the Twenty-first General Assembly.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That the governor, by and with the advice and consent of the senate, shall appoint a suitable person, resident of the State, who is not interested in manufacturing, dealing in, or vending any illuminating oils manufactured from petroleum, as State inspector of oils, whose term of office shall commence on the first day of April of each even-numbered year, and continue for the term of two years and until his successor is appointed and qualified. It shall be the duty of such State inspector, by himself or his deputies, hereinafter provided for, to examine and test the quality of all such oils offered for sale by any manufacturer, vender or dealer; and if, upon such testing or examination, the oils shall meet the requirements hereafter specified, he shall fix his brand or device. "Approved flash test—degrees" (inserting the number of degrees) with the date over his official signature upon the package, barrel or cask containing the same. And it shall be lawful for the State inspector, or his deputies, to enter into or upon the premises of any manufacturer, vender or dealer of said oils, and if they shall find or discover any kerosene oil, or any other product of petroleum kept for illuminating purposes, that has not been inspected and branded according to the provisions of this act, they

Health Laws.

shall proceed to inspect and brand the same. It shall be lawful for any manufacturer, vender or dealer to sell the oil so tested and approved as an illuminator; but if the oil or other product of petroleum so tested shall not meet said requirements, he shall mark in plain letters on said package, barrel or cask, over his official signature, the words: "*Rejected for illuminating purposes, flash, test—degrees*" (inserting the number of degrees). And it shall be unlawful for the owner thereof to sell such oil or other product of petroleum for illuminating purposes. And if any person shall sell or offer for sale any of such rejected oil or other product of petroleum for such purpose, he shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be subject to a penalty not exceeding three hundred dollars.

SEC. 2. The State inspector provided for in this act is authorized to appoint a suitable number of deputies, which deputies are empowered to perform the duties of inspection, and shall be liable to the same penalties as the State inspector; *provided*, that the State inspector may remove any of said deputies for reasonable cause. It shall be the duty of the inspector and his deputies to provide themselves, at their own expense, with the necessary instruments and apparatus for testing the quality of said illuminating oils, and when called upon for that purpose to promptly inspect all oils heretofore mentioned, and to reject for illuminating purposes all oils which will emit a combustible vapor at a temperature of one hundred and five degrees standard Fahrenheit thermometer, closed test, provided the quality of oil used in the flash test shall not be less than one-half pint. The oil tester adopted and recommended by the Iowa State board of health shall be used by the inspector and his deputies in all tests made by them. And said board shall prepare rules and regulations as to the manner of inspection, which rules and regulations shall be in effect and binding upon the inspector and deputies appointed under this act.

SEC. 3. The State inspector, before he enters upon the discharge of the duties of his office, shall take the oath or affirmation provided by law, and file the same in the office of the secretary of State, and execute a bond to the State of Iowa in a penal sum of not less than twenty thousand dollars, with sureties thereto, to be approved by the secretary of State, who shall justify as provided by law, and in addition thereto state under oath that they are not interested, directly or indirectly, in manufacturing, dealing in, or vending any illuminating oils manufactured from petroleum; such bond to be conditioned for the faithful performance of the duties imposed upon him by this act, and which shall be for the use of all persons aggrieved by the acts of said inspector, or his deputies, and the same shall be filed with the secretary of State. Every deputy inspector shall take a like oath or affirmation prescribed herein for the State inspector, and execute to the State a bond in the penal sum of five thousand dollars with like conditions and for like purposes, and with sureties thereto who shall justify and have like qualifications as herein provided for the sureties for State inspector, and such sureties shall be approved by the clerk of the district court of the county in which such deputy inspector resides, and said bond and oath shall be filed in the office of such clerk and such deputy inspector shall before entering upon the discharge of his duties forward said clerk's certificate of such filing to the secretary of State to be placed on file.

Health Laws.

SEC. 4. All inspections herein provided for shall be made within the State of Iowa, and the inspector and deputy inspectors shall be entitled to demand and receive from the owner or party calling on him, or for whom he shall perform the inspection, the sum of ten cents per barrel, and for the purpose of this act a barrel shall be deemed fifty five gallons.

SEC. 5. It shall be the duty of the State inspector and every deputy inspector to keep a true and accurate record of all oils so inspected and branded by him, which record shall state the date of inspection, the number of gallons rejected, the number of gallons approved, the number of gallons inspected, the number and kind of barrels, casks or packages, the name of the person for whom inspected and the amount of money received for such inspection, and such record shall be open to the inspection of all persons interested; and every deputy inspector shall return a true copy of such record at the beginning of each month to the State inspector. It shall be the duty of the State inspector to make and deliver to the Governor for the fiscal period ending the 30th day of June, 1885, and every two years thereafter, a report of the inspections made by himself and deputies for such period, containing the information and items required in this act to be made of record, and the same shall be laid before the General Assembly.

SEC. 6. If any person or persons, whether manufacturer, vendee [er] or dealer, shall sell or attempt to sell to any person in this State, any illuminating oil, the product of petroleum, whether manufactured in this State or not, which has not been inspected as provided in this act, he shall be deemed guilty of a misdemeanor and subject to a penalty in any sum not exceeding three hundred dollars, and if any manufacturer, vender or dealer in either or any of said illuminating oils shall falsely brand the package, cask or barrel containing the same, as provided in this act, or shall refill packages, casks or barrels having the inspector's brand thereon, without erasing such brand, having the oil inspected, and such packages, casks or barrels rebranded, he shall be deemed guilty of a misdemeanor, and shall be subject to a penalty not exceeding three hundred dollars, or be imprisoned in the county jail six months, or both in the discretion of the court.

SEC. 7. Any person selling or dealing in illuminating oils produced from petroleum who shall purchase, sell or dispose of any empty kerosene barrel, cask or package before thoroughly cancelling, removing or effacing the inspection brand on the same, shall be guilty of a misdemeanor, and, on conviction thereof, shall pay a fine of one dollar for each barrel, cask or package thus sold or disposed of; and any person who shall knowingly use any illuminating oil, the product of petroleum for illuminating purposes, before the same has been approved by the State inspector of oils, or his deputy, shall be guilty of a misdemeanor, and, on conviction thereof, shall pay a fine in any sum not exceeding ten dollars for each offense.

SEC. 8. No person shall adulterate with paraffine or other substance, for the purpose of sale or use, any coal or kerosene oils to be used for lights, in such a manner as to render them dangerous to use; nor shall any person knowingly sell or offer for sale, or knowingly use any coal or kerosene oil, or any product of petroleum, for illuminating purposes, which, by reason of being adulterated, or for any other reason, will emit a combustible vapor at a temperature of less than one hundred and five degrees of standard Fahrenheit thermometer, tested as provided in this act; *provided*, that the gas or vapor from said oils may be used for illuminating

Health Laws.

when the oils from which said gas or vapor is generated are contained in closed reservoirs outside of the building illuminated or lighted by said gas. Any person violating the provisions of this section shall be deemed guilty of a misdemeanor, and shall upon conviction thereof be punished by imprisonment in the county jail not more than one year, or by fine not exceeding \$500, or by both such fine and imprisonment, in the discretion of the court: *Provided further*, that nothing in this act shall be so construed as to prevent the sale for and use in street lamps of lighter products of petroleum, such as gasoline, benzine, benzole, naphtha, or to prevent the use of machines or generators constructed on the principal of the "Davy safety lamp."

SEC. 9. It shall be the duty of the State inspector, and of any deputy inspector, who shall know of the violation of any of the provisions of this act, to prosecute before a court of competent jurisdiction any person so offending. And in case the State inspector, or any deputy inspector, having knowledge of the violations of the provisions of this act, shall neglect to prosecute as required herein, he shall be deemed guilty of a misdemeanor and punished accordingly, and, upon conviction, shall be removed from office.

SEC. 10. No oil, or fluid, whether composed wholly or in part of petroleum or its products, or of other substance or material which will ignite and burn at a temperature of 300 degrees of the standard Fahrenheit thermometer, open test, shall be carried as freight, nor shall the same be burned in any lamp, or vessel, or stationary fixture of any kind, in any passenger, baggage, mail or express car on any railroad, nor on any passenger boat moved by steam power, nor in any street railway car, stage coach, omnibus or other public conveyance in which passengers are carried, within the State. Any violation of the provisions of this section shall be deemed a misdemeanor, and the offender shall, on conviction thereof, be fined not less than one hundred dollars nor more than one thousand dollars, and shall be liable for all damages resulting therefrom.

SEC. 11. If any inspector or deputy shall falsely brand or mark any barrel, cask or package, or be guilty of any fraud, deceit, misconduct or culpable negligence in the discharge of his official duties, or shall deal in, or have any pecuniary interest, directly or indirectly, in any oils or fluids used or sold for illuminating purposes while holding such office, he shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be fined not exceeding one hundred dollars, or imprisoned not exceeding thirty days, and be liable to the party injured for all damages resulting therefrom.

SEC. 12. It shall be the duty of the governor to remove from office, and to appoint a competent person in the place of, any inspector who is unfaithful in the duty of his office.

SEC. 13. Any person who shall knowingly or negligently sell or cause to be sold any of the oils mentioned in this act for illuminating purposes, except for the purposes herein authorized, which are below the standard and test required in this act, shall be liable to anyone purchasing said oil, or to any person injured thereby, for all damages resulting from any explosion of said oil.

SEC. 14. Within sixty days after the passage of this act the State Board of Health shall make and provide the necessary rules and regulations for the inspection of illuminating oil, and for the government of the inspector and deputy

Health Laws.

inspectors provided for in this act, and as contemplated by the provisions of this act, which shall be approved by the governor of the State, and when so approved shall be furnished by said board to the inspector and his deputies. When written complaint shall be presented to the governor charging the inspector or any deputy with a failure or refusal to comply with or carry out said rules and regulations, or any provision of this act, he shall investigate such charge, and if well founded and sustained, the person against whom said charges were made shall be removed from office by the governor without delay. Said rules and regulations may be changed or modified by said board, subject to the approval of the governor, not oftener than once a year.

SEC. 15. Chapter 172, of the acts of the seventeenth general assembly, and section 3901, of the Code, are hereby repealed.

DISEASED ANIMALS.

[Chapter 180, Laws of 1884.]

AN ACT for the Appointment of a State Veterinary Surgeon and Defining his Duties.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. The governor shall appoint a State veterinary surgeon, who shall hold his office for the term of three years unless sooner removed by the governor; he shall be a graduate of some regular and established veterinary college, and shall be skilled in veterinary science; he shall be a member of the State Board of Health, which membership shall be in addition to that now provided by law. When actually engaged in the discharge of his official duties he shall receive from the State treasury as his compensation the sum of five dollars per day and his actual expenses, which shall be presented under oath and covered by written vouchers before receiving the same.

SEC. 2. He shall have general supervision of all contagious and infectious diseases among domestic animals within or that may be in transit through the State, and he is empowered to establish quarantine against animals thus diseased, or that have been exposed to others diseased, whether within or without the State, and he may with the concurrence of the State Board of Health, make rules and regulations such as he may deem necessary for the prevention, against the spread, and for the suppression of said disease or diseases, which rules and regulations, after the concurrence of the governor and executive council, shall be published and enforced, and in doing said things he shall have power to call on any one or more peace officers, whose duty it shall be to give him all assistance in their power.

SEC. 3. Any person who wilfully hinders, obstructs or resists said veterinary surgeon or his assistants, or any peace officer acting under him or them when engaged in the duties or exercising the powers herein conferred, shall be guilty of a misdemeanor and punished accordingly.

SEC. 4. Said veterinary surgeon shall on or before the 30th day of June of each year, make a full and detailed report of all and singular his doings since his last report to the governor, including his compensation and expenses, and the report shall not exceed one hundred and fifty pages of printed matter.

Health Laws.

SEC. 5. Whenever the majority of any board of supervisors, city council, trustees of an incorporated town, or township trustees, whether in session or not, shall in writing notify the governor of the prevalence of, or probable danger from, any of said diseases, he shall notify the State veterinary surgeon, who shall at once repair to the place designated in said notice and take such action as the exigencies may demand, and the governor may in case of emergency appoint a substitute or assistants, with equal powers and compensation.

SEC. 6. Whenever in the opinion of the State veterinary surgeon the public safety demands the destruction of any stock under the provisions of this act, he shall, unless the owner or owners consent to such destruction, notify the governor, who may appoint two competent veterinary surgeons as advisors, and no stock shall be destroyed except upon the written order of the State veterinary surgeon countersigned by them and approved by the governor, and the owners of all stock destroyed under the provisions of this act, except as hereinafter provided, shall be entitled to receive a reasonable compensation therefor; but not more than its actual value in its condition when condemned, which shall be ascertained and fixed by the State veterinary surgeon and the nearest justice of the peace, who if unable to agree shall jointly select another justice of the peace as umpire, and their judgment shall be final when the value of the stock does not exceed one hundred dollars, but in all other cases either party shall have the right to appeal to the circuit court, but such appeal shall not delay the destruction of the diseased animals. The State veterinary surgeon shall, as soon thereafter as may be, file his written report thereof with the governor, who shall, if found correct, endorse his findings thereon, whereupon the auditor of state shall issue his warrant therefor upon the treasurer of state who shall pay the same out of any moneys at his disposal under the provisions of this act; *provided*, that no compensation shall be allowed for any stock destroyed while in transit through or across the State, and that the word stock, as herein used, shall be held to include only neat cattle and horses.

SEC. 7. The governor of the State, with the State veterinary surgeon, may co-operate with the government of the United States for the objects of this act, and the governor is hereby authorized to receive and receipt for any moneys receivable by this State under the provisions of any act of Congress which may at any time be in force upon this subject, and to pay the same into the State treasury to be used according to the act of Congress and the provisions of this act as nearly as may be.

SEC. 8. There is hereby appropriated out of any moneys not otherwise appropriated the sum of ten thousand dollars for use in 1884 and 1885, and three thousand dollars annually thereafter, or so much thereof as may be necessary for the uses and purposes herein set forth.

SEC. 9. Any person, except the veterinary surgeons, called upon under the provisions of this act shall be allowed and receive two dollars per day while actually employed.

Approved April 14, 1884.

Health Laws.

[Chapter 156, Laws of 1886.]

AN ACT to amend Chapter 11, Title 24 of the Code, Relating to Contagious Diseases in Domestic Animals.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That sections 4058, and 4059 in chapter 11, title 24 of the Code be hereby repealed, and sections 2 and 3 of this act be substituted therefor, and be it known hereafter as sections 4058 and 4059 of the Code.

SEC. 2. Be it enacted: "Section 4058. Any person or persons driving any cattle into this State, or any agent, servant or employé of any railroad or other corporation who shall carry, transport or ship any cattle into this State, or any railroad company, or other corporation or person who shall carry, ship or deliver any cattle into this State, or the owners, controllers, lessees, or agents or employés of any stock yards, receiving into such stock yards, or in any other enclosures, for the detention of cattle in transit, or shipment, re-shipment or sale, any cattle brought or shipped in any manner into this State, which at the time they were either driven, brought, shipped or transported into this State were in such condition as to infect with or to communicate to other cattle, pleuro pneumon[ia], or splenic or Texas fever, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than three hundred dollars and not more than one thousand dollars, or by both fine and imprisonment in the county jail not exceeding six months, in the discretion of the court.

SEC. 3. Be it enacted: "Section 4059. Any person who shall be injured or damaged by any of the acts of the persons named in section 4058, and which are prohibited by such section, in addition to the remedy therein provided, may bring an action at law against any such persons, agents, employés or corporations mentioned therein, and recover the actual damages sustained by the person or persons so injured, and neither said criminal proceeding nor said civil action, in any stage of the same, be a bar to a conviction or to a recovery in the other."

Approved April 10, 1886.

[Chapter 79, Laws of 1886, as amended by Chapter 67, Laws of 1888.]

AN ACT to Prohibit the Traffic in Hogs infected with Swine Plague or Hog Cholera, and to Prevent the Spread of the same.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. All traffic in swine which have died with the swine plague or hog cholera, or from other contagious or infectious diseases within the State is hereby prohibited, and it shall be unlawful for any person to haul in any vehicle or public conveyance any dead hogs which have so died or known to be affected with such disease, upon any public road or highway or upon any enclosure other than that upon which said hogs have died.

SEC. 2. Any person having in his possession swine which have died from the swine plague, hog cholera or other infectious disease, shall, within a reasonable time, cause the same to be burned or buried to the depth of at least thirty inches so as to prevent the spread of the disease.

Health Laws.

SEC. 3. Any person violating or failing to comply with any provision of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punished by fine of not less than five dollars nor more than one hundred dollars, at the discretion of the court. [It shall be unlawful for any person, negligently or willfully, to allow his hogs, or those under his control, infected with hog cholera, or other plague, or contagious disease, to escape his control or run at large.—*Chapter 67, Laws of 1888.*]

SEC. 4055. If the owner of sheep, or any person having the same in charge, knowingly import or drive into this State, sheep having any contagious disease, or turn out, or suffer any sheep having any contagious disease, knowing the same to be so diseased, to run at large upon any common highway, or unenclosed lands, or sell or dispose of any sheep, knowing the same to be so diseased, he shall be deemed guilty of a misdemeanor and punished by a fine in any sum not less than fifty dollars nor more than one hundred dollars.—*Code of 1873.*

SEC. 4056. If any person knowingly import or bring within this State, any horse, mule or ass, affected by the disease known as nasal gleet, glanders or button-farcy, or suffer the same to run at large upon any common highway or uninclosed land, or use or tie the same in any public place, or off his own premises, or sell, trade, or offer for sale or trade, any such horse, mule or ass, knowing the same to be so diseased, he shall be deemed guilty of a misdemeanor, and shall, on conviction, be punished by a fine of not less than fifty dollars, nor more than five hundred dollars; and in default of payment shall be imprisoned for any period not exceeding twelve months, or by both fine and imprisonment, at the discretion of the court.—*Code of 1873.*

SEC. 4057. If any horse, mule or ass, reasonably supposed to be diseased with nasal gleet, glanders or button-farcy, be found running at large without any known owner, it shall be lawful for the finder thereof to take such horse, mule or ass, so found, before some justice of the peace, who shall forthwith cause the same to be examined by some veterinary surgeon, or other person skilled in such diseases, and if, on examination, it is ascertained to be so diseased, it shall be lawful for such justice of the peace to order such diseased animal to be immediately destroyed and buried; and the necessary expense accruing under the provisions of this act shall be defrayed out of the county treasury.—*Code of 1873.*

SEC. 1484. The sheriff, constable, police officer, officer of any society for the prevention of cruelty to animals, or any magistrate, shall destroy any horse or other animal having the disease called and known as glanders, or any disabled creature unfit for other use.—*Code of 1873.*

SHEEP INSPECTION.

[Chapter 49, Laws of Twenty-fourth General Assembly.]

AN ACT to Provide for the Appointment of Sheep Inspectors, and Prescribing their Duties.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. The county board of supervisors of any county in the State when notified in writing, by five or more sheep owners of such county, that sheep diseased

Health Laws.

with scab, or other malignant contagious disease exists in such county, shall, at any regular or special meeting, appoint and commission a suitable person, to be known as county sheep inspector, who shall take an oath of office prescribed by the board of supervisors and whose duties shall be hereafter prescribed, and whose term of office shall be two years, or until his successor is appointed and qualified.

SEC. 2. It shall be the duty of the county sheep inspector, upon the information of three or more sheep owners, that any sheep within his jurisdiction have the scab, or any other malignant contagious disease, to immediately inspect and report in writing the result of his inspection to the county auditor of his county to be filed by him for reference by the county board of supervisors, or any party concerned; and if so desired, shall command the owner or agent to dip or otherwise treat such diseased sheep, and shall inspect such diseased sheep every month thereafter until such disease shall be cured or otherwise eradicated.

SEC. 3. Should such owner or agent fail to comply with the provisions of section two of this act, he or they shall be subject to a fine not to exceed one hundred dollars, and such fine shall be a lien on such sheep, and shall be recovered in an action of debt, together with all costs in any court of competent jurisdiction; and it is hereby made the duty of the county board of supervisors and county attorney to prosecute such cases of negligence.

SEC. 4. It is hereby made the duty of the sheep inspector to dip or otherwise treat such diseased sheep, should the owner or agent refuse to do so, and all costs, expenses or charges together with a per diem of three dollars per day, shall be charged against such sheep for such costs, expenses or charges, and may be collected together with all costs in any court of competent jurisdiction.

SEC. 5. The compensation of sheep inspector shall be three dollars per day, and shall be paid by the owner of the sheep or his agent, if the disease is found to exist.

SEC. 6. Upon the arrival of any flock of sheep within the State from a distance of more than twenty miles outside the boundaries of the State, the owner or agent shall notify the inspector of the county in which such sheep are being held and he shall inspect such flock of sheep at the expense of the owner or agent, and if the sheep are found sound shall furnish the owner or agent a certificate which shall be a passport to any part of the State. *Provided,* however, in transport on board of railroad cars, or passing through the State on such cars, shall not come within the provisions of this act. Any violation of the provisions of this act by the agent or owner of any sheep shall subject the owner to a fine not to exceed one hundred dollars, and shall be a lien and may be collected as in section three of this act. This act shall be in full force and effect from and after its passage.

Approved April 9, 1892.

COFFINEMENT OF PERSONS ALLEGED TO BE INSANE.

[Chapter 68, Laws of 1888.]

AN ACT to Amend Sections 1401 and 1403 of the Code, Relative to the Confinement of Persons Found or Alleged to be Insane.

SECTION 1. *Be it enacted by the General Assembly of the State of Iowa:* That section 1401 of the Code be, and the same is hereby amended, by inserting after

Health Laws.

the word "fees," in the fortieth line, the following: "And no person during such investigation, or who shall be found to be insane, as above provided, shall during investigation or after such finding and pending commitment to the hospital for the insane, or when *en route* to said hospital, be confined in any jail or prison, or other place of solitary confinement; except in cases of extreme violence when it may be deemed absolutely necessary for the safety of such insane person, or of the public; and if such violently insane person be so confined, there shall at all times during such confinement be some suitable person or persons in attendance in charge of such insane person; but at no time shall any female be placed in such confinement without at least one female attendant remaining in charge of such insane person."

SEC. 2. That section 1403, of the Code, be amended by adding to said section the words: "Provided, however, that any female that may be so confined in such poor house or jail shall be at all times under the personal care of a suitable female attendant, who shall hold a key of the apartment in which said insane person is confined."

Approved April 6, 1888.

SUPPORT OF FAMILIES OF INSANE PERSONS.

[Chapter 70, Laws of 1888.]

AN ACT to Provide for the Support of the Family of Insane Persons Out of Their Estate and to Amend Section 2276 of the Code.

SECTION 1. *Be it enacted by the General Assembly of the State of Iowa:* Amend section 2276 of the Code is hereby amended by adding thereto the following: The court shall, if necessary, set off to the wife, and children under fifteen years of age of the insane person or to either, sufficient of his property of such kind as it shall deem appropriate, to support them for twelve months from the time he was adjudged insane.

Approved April 12, 1888.

TO PROTECT PASSENGERS ON SAIL AND STEAM BOATS.

[Chapter 107, Laws of 1888.]

AN ACT to Provide for the Greater Safety of Passengers on Board all Sail and Steam Boats on the Inland Waters of the State of Iowa.

SECTION 1. *Be it enacted by the General Assembly of the State of Iowa:* That from and after the taking effect of this act it shall be unlawful for any person as owner, agent or master of any sail or steamboat plying on the inland waters of this State, having a capacity to carry five persons or more, to hire such boat for the carrying of persons, or to receive passengers for carriage thereon for hire, without each year, before the boating season, and before its use, first obtaining a license for the said boat as hereinafter provided; and every person violating the provisions of this section shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished accordingly. *Provided*, that the provisions of this act

Health Laws.

shall not apply to any sail or steam boat duly licensed under laws of the United States during the term covered by such license.

SEC. 2. That the governor shall on or before the (2nd) second Monday in May in each year appoint such number of competent and suitable persons inspectors of boats as he may deem necessary, to serve until the second Monday in May of the next ensuing even numbered year, unless sooner removed by the governor. The person so appointed shall qualify by taking an oath to be endorsed on his certificate of appointment, to faithfully and honestly discharge the duties of his office.

SEC. 3. That it shall be the duty of any inspector upon demand of any owner, agent, or master of any sail or steamboat, having a capacity for the carrying of five passengers or more, plying upon the inland waters of the State, and upon payment to him of the fee hereinafter provided for, to thoroughly and carefully inspect such boat and all its machinery and appliances, and if such boat is found safe and suitable to be hired for the carrying of persons or for the carrying of passengers, to give to such owner, agent or master, a certificate to that effect, and certifying the number of persons that may be carried thereon; which certificate shall entitle such boat to be used for the carrying of passengers for the season from the date thereof; and said certificate or a copy thereof shall be posted in a conspicuous place on or in said boat. And any owner, agent, or master of such boat, knowingly permitting or receiving for carriage on such boat a greater number of persons than authorized in such certificate shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not less than twenty dollars nor more than one thousand dollars.

SEC. 4. That it shall be unlawful for any person to act as pilot or engineer on any steamboat carrying passengers on the inland waters of this State, without first obtaining a license so to do as hereinafter provided. And any person violating this provision shall be deemed guilty of a misdemeanor, and on conviction thereof shall be punished by a fine not less than twenty dollars nor more than five hundred dollars. That any person desiring license as such pilot or engineer shall apply therefor to some inspector appointed under this act whose duty it shall be, upon payment to him of the fee hereinafter provided for, to forthwith inquire into the competence of such applicant. If such applicant is found to be of sober habits competent and capable of performing the duties of a pilot or engineer, the inspector shall issue to such pilot or engineer, a certificate entitling him to act as such pilot or engineer, as the case may be, for five years from the date thereof, unless sooner revoked for good cause by some inspector of the State with the approval of the governor.

SEC. 5. That said inspector shall be entitled to charge the following fees and require payment thereof in advance: For each sail boat inspected (\$1.00) one dollar; for each steam boat inspected (\$10.00) ten dollars. Provided that steamers with capacity of twenty or less passengers shall be inspected for five dollars, whether the same be licensed or not, and for each application for license as pilot or engineer (\$3.00) three dollars, whether a license be granted or not.

SEC. 6. Said inspectors shall report on or before January first of each year, to the governor of the State, the whole number of licenses, granted by them to pilots and engineers and to whom granted, the total number of sail boats and steam

Health Laws.

boats inspected by them, also the total amount of fees received by them for such licenses and inspection.

Approved April 12, 1888.

OFFENSES AGAINST PUBLIC POLICY.

SECTION 4087. If any two or more persons conspire or confederate together with the fraudulent or malicious intent wrongfully to injure the person, character, business or property of another, or to do any illegal act injurious to the public trade, health, morals, or police, or to the administration of public justice, or to commit any felony, they are guilty of a conspiracy, and every such offender, and every person who is convicted of a conspiracy at common law, shall be punished by imprisonment in the penitentiary not more than three years.—*Code of 1873.*

NUISANCES.

SECTION 4098. "The erecting, continuing, or using, any building, or other place, for the exercise of any trade, employment or manufacture, which by occasioning noxious exhalations, offensive smells, or other annoyances, becomes injurious to the public health, comfort, or property of individuals, or the public, the causing or suffering any offal, filth or noisome substance to be collected or to remain in any place, to the prejudice of others, the obstructing or impeding, without legal authority, the passage of any navigable river, harbor or collection of water, or the corruption, or rendering unwholesome or impure the water of any river, stream or pond. * * * are nuisances." (1)—*Code of 1873.*

(1) That boards of health may act understandingly in the removal of nuisances which are injurious to the public health, it is essential that they should have a clearly defined idea of what nuisances are, which they may remove or cause to be removed. A nuisance is said to be anything wrongfully done, or permitted, which injures or annoys another in the enjoyment of his legal rights.—Cooley on Torts, page 565; *Rex v. Watts*, 2 C. & P. 486, slaughter-house; *Rankett's Case*, 2 Rolle's Abr. 140, 141, melting stinking tallow; *Catlin v. Valentine*, 9 Paige's Ch. (N. Y.) 576, slaughter-houses; *Pickard v. Collins*, 23 Barb. (N. Y. S. C.) 444, barn; Wood on Nuisances, Sec. 404.

Anything, then, which injures or annoys the public in the enjoyment of life or health is a nuisance, which it is the duty of boards of health, as the guardians of the public health, to abate.

The erecting, continuing, or using any building or other place, for the exercise of any trade, employment or manufacture, which by occasioning noxious exhalations, offensive smells, or other annoyances, becomes injurious to the public health, comfort or property of individuals, or the public, the causing or suffering any offal, filth or noisome substance to be collected or to remain in any place, to the prejudice of others, the obstructing or impeding without legal authority, the passage of any navigable river, harbor, or collection of water, or the corruption, or rendering unwholesome, or impure, the water of any river, stream or pond; * * * are nuisances.—*Code of 1873, sec. 4098.*

Where an indictment charged that the defendant "unlawfully and injuriously did erect, continue and use a certain enclosure, or pen, in which cattle and hogs were confined, fed and watered, and the excrement, decayed food, slops and other filth were retained," whereby were occasioned "noxious exhalations and offensive smells, greatly corrupting and infesting the air; and other annoyances dangerous to the public health, comfort and property of the good people residing in that immediate neighborhood," it was held, that the acts charged constituted a public indictable nuisance, both under this section (4089) of the statute, and at the common law.—*The State v. Kaster*, 35 Iowa Supreme Court Reports, 221.

Any use of property, or any trade, that corrupts the atmosphere with smoke, noxious vapors, noisome smells, dust, or other substances or gases producing injury to property or to health, or impairing the comfortable enjoyment of property, is a nuisance.—*Wood on Nuisance*, p. 574, sec. 531.

Health Laws.

TO PROTECT FISH.

[Chapter 34, Laws of 1890.]

AN ACT for the Protection and Preservation of Fish and Repealing Sections 1, 2, 3, 4, 6, 7, 8, 9, 10 and 11 of Chapter 50, Acts of the Fifteenth General Assembly, Chapter 70, Acts of the Sixteenth General Assembly, Sections 3, 5, 6, 7 and 8 of Chapter 80, Acts of the Seventeenth General Assembly, Chapter 92, Acts of the Eighteenth General Assembly, and Chapter 9, Acts of the Twentieth General Assembly.

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. That sections 1, 2, 3, 4, 6, 7, 8, 9, 10 and 11 of Chapter 50, of the Acts of the Fifteenth General Assembly, Chapter 70, Acts of the Sixteenth Gen-

Where defendant erected stock yards so near plaintiff's dwelling, and so kept them that the odors therefrom were not only an annoyance, but were unwholesome, threatening the health of plaintiff and his family, held that the defendant could not escape liability on the ground that the yards were necessary to the operations of the road, and that the odors could not be avoided.—*Shively v. Cedar Rapids, I. F. & N. W. R. R. Co.*, 74 Iowa, 170.

Any classification of nuisances will be necessarily imperfect; yet, for the purposes of this subject, it may be said that the public health nuisances are of two kinds:

1. Those which are *per se*, or which are such from their very nature, and which cannot exist in the vicinity of habitations without causing offense to the senses and injury to the health: such, for instance, as the exposed and decaying carcasses of dead animals, or accumulations of offal, garbage and slops, or fecal matter in exposed places.

2. Those which are *prima facie*, or which become nuisances by reason of the misuse or negligent care exercised of an otherwise harmless and perfectly lawful object, business or occupation: as, for instance, slaughter-houses, rendering establishments, mill-ponds or burying-grounds.

The methods of procedure to be adopted for the removal of any unhealthy nuisance will vary according as the nuisance to be abated comes within one or the other of these classifications.

If a board of health finds any decomposing or offensive matter upon private property, which, in their opinion is injurious to health, they must first order the owner or occupant to remove it within twenty-four hours. If he neglects to do so, they may proceed summarily to cause such nuisance to be removed. If the danger to public health is imminent, and safety requires immediate suppression or abatement of the nuisance, the board of health would be protected if they proceeded at once to suppress it, for the safety of the people is the highest law.—*Moeker v. Reusselator*, 14 Wend., 307.

If any unhealthy nuisance is found in a public place, it is the duty of the board of health to cause its immediate removal. If a pond, a slaughter-house or a burial-ground, or anything of a kindred nature, becomes offensive and unhealthy to the community it is the duty of the board of health to proceed at once to abate the same. In the case of *City of Salem v. Eastern Railroad Company*, the Supreme Court of Massachusetts (98, p. 443,) under a statute which is a verbatim copy of the Iowa statute, held that the adjudication of the board that a nuisance exists is conclusive, and no appeal lies therefrom. The board should keep an accurate record of their proceedings, and all adjudications should appear therein in clear and distinct language. It is not the purpose of the order to direct in what mode the person should proceed to remove the nuisance. It should direct the end to be accomplished, leaving the party to adopt any effectual mode he may choose. If the owner or occupant neglects to remove the nuisance the board are at liberty to enter upon private property where it exists and take such measures as they may see fit for its removal.

The court further says, in relation to boards of health: "Their action is intended to be prompt and summary. They are clothed with extraordinary powers for the protection of the community from noxious influences affecting life and health, and it is important that their proceedings should be unembarrassed and delayed as little as possible by the necessary observance of formalities. Although notice and opportunity to be heard upon matters affecting private interests ought always to be given when practicable, yet the nature and object of those proceedings are such that it is deemed to be most for the general good that notice should not be essential to the right of the board to act for the public safety. Delay for the purpose of giving notice, involving either of public delay for such hearings as the parties may think necessary for the protection of their interests, might defeat all beneficial results from an attempt to exercise the powers conferred upon boards of health. The necessity of the case and the importance of the public interest at stake, justify the omission of notice to the individual."

"Notice must be given of general regulations prescribed by the board before parties can be held in fault for a disregard of their requirements. No previous notice to

Health Laws.

eral Assembly, sections 3, 5, 6, 7 and 8 of Chapter 80, Acts of the Seventeenth General Assembly, Chapter 92, Acts of the Eighteenth General Assembly, and Chapter 9, Acts of the Twentieth General Assembly, be and the same are hereby repealed and the following enacted in lieu thereof.

SEC. 2. It shall be unlawful for any person to take from any of the waters of the State any fish in any manner except by hook and line, except that it shall be lawful for any person to take minnows for bait with a seine that does not exceed five yards in length. Also that it shall be lawful to take buffalo and suckers by spearing between the first day of November and the first day of March following. The word minnows, as used herein, does not include or apply to young bass, pike, croppies, salmon, or fry of any game fish, either native or foreign; and all such fish, either young or adult, so taken, shall be immediately returned to the waters whence taken. It shall be lawful for the State fish commissioner to take from any of the public waters in any manner any fish for the purpose of propagation or restocking other waters.

SEC. 3. It shall be unlawful for any person to catch or take from any of the waters of the State, any salmon or trout, between the first day of November and the first day of April following, or any bass, pike, croppies or any other game fish between the first day of November and the fifteenth day of May following, in each year, in any manner whatsoever.

SEC. 4. It shall be unlawful for any person, company or corporation to buy, sell or offer for sale, or have in his or their possession for sale or transportation, any fish which shall have been taken in violation of sections 2 and 3 of this act.

SEC. 5. Any person found guilty of a violation of the preceding sections of this

parties so to be affected by them is necessary. They belong to that class of police regulations to which all individual rights of property are held subject, whether established directly by enactments of the legislature, or by its authority through boards of local administration."

Whether a business or thing, not in itself a nuisance, is so managed or suffered to exist as to be a nuisance, is a fact which must be determined by the board, upon investigation made by them. Although slaughter-houses are regarded by the courts as *prima facie* nuisances, a person engaged in carrying on the business of slaughtering animals cannot be compelled to discontinue that business upon the judgment of any tribunal except that of a court of competent jurisdiction. In this way alone can a board of health legally determine whether such a business is a nuisance so as to authorize them to abate it. But any collection of offal or filth in or about the slaughter-house may be removed by the board of health, and the place may be required to be kept clean under the authority conferred by sections 17 and 18, chapter 151, Laws of 1880, but the suppression of the business itself can only follow a judicial determination that it is conducted so as to be injurious to the public health. "A slaughter-house in a city or public place, or near a highway, or where numerous persons reside, is *prima facie* a nuisance." *Bushnell v. Robeson & Co.*, 62 Iowa, 540.

As to whether or not animals affected with a contagious disease may be summarily destroyed, the general rule seems to be that so long as the owner restrains the animal upon his own premises, no person has a right to kill them (except as provided by regulations of the State veterinary surgeon under the provision of chapter 180, Laws of 1884); but if they are suffered to go at large, or if they escape from the owner's custody, the owner of the premises upon which they escape may kill them if necessary for the protection of his own animals. In the case of a horse or other animal affected with glanders, which is recognized by the courts as an incurable disease, and one which may communicate all its loathsomeness and fatality to human beings, there is no question but what a board of health would be protected in destroying them whenever found, after due notice given to the owner, if in their opinion it was necessary for the public health.—See section 1481, Code of 1873.

From the foregoing it will be seen, boards of health are armed with power to suppress unhealthy nuisances, which they should be prompt to exercise in all cases where the public health is or will be jeopardized.

The success of boards of health depends very much upon the firmness with which they enforce needful sanitary regulations. See Hanover's Law of Horses, page 76.

Health Laws.

act shall, upon conviction before any justice of the peace, mayor of any incorporated town or city, or any court of record within the county in which such offense is committed, be fined not less than ten nor more than fifty dollars, and stand committed until such fine and costs are paid.

SEC. 6. No person shall place, erect, or cause to be placed or erected, in or across any of the rivers, creeks, lakes or ponds, or any outlets or inlets thereto any trawl line, seine, net, weir, trap, dam or other obstruction in such manner as to hinder or obstruct the free passage of fish up, down or through such water course for the purpose of taking or catching fish, unless the same shall be done under the supervision of the fish commissioner, except minnows as provided in section 2 of this act.

SEC. 7. No person shall place in any of the waters of the State any lime, ashes, drug, or medicated bait, or shoot any gun or use any dynamite, gun cotton, giant powder or other explosive, or any electrical machine or device with the intent thereby to kill, injure, poison, stupify or catch fish.

SEC. 8. Any person found guilty of a violation of sections 6 or 7 of this act shall, upon conviction before any justice of the peace, mayor of any incorporated town or city, or any court of record in the county in which such offense is committed, be fined not less than twenty-five dollars nor more than one hundred dollars, and stand committed until such fine is paid. And any seine, net, trap or other device used in violation of sections 6 or 7 of this act may be seized and destroyed by order of the court before whom such action may be brought.

SEC. 9. In all prosecutions under sections 2, 3, 4, 5 and 13 of this act the person filing the information shall be entitled to a fee of five dollars, which shall be taxed as costs against the person, company or corporation so convicted, and in all prosecutions under sections 6, 7 and 8 of this act the persons filing the information shall be entitled to a fee of ten dollars, which shall be taxed as costs, as above provided, but in no case shall the fee of the informant be paid out of the county treasury. Any fish found in the possession of any person, company or corporation taken in violation of the preceding sections shall be seized and sold for the purpose of paying the costs in the case.

SEC. 10. Persons raising or propagating fish on their own premises or owning premises on which there are waters having no natural outlet or inlet through which such waters may become stocked or replenished with fish from public waters, shall absolutely own such fish as they may contain, and any person taking or attempting to take any fish therefrom, without the consent of the owner or his agent, shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be fined not less than five dollars nor more than twenty-five dollars, or imprisoned in the county jail not more than thirty days, and shall be liable to the owner of the fish in damages, in double the amount of damages sustained, the same to be recovered in civil action before any court having jurisdiction over the same.

SEC. 11. Nothing herein contained shall be held to apply to fishing in the Mississippi, the Missouri or the Big Sioux rivers, nor so much of the Des Moines river as forms the boundary between the States of Missouri and Iowa.

SEC. 12. It shall be the duty of the fish commissioner to see that the provisions of this act are enforced, and, for that purpose, he shall have the right to call to his assistance any prosecuting attorney to prosecute all violations of this act in the county where such violations occur.

Health Laws.

When requested by the fish commissioner, the attorney-general shall give his opinion in writing upon all questions of law pertaining to his office. Nothing in this act shall be construed as prohibiting any citizen from instituting legal proceedings for the enforcement of any provisions hereof.

SEC. 13. It shall be unlawful for any person to fish for or catch in any manner any fish in any stream in this State which has been stocked with breeding trout—one or two years old—by this State or the United States fish commissioner for one year from date of said stocking, provided notice of said stocking is posted by authority of the State fish commissioner whenever a public highway crosses such stream.

Any violation of this section shall be subject to the penalties prescribed in section 5 of this act.

SEC. 14. All acts or parts of acts, inconsistent or in conflict herewith are hereby repealed.

SEC. 15. This act being deemed of immediate importance shall be in force and take effect from and after its publication in the "Iowa State Register" and "Des Moines Leader," newspapers published in Des Moines, Iowa.

Approved April 1, 1890.

SALE OF INTOXICATING LIQUORS.

[Chapter 35, Laws of 1890.]

SECTION 2. That after this act takes effect no person shall manufacture for sale, sell, keep for sale, give away, exchange, barter or dispense any intoxicating liquor, for any purpose whatever, otherwise than is provided in this act. Persons holding permits, as herein provided, shall be authorized to sell and dispense intoxicating liquors for pharmaceutical and medical purposes, and alcohol for specified chemical and mechanical purposes, and wine for sacramental purposes, and to sell to registered pharmacists and manufacturers of proprietary medicines, for use in compounding medicines, and to permit-holders for use and resale by them, for the purposes authorized by this act, but for no other purposes whatever; and all permits must be procured, as hereinafter provided, from the district court of the proper county at any term thereof after this act takes effect, and a permit to buy and sell intoxicating liquors, when so procured, shall continue in force until revoked according to law. *Provided*, further, that this section shall not be construed to prevent licensed physicians from dispensing in good faith such liquors as medicine to patients actually sick and under their treatment at the time of such dispensing.

The remaining sections provide the machinery for the enforcement of the law.

INDEX.

	PAGE.
ACCIDENTS—	
how to bandage a finger.....	261
on railroads.....	263
prevention of.....	352
ACID—	
salicylic, as food preservative.....	123
ADULTERATED—	
food.....	117
canned goods.....	120
preservatives.....	121
salicylic acid.....	123
statute relating to.....	339
AIR—	
bacteria in.....	104
ALCOHOL—	
teaching effect of on human system.....	351
ANIMALS DISEASED—	
regulations for.....	19, 257, 381, 383, 384
aphthous fever among cows.....	257
APTHOUS FEVER—	
among cows.....	257
ATTORNEY-GENERAL, DECISIONS OF—	
pollution of rivers.....	330
power of local boards to prevent rabies.....	333
BACTERIA—	
our hidden foes.....	93
in dust of streets.....	102
in hospital.....	106
human lung.....	109
of surgical fever.....	96
consumption.....	97
pneumonia.....	98
typhoid fever.....	98
cholera.....	99
diphtheria.....	100
BARBED WIRE—	
around school houses.....	352

	PAGE
BECKER, DR. F.—	
report of meat poisoning	6
BIRMINGHAM—	
school house case.....	33
BURIAL—	
regulations for.....	16, 24
BUTTER—	
fraud in making.....	136
penalty for fraudulent.....	341
making imitation.....	341
CANCER—	
and pork.....	71
tobacco.....	72
CANNED FOOD—	
adulteration of.....	116, 120, 347
CARTER, DR. E. H.—	
report on small pox.....	7, 10, 27
diphtheria in Greene county.....	28
scarlet fever at Audubon.....	28
CATTLE YARDS—	
nuisance, abatement of.....	311
CEDAR RAPIDS—	
water supply of.....	173
CHOLERA—	
emergency meeting to consider.....	10
rules for prevention of.....	35
bacteria of.....	99
CHOLERA-INFANTUM—	
bad milk.....	129
CITIES AND TOWNS—	
water supply for.....	159
COAL—	
law regulating mining.....	365, 367
CONNIFF, DR. R. E.—	
commissioned to the board.....	27
CONSPIRACY—	
to injure a person, penalty.....	388
CONSUMPTION—	
prevention of.....	43
is contagious.....	48
not incurable.....	50
bacillus of.....	97
CONTAGIOUS DISEASE—	
regulations for cities.....	17
townships.....	20
public funeral.....	13, 23
immigrants.....	33
by importation.....	90

	PAGE
CORPSES—	
removal of.....	24, 271
disinterment of.....	24, 271
depositing in receiving vault.....	34, 272
what cannot be disinterred.....	34, 272
shipment of.....	271
DAVENPORT—	
water supply of.....	170
DECISIONS, SUPREME COURT—	
nuisance public and private.....	305
pollution of rivers.....	306
hog-pens.....	309
cattle yards.....	311
expenses of small pox.....	316, 318, 320, 322, 326
physicians' return of births and deaths.....	327
DECISIONS, ATTORNEY-GENERAL—	
pollution of rivers.....	330
nuisance, abatement, notice.....	333
rabid dogs.....	333
DENTISTRY—	
law regulating practice of.....	359
DIPHTHERIA—	
corpses, disinterment.....	34
quarantine period.....	12, 53
germs, vitality of.....	55
how it spreads.....	54
identity with membranous croup.....	55
and sub-soil water.....	55
bacillus of.....	129
caused by infected milk.....	129
DISEASED—	
animals.....	19, 257, 381, 383, 384
DISINFECTION—	
rules for.....	14, 23
sulphur candles.....	34
DISINTERMENT—	
of corpses.....	17, 24, 34, 272
DOGS—	
regulations for rabid.....	xii, 333
DRAINS AND DITCHES—	
law regulating.....	373
across public highways.....	375
DRUGGISTS—	
law regulating.....	361
DUST—	
bacteria in.....	101
EDSON, DR. CYRUS—	
on modern plumbing.....	240

	PAGE
EMMET, DR. J. M.—	
admitted to the board	5
EMPLOYÉS—	
female, must have seats	346
FILTH DISEASE—	
what it is	75
FINANCIAL—	
statement	304
FISH—	
poisoning water to catch	349
protection of	389
FOOD—	
adulterated	116
poisonous	126
sugar	126
flour	127
meat	128
milk	128
FUNERAL—	
in school house, church, etc., contagious disease	13, 23
GASOLENE—	
use of in stoves, dangers of	280
GUILBERT, DR. E. A.—	
resolution on corpses	6
amended rules	27
sanitary days	27
paper on hygiene	215
HEALTH LAWS—	
adulteration of food and drink	239, 349
fraudulent butter and cheese	341
new dairy law	345
health of female employés	346
fraudulent canned goods	347
fraud in sale of lard	348
infection of another by small pox	349
pollution of rivers or streams	349
giving intoxicating liquor	349
running threshing machine without tumbling-rod	349
poisoning rivers to catch fish	350
steam boilers must have steam gauge	350
producing miscarriage of pregnant woman	350
poisoning food	350
tramps and vagrants	350
noxious weeds exterminated	350
toy pistols prohibited	351
effect of alcohol on human system	351
barbed wire around school houses	352
to prevent railroad accidents	353

	PAGE
HEALTH LAWS— <i>Continued</i> —	
regulating the practice of medicine	355
dentistry	359
pharmacy	361
mining of coal	365
drains and ditches	373
construction of drains across highways	375
inspection of kerosene oil	377
state veterinary surgeon, powers and duties	381
traffic in diseased hogs	383
inspection of diseased sheep	384
insane persons, confinement of	385
support of families of	386
steamboat passengers, protection of	386
sailboat, regulations for	386
conspiracy to injure a person	388
nuisance, defined	388
fish, protection of	389
sale of intoxicating liquor	392
creating state board of health	ix
HOGS—	
cholera, and plague, prevention of	383
traffic in diseased, prohibited	383
HOG-PENS—	
nuisance, abatement of	309
HOSPITAL—	
for emergencies	249
plans for	250
HOUSES—	
sanitary construction of	231
HYGIENE—	
the science	214
ICE—	
polluted, cause of disease	154
not purified by freezing	156
IMMIGRANTS—	
must be quarantined when	33
inspection of	90
INSANE—	
confinement of in jail prohibited	385
support of families of	386
INSPECTION—	
of kerosene oil	377
diseased hogs	383
sheep	384
steamboats	386
sailboats	386
INTOXICATING LIQUORS—	
sale of	392

	PAGE
KEMPKER, DR. J. F.—	
paper on sanitary construction of houses.....	231
KEROSENE—	
change of inspection rule.....	7
accidents from.....	275
lighting railroad cars.....	279
inspection of.....	377
LARD—	
sale of adulterated.....	348
LEGISLATIVE—	
suggestions.....	288
LEPROSY—	
quarantine of.....	33
LOCAL BOARDS—	
must pay visiting members.....	33
nuisance, powers of, to abate.....	303
MEAT—	
poisoned, case of.....	6, 128
penalty for selling unwholesome, or diseased.....	349
MEDICINE—	
penalty for selling adulterated.....	339, 340
poisonous.....	350
regulating practice of.....	353
METEOROLOGICAL—	
tables.....	294
for Iowa City.....	294
Muscatine.....	295
Davenport.....	296
Des Moines.....	297
Dubuque.....	298
Keokuk.....	299
Omaha.....	300
Sioux City.....	301
temperature of the state.....	303
rainfall of the state.....	303
MICROBES—	
in the soil.....	114
MILK—	
sale of contagious disease.....	15, 24
adulteration of.....	128
disease from diseased cows.....	128
chemical composition of.....	130
report of dairy commissioner.....	134
sale of, new dairy law.....	344
MINING—	
law regulating.....	365, 367
MOXHAM, MR.—	
on sanitary education of plumbers.....	296

	PAGE
MYOPIA—	
cause and prevention.....	225
NUISANCE—	
public and private defined.....	303, 388
removal of, notice.....	333
pollution of rivers.....	306
privies.....	305
hog-pens.....	309
cattle yards.....	311
what is, defined.....	313
ORDINANCE—	
public health, for cities.....	11
PHARMACY—	
law regulating.....	361
PHYSICIANS—	
must give notice of contagious disease.....	11, 20
secreting contagious disease.....	17, 25
facts they should know.....	287
must make return of births and deaths.....	327
law regulating practice of.....	353
PLUMBERS—	
sanitary education of.....	236
PLUMBING—	
modern and sewer air.....	240
PNEUMONIA—	
bacteria of.....	98
POISONS—	
sale of, must be labeled.....	340
by pharmacists.....	363
PRIVIES—	
a nuisance, when.....	305
PTOMAINES—	
poisonous.....	127
QUARANTINE—	
rules for.....	12, 21
period of.....	12
RABIES—	
in Fayette county.....	81
Mahaska county.....	82
Osceola county.....	82
Jefferson county.....	82
Jasper county.....	83
what to do when bitten by rabid dog.....	83
power of local boards to control.....	333
RAILROADS—	
fatalities on.....	263
risks of travel on.....	265
shipping corpses on.....	271
lighting of cars.....	279

	PAGE
RAILROADS—Continued—	
laws to prevent accidents on.....	352
stoning or shooting at cars.....	352
holding up trains.....	353
locomotives must have bell and whistle.....	353
trains must stop at crossings.....	354
cars must have air brakes and automatic couplers.....	354
stealing and using hand-cars.....	353
RAINFALL—	
in state for forty-five years.....	303
REGULATIONS—	
ordinance, for cities.....	11
townships.....	20
to prevent hog cholera.....	383
disease in sheep.....	384
of steamboats.....	386
RESOLUTIONS—	
shipment of corpses.....	6
leprosy to be placarded.....	33
investigations made by members of State Board.....	33
RIVERS—	
pollution of, liability for.....	303, 330
throwing dead animals in.....	349
ROADS—	
drains across.....	375
ROBINSON, DR. C. M.—	
paper on myopia.....	225
SALICYLIC ACID—	
as food preservative.....	123
SANITARY—	
construction of houses.....	231
education of plumbers.....	236
SCARLET FEVER—	
corpses, disinterment of.....	34, 271
desquamation of.....	68
caused by infected milk.....	129
SCHOOL PUPILS—	
vaccination of.....	26
myopia in.....	225
SCHOOL HOUSE—	
funeral in, contagious disease.....	14, 23
heating of, Smead system.....	32
the Birmingham case.....	33
barbed wire around.....	352
SEWER—	
air and modern plumbing.....	240
ordinances.....	242
SEWERAGE—	
disposal of in country.....	183

	PAGE
SHEEP—	
inspection of.....	384
SLAUGHTER-HOUSES—	
regulations for.....	18, 25
SMALL POX—	
at Des Moines.....	7
Newton.....	10
Danbury.....	27, 85
symptoms of.....	85
at Cumberland.....	86
vaccination for.....	87
expenses of, how paid.....	306
SOIL—	
microbes in.....	114
SPIRITOUS LIQUOR—	
penalty for adulterating.....	340, 341, 392
STATE BOARD—	
meeting Dec. 19, 1891.....	4
May 12, 1892.....	5
Sept. 22, 1892.....	10
Nov. 3, 1892.....	11
May 4, 1893.....	30
election of officers.....	7, 31
standing committees of.....	31
law creating.....	ix
powers of.....	316
STEAMBOATS—	
protection of passengers on.....	380, 386
SUGAR—	
penalty for adulterating.....	339
SUPREME COURT—	
expenses of small pox.....	316, 318, 320, 322, 326
nuisance—public and private.....	305
hog-pens.....	309
cattle yards.....	311
what is, defined.....	313
return of births and deaths by physicians.....	327
SURGICAL—	
fever, micrococci of.....	96
TEMPERATURE—	
of state for twenty years.....	302
THRESHING MACHINE—	
penalty for running without tumbling-rod.....	349
TOY PISTOLS—	
sale prohibited.....	351
TRICHINOSIS—	
outbreaks of.....	30, 78
symptoms of.....	78
source of.....	80
prophylaxis for.....	81

	PAGE
TUBERCULOSIS—	
bacillus of.....	97
caused by infected milk.....	122
TYPHOID FEVER—	
cause and prevention.....	57
bacteria of.....	98
caused by infected milk.....	129
impure water.....	150
ice.....	156
UNDERTAKERS' ASSOCIATION—	
petition to the board.....	4
VACCINATION—	
as prevention of small pox.....	87
VETERINARY SURGEON—	
powers and duties.....	381
VITAL STATISTICS—	
importance of.....	283
WATER—	
standard of potable fixed.....	11, 157
and diphtheria.....	55
pollution of.....	144, 306
an artesian well.....	147
a driven well.....	148
model well.....	149
contaminated well.....	151
polluted, cause of disease.....	150
typhoid fever.....	150
scarlet fever.....	150
pollution from cemetery.....	153
supply for cities and towns.....	159
of Davenport.....	170
Cedar Rapids.....	173
purification of.....	177
pollution of rivers, liability for.....	303
throwing dead animals in.....	349
poisoning of to catch fish.....	349
WELLS—	
throwing dead animals in.....	349
pollution from cemetery.....	153
contamination of.....	148
artesian.....	147
driven.....	148
model.....	149
contaminated.....	148, 151
WINE—	
penalty for adulterating.....	340