FOURTEENTH BIENNIAL REPORT

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF IOWA

FOR THE

Fiscal Period Ending June 30, 1908

PRINTED BY ORDER OF THE GENERAL ASSEMBLY

DES MOINES:
EMORY H. ENGLISH, STATE PRINTER
1908

LETTER OF TRANSMITTAL

STATE OF IOWA,
OFFICE OF SECRETARY STATE BOARD OF HEALTH.
DES MOINES, August 31, 1908.

To His Excellency, ALBERT B. CUMMINS, Governor of Iowa:

SIR,—In accordance with the provisions of Section 2565 of the Code, I have the honor to present the Fourteenth Biennial Report of the State Board of Health for the period commencing July 1, 1906, and ending June 30, 1908. Respectfully,

LOUIS A. THOMAS, Secretary.

MEMBERS OF THE STATE BOARD OF HEALTH, JUNE 30, 1908.

H. W. Byers, Attorney General, Ex-Officio, Des Moines.
Paul O. Koto, State Veterinarian, Ex-Officio, Des Moines.
*Charles Francis, Civil Engineer, Davenport, Term expires August 23, 1908.

PHYSICIANS.

Joseph H. Sams, (R) Clarion, Term expires January 31, 1909.
Alexander M. Linn, (H) Des Moines, Term expires January 31, 1910.
Alfred P. Hanchett, (H) Council Bluffs, Term expires January 31, 1911.
Albert C. Moerke, (E) Burlington, term expires January 31, 1912.
Bert L. Eiker, (R) Leon, Term expires January 31, 1913.
George E. Decker, (R) Davenport, Term expires January 31, 1914.
Albert De Bey, (R) Orange City, Term expires January 31, 1915.

OFFICERS OF THE BOARD.

Joseph H. Sams, President.
Louis A. Thomas, Secretary and Executive Officer.
Henry Albert, Director of the Bacteriological Laboratory.
Charles N. Kinney, Chemist.

EMPLOYEES.

SECRETARY'S OFFICE.

Mabel W. Conlon, Chief Clerk and Stenographer.
Eleanor M. Hutchinson, Assistant Clerk and Stenographer.

BACTERIOLOGICAL LABORATORY.

Jessie B. Hudson, First Assistant Bacteriologist.
F. A. Slyfield, Second Assistant Bacteriologist.
Anna Stach, Clerk and Stenographer.

DEPARTMENT OF VITAL STATISTICS.

Louis A. Thomas, State Registrar.
Gertrude Kennedy, Assistant Registrar.
Francis Jones, Clerk.

*Lafayette Higgins, C. E., Des Moines, was appointed to succeed Col. Charles Francis, August 23, 1908.

PUBLIC HEALTH DISTRICTS.

DISTRICT No. 1.—Allamakee, Butler, Bremer, Black Hawk, Buchanan, Chickasaw, Clayton, Delaware, Fayette, Floyd, Grundy, Howard, Mitchell, Winneshiek. Not represented.

DISTRICT No. 2.—Benton, Cedar, Clinton, Dubuque, Iowa, Jones, Jackson, Johnson, Linn, Muscatine, Scott. Represented by Dr. Geo. E. Decker, Davenport.

DISTRICT No. 3.—Appanoose, Davis, Des Moines, Henry, Jefferson, Keokuk, Louisa, Lee, Mahaska, Monroe, Wapello, Washington, Van Buren. Represented by Dr. A. C. Moerke, Burlington.

DISTRICT No. 4.—Cerro Gordo, Calhoun, Emmet, Franklin, Hancock, Humboldt, Hamilton, Hardin, Kossuth, Palo Alto, Pocahontas, Webster, Winnebago, Worth, Wright. Represented by Dr. J. H. Sams, Clarion.

DISTRICT No. 5.—Buena Vista, Cherokee, Clay, Dickinson, Ida, Lyon, Osceola, O'Brien, Plymouth, Sioux, Sac, Woodbury. Represented by Dr. Albert De Bey, Orange City.

DISTRICT No. 6.—Audubon, Adair, Cass, Crawford, Carroll, Greene, Guthrie, Harrison, Monona, Pottawattamie, Shelby. Represented by Dr. A. P. Hanchett, Council Bluffs.

DISTRICT No. 7.—Boone, Dallas, Jasper, Marshall, Madison, Marion, Polk, Story, Tama, Poweshiek, Warren. Represented by Dr. A. M. Linn, Des Moines.

DISTRICT No. 8.—Adams, Clarke, Decatur, Fremont, Lucas, Mills, Montgomery, Page, Ringgold, Taylor, Union, Wayne. Represented by Dr. B. L. Elker, Leon.

When vacancies occur in the State Board of Health, it shall be the duty of the governor to appoint to membership on the board, physicians residing in the various health districts until seven such districts are represented on the board. After which time the annual appointment shall be made from the physicians residing in the district not represented on the board the preceding year.—*The Code.*

At the beginning of the biennial period Dr. R. E. Conniff, of Sioux City, and Dr. F. W. Powers, of Waterloo, were members of the Board of Health; the former retired by expiration of term, January 31, 1907, and the latter January 31, 1908. Each held the office of President during their senior year of membership.

PREFACE.

Under the provisions of Section 2565 of the Code, it is made the duty of the Secretary of the State Board of Health to present to the Governor, biennially, a report of the Board, including therein "So much of its proceedings, such information concerning Vital Statistics, such knowledge respecting diseases, and such instructions upon the subject of hygiene as may be thought useful for dissemination among the people, with such suggestions as to further legislation as may be thought advisable."

In preparing this, the Fourteenth Biennial Report, I have endeavored to conform to the statutory requirements.

As a detailed statement of the receipts and expenditures of each department under the immediate jurisdiction of the Board has been filed with the Executive Council, and will appear in the published report of that body, it is not necessary to include such feature in this report; however, a summary is essential to an intelligent conception of the work of the Board of Health.

An examination of the table of contents will give some idea of the more important problems now confronting the Sanitarian. Following the report of each department are certain recommendations and suggestions pertaining to legislation. These should be earnestly considered by the public at large, and especially by its representatives in the Thirty-third General Assembly.

As the State Board of Health is given "general supervision over the interests of health and life of the citizens of the State" and required by Statute to "make such rules and regulations as it may find necessary for the preservation and improvement of the public health," it is but reasonable to expect that the public will interest itself in these matters.

From its experiences of the past, the Board is in position to judge and estimate present and future necessities, but it rests with the people and the legislature to determine whether or not the facilities shall be provided to promptly and successfully carry out the recommendations.

The various scientific articles contained in this report have been prepared, or selected, on account of their special importance. In their composition technical terms have so far as possible been avoided. The subjects treated are of vital interest to every citizen of Iowa, and, if carefully read, should prove beneficial to every community.

LOUIS A. THOMAS, Secretary.

CONTENTS.

1. The Sanitary Obligations of the State.
2. Report of Infectious Diseases.
3. Rules and Regulations, Disinfection and Expenses of Local Boards of Health.
4. Analysis of Public Water Supply.
5. Embalmers' Department.
6. Disinterments.
7. Maternity Hospital Department.
8. Nurses' Department.
9. The Iowa Health Bulletin.
10. Bacteriological Laboratory.
11. Department of Vital Statistics.
12. Retirement of Members.
13. The Geneva Cross.
14. Concerning the Appointment of Health Officers, Their Duties.
15. Conference of State and Local Boards of Health.
16. Duties and Powers of Local Boards of Health.

EDUCATIONAL ARTICLES.

17. Disinfectants and Disinfection.
    Henry Albert, M. S., M. D.
18. Insects; The Role They Play in the Transmission of Disease.
    Henry Albert, M. S., M. D.
19. Plea for National Health.
    Wm. Louden.
20. Sanitary Water Analysis and Water Purification.
    Charles N. Kinney, B. S.
21. Meat Infection.
    J. H. Kellogg, M. D.
22. Municipal Inspection of Meats and Dairy Products.
23. To Augment Health, Wealth and Happiness.
    Burton Rogers, D. V. M.
24. Economic Aspect of the Modern Treatment of Tuberculosis.
    J. W. Petit, M. D.
25. What shall we do with the Question of Animal Tuberculosis.
    J. W. Kime, M. D.
26. Disposition of Tuberculosis Cattle.
    G. A. Johnson, D. V. M.

27. Tubercle Bacilli in Butter.
U. S. Bureau of Animal Industry.
28. The Necessity of a Sanitary Milk Supply.
L. Enos Day, D. V. S.
29. The Conditions Influencing the Production of Sanitary Milk.
J. H. McNeil.
30. Venereal Diseases.
B. L. Eiker, M. D.
31. Should The Public Be Enlightened as to Venereal Diseases?
Egbert H. Grandin, M. D.
32. Teaching Sex Matters in the Public Schools.
Morrison I. Swift, M. D.
33. Circular of Information.
34. Hygiene of Young Girls.
J. H. Carstens, M. D.
35. Results of Vaccination.
36. Chronic Running Ears.
37. Cerebrospinal Meningitis.
A. M. Linn, M. D.
38. Sanitary Plumbing.
U. S. Dept. of Agriculture.
39. Ventilation of Buildings.
Charles Francis, C. E.
40. Scientific Embalming and Its Relation to Public Health.
W. P. Hohenschuh.
41. Medical Inspection of School Children.
G. E. Decker, M. D.
42. Prevalence of Defects of Hearing and Sight among School Children.
Henry G. Langworthy, M. D.
43. Rabies and Its Increasing Prevalence.
U. S. Bureau of Animal Industry.
44. The Iowa Medical Laws and Their Enforcement.
Louis A. Thomas, M. D., Secretary
State Board of Medical Examiners.
45. List of Blank Forms for use of Local Boards of Health.

THE SANITARY OBLIGATIONS OF THE STATE.

Prevention of disease is a state and national economy of the first importance. Money judiciously expended for sanitary educational and preventative measures could well be looked upon in the light of insurance, for experience has repeatedly demonstrated that an adequate appropriation for this purpose will prove an investment returning continual profits beyond computation. A single case of infectious disease necessarily entails a heavy expense upon the individual or head of the family, and the consequent inconvenience and interruption to business, the suffering, loss of life, blighted ambitions and permanent disabilities incident to most of the transmissible diseases have a most important influence upon the social economy and financial prestige of the State and Nation.

The health, happiness and physical development of its citizens should be the first and paramount consideration of every government; these form the foundation for financial ascendency, and upon their durability must depend the prosperity of the commonwealth.

When an individual contracts disease he is obliged to expend part and perhaps all of his resources to regain health, and during this period and for some time following, his usefulness to the State is proportionately diminished. The various sequelæ, more or less common to all infectious diseases, are such as materially limit the productiveness of the afflicted, and frequently develop permanent and serious disabilities. Persons thus incapacitated are partially removed or totally eliminated from the productive class, and as a consequence many such become recruits for our State Institutions, thereby increasing the expenses of the State in place of its resources.

We do not intend to convey the impression that all of the inmates of our Insane Asylums, Homes for Feeble-Minded, the Deaf and Dumb or Blind, are there only as the ultimate result of infectious disease, but it is well known that many such unfortunates owe their present condition, either directly or remotely, to the sequelæ of Scarlet Fever, Measles, Cerebrospinal Meningitis, Typhoid Fever, or Syphilis, and it is probable that many of the State's convicts could trace their downfall to perverted faculties, brought about by at least one of the above mentioned causes.

It is conceded that legislation alone will not keep man rational or preserve him in bodily health, and that compulsion without opportunities for enlightenment is repugnant to modern civilization. It therefore follows that education along certain well defined lines should precede legislative enactments.

Ignorance of hygienic matters has always been the principal obstacle to sanitary progress. As the general public become more enlightened in hygiene, opposition to sanitary requirements gradually diminishes. The reason for this is too obvious to require explanation, and the fact alone is sufficient to demonstrate conclusively the need of the people and the responsibility of the State.

Our Institutions for the care of the defectives are the pride of the State and envy of our neighbors, and since the State, through its negligence of sanitary education, is in a measure responsible for the development of many of the conditions making such institutions necessary, it is but proper that it should bear the burden of caring for these unfortunates in a humane and liberal manner. But the knowledge gained through these errors and experiences should be turned to future account, and in place of drifting along and collecting new recruits and enlarging our institutions to accommodate them, we should close as many channels of supply as possible, using our best agents and endeavors to check the continually increasing waste of health, lives, and money.

If this work is undertaken with the perseverance and determination necessary to bring success, it will require a liberal expenditure of money, and although the results may not be conspicuous for some years to come, a marked improvement will be seen and substantial progress made toward the end to be accomplished, while every year's delay will correspondingly increase the irrational conditions now existing.

The State Board of Health appreciates the necessity of educating the general public in matters pertaining to sanitation and has used its best endeavors in this direction. The work already accomplished by this department, with the meager funds and equipment at its command, amply demonstrates its capabilities and the possibilities attainable, but increased usefulness and efficiency must depend upon the liberality of the legislature in providing sufficient additional appropriation to enable the Board to meet and properly discharge its responsibilities.

The Board and its officials are willing and anxious to discharge all the duties incumbent upon them, and the people expect nothing less. Under present conditions it is impossible to meet the ever

increasing demands made upon this department with anything approaching the thoroughness and promptness essential to matters of State.

A brief statement of the resources of the Board since its organization and the problems now confronting it is presented.

The Iowa State Board of Health was organized in the year 1880. The population of the State was then 1,624,615. The General Assembly provided the Board with an annual appropriation of $5,000; this represented a per capita of 3 mills. The estimated increase in population to date is 875,385. The amount of the annual appropriation provided for the State Board of Health remains the same as when first organized, but now represents a per capita of only 2 mills.

If the original ratio has been maintained in proportion to the increase in population, the Board should now receive $7,500 annually.

The Thirty-second General Assembly authorized an appropriation of $1,800 for additional clerk hire for the biennial period ending June 30, 1909, but this amount merely provides sufficient office help for the two new departments organized during this period, and unless renewed, will cease with the expiration of the present biennial period.

While increased population has added much to the responsibilities of the Board, other important factors have multiplied its duties and enlarged its field of operation. Modern improvements and environments have brought in their train sanitary problems proportionate to their advantages. The growth of commercial and social intercourse has developed need for rapid transit. Mechanical skill and popular demand for modern luxuries have created numerous elements of danger to human life, and provided new mediums favorable to development and distribution of infectious diseases. Thus diseases active in a given locality, and formerly readily confined within a small area, may be easily transported to the remotest portions of the country, within the period of incubation. The multitudinous avenues now opened to transmission of infectious material, the apparently insignificant and often unsuspected conductors, and the remote distance of the infected host, provide advantageous features for wide distribution, and practically unlimit the field for sanitary work, and continually create new and serious responsibilities for the department of public health.

Out of the annual appropriation of $5,000, the following items are permanent expenses:

Secretary's salary	$1,200.00
One Clerk and stenographer	900.00
Publishing and mailing Health Bulletin	1,451.00
Total	$3,551.00

This leaves $1,449.00 for all other expenses of the Board, including postage, printing, stationery, office supplies, and members' traveling expenses.

During the past year $600 of the expenses incident to publishing the Bulletin has been paid from fees received from the Board of Medical Examiners, and the Embalmers' and Nurses' departments, but the probable future receipts of these departments will not admit of such an arrangement being continued. The members of the Board receive no compensation for their services in connection with the Board of Health, and are allowed only actual traveling expenses incurred in going to and from the meetings.

A review of the laws pertaining to the State Board of Health will give a partial understanding of the numerous duties and responsibilities devolving upon this department. But few outside those immediately responsible for the discharge of these duties have a true conception of the wide scope and varied detail of the work or its importance to the people of the State.

It is popularly supposed that the Board is provided with ample means to perform all the duties incumbent upon it, but the numerous demands for advice, investigations, and many other services required by the public cannot receive the attention they deserve owing to the lack of funds and facilities.

On several occasions in former years, the expenses of this department exceeded the annual appropriation by several hundred dollars, owing to urgent exigencies that could not be avoided. The period ending June 30, 1908, shows a deficit of $122.38, the balance of the deficit of $892.46 carried forward from June 30, 1906. On June 30, 1908, there was an unexpended balance of $34.25 in the Maternity Hospital account; if this be deducted from the deficit above shown, the deficit of the Board to date is $88.13. The actual amount expended during the biennial period being $10,122.38.

SUMMARY OF CLASSIFIED EXPENDITURES.

For the Fiscal Year Commencing July 1, 1906, and ending June 30, 1907.

Members' Expense, Board Meetings	$ 525.44
Members' Expense, other official business	201.62
Salaries and Clerk Hire	2,128.30
Postage	255.00
Stationery, Printing and Binding	1,012.24
Books and Miscellaneous	127.02
Telephone and Telegraph	47.08
Expressage	14.43
Total Expense for the year	$4,311.13

SUMMARY OF CLASSIFIED EXPENDITURES.

Fiscal Year From July 1, 1907, to June 30, 1908.

Members' Expenses, attending Board Meetings	$ 795.75
Members' Expenses, other official business	487.33
Salaries and Clerk Hire	2,159.50
Postage	160.00
Stationery, Printing and Binding	1,111.75
Books and Miscellaneous	143.99
Telephone and Telegraph	49.68
Expressage	10.79
Total Expense for the year	$4,918.79

EXPENDITURE FOR BOARD OF HEALTH FOR BIENNIAL PERIOD.

June 30, 1906, to June 30, 1907	$ 4,311.13
June 30, 1907, to June 30, 1908	4,918.79
Total expense of the biennial period	$ 9,229.92
Overdrawn during 1906 and paid during '07-'08	892.46
Amount paid by Board of Health Appropriation	$10,122.38
Amount of two annual appropriations	10,000.00
Overdrawn on July 1, 1908	$ 122.38
Balance in Maternity Hospital Department	34.25
Leaving an actual deficit for Board of Health	$ 88.13

NOTE.—(The Treasurer's books show that the amount overdrawn on July 1, 1906, was $587.56. In addition to this, expense incurred prior to June 30, 1906, but for which bills had not been presented at that time, and some warrants uncashed, $304.90, was paid during the year from July 1, 1906, to June 30, 1907. Making a total of $892.46 paid during that year besides the actual expense incurred.)

By the strictest economy the Board has endeavored to keep its expenditures within the appropriation, but to accomplish this, its usefulness and efficiency have necessarily been curtailed. As the legislature seriously objects to expenditures beyond the amount appropriated, and as the continually increasing duties and responsibilities placed upon this department ought not to be disregarded and cannot be discharged with the insufficient funds and office force at its disposal, it is evident that an additional appropriation is absolutely necessary.

In view of these facts, the following statement of expenses essential to economically and properly perform the duties of the department is submitted:

Chief Clerk	$ 1,020.00
One Assistant Clerk and Stenographer	900.00
One Assistant Clerk and Stenographer	720.00
One Record and Filing Clerk	900.00
For Expenses incident to publishing Bulletin	1,600.00
Postage	500.00
Printing, Stationery and office supplies	1,500.00
Members' Traveling Expenses	1,500.00
Contingent Expenses, including Extra Clerk Hire, Investigations, Sanitary Educational matters, and other incidental expenses	2,000.00
Annual Requirement	$10,640.00

NOTE.—(In addition to the above, a clerk should be provided for the State Board of Medical Examiners. While this is a separate Board, its membership is composed of the physicians of the Board of Health, and as the Secretary of the Board of Health is also the Secretary of the Board of Medical Examiners, and all the business is transacted in this office, it is considered a department of the Board of Health, and since its duties have assumed such large proportions, the services of one clerk are continually required to attend to the detail work and daily correspondence.)

In connection with the responsibility of the State in regard to the protection of the public health it will be interesting to compare the annual appropriations of other States with that of Iowa. None of these have as extensive responsibilities as the Iowa Board, many of them having but one or two departments and a much smaller State population.

The list is arranged according to the annual appropriation as compared with the population and is compiled from recent reports. the amounts given are for the maintenance of the Board of Health

and its office and office force, but do not include the appropriation for Chemical or Bacteriological Laboratories, and, excepting Iowa, do not include clerical assistance for the Board of Medical Examiners:

State	Population	Annual Appropriation	Per Capita
Florida	528,542	$ 60,000	113 mills
Pennsylvania	6,302,115	300,000	47.7 mills
Virginia	200,000	40,000	20 mills
Montana	300,000	6,000	20 mills
Colorado	615,570	11,600	19.2 mills
New York	8,580,693	152,000	18 mills
Maryland	1,188,044	18,500	16 mills
New Hampshire	430,000	6,800	16 mills
Delaware	200,000	2,500	12 mills
Rhode Island	500,000	6,000	12 mills
Kansas	1,700,000	18,500	11 mills
Maine	694,466	8,000	11.4 mills
Ohio	4,500,000	45,000	10 mills
Vermont	250,000	3,500	10 mills
South Carolina	1,340,316	12,000	9 mills
Michigan	2,611,792	19,500	8 mills
Indiana	2,691,263	18,500	7 mills
Louisiana	1,500,000	10,000	6.6 mills
Minnesota	2,000,000	12,000	6 mills
Washington	1,200,000	6,250	5.2 mills
Missouri	3,106,665	15,000	5 mills
Connecticut	1,100,000	6,000	5 mills
Wisconsin	2,300,000	9,000	4 mills
Oklahoma	1,700,000	7,000	4 mills
Nebraska	1,200,000	5,000	4 mills
North Carolina	1,893,810	7,000	3.7 mills
Mississippi	1,750,000	5,000	2.8 mills
Iowa	2,500,000	5,000	2 mills

REPORT OF INFECTIOUS DISEASES.

Prior to the adoption of the Revised Rules and Regulations, October 22, 1907, the reports of infectious diseases received at this office were so meager and unreliable as to be practically worthless for statistical purposes. Owing to the absence of reliable data it was impossible to determine the relative prevalence of the various communicable diseases.

Appreciating the need of such data and for the purpose of establishing a closer supervision over Local Boards, the State Board adopted the following rule providing for daily reports to the Secretary of this Board:

RULE 3. It shall be the duty of the mayor of every city or town, and the clerk of every township, to report to the Secretary of the State Board of Health, within twenty-four (24) hours after being notified thereof, every case of contagious or infectious disease reported to him; and upon receiving notice of the subsidence of such disease, to likewise immediately report that fact, together with the mode of termination, whether by death or recovery. All reports provided for in this regulation, shall be made upon postal cards in accordance with the following forms adopted by the State Board of Health.

DAILY REPORT.

DEPARTMENT OF PUBLIC HEALTH.

County..... Date..... 190....

To the Secretary, State Board of Health:
The following cases of infectious diseases were reported to this office today:

For Quarantine	Number	Total for Month to Date	For Placarding or Record	Number	Total for Month to Date
Asiatic Cholera			Chickenpox		
Diphtheria			Measles		
Scarlet Fever			Typhoid Fever		
Smallpox			Tuberculosis		
Cerebrospinal Meningitis			Whooping Cough		
			Pneumonia		
Total			Total		

.....M. D.
Health Officer.

Mayor-Clerk.

City or Township of.....

REPORT OF RECOVERY.

DEPARTMENT OF PUBLIC HEALTH.

County.....

Date.....190....

To the Secretary, State Board of Health:

The following cases of infectious diseases, previously reported to you from this office, have terminated as follows:

Diseases	Recovery	Deaths
Asiatic Cholera		
Cerebrospinal Meningitis		
Diphtheria		
Scarlet Fever		
Smallpox		
Chickenpox		
Measles		
Typhoid Fever		
Tuberculosis		
Whooping Cough		
Pneumonia		
Total		

The premises infected by these diseases have been properly disinfected and released.

.....M. D.

Health Officer. Mayor-Clerk.

City or Township.....

By reference to the table given below it will be seen that the reports received for the first six months of 1908 are much more complete than those received during the preceding six months. While many of the Mayors and Township Clerks promptly complied with the requirements for daily reports, others have entirely neglected this duty, so that the reports for the whole State are not yet as complete as they should be. We trust in time these officials will appreciate the importance of accurate statistics and cheerfully and promptly forward their reports to this office.

REPORT OF INFECTIOUS DISEASES FOR THE LAST SIX MONTHS OF THE YEAR 1907.

Month	Scarlet Fever	Diphtheria	Smallpox	Cerebrosp'l Meningitis	Measles	Whooping cough	Chickenpox	Mumps	Puerperal Fever	Typhoid Fever	Tuberculosis	Pneumonia	Total
July	12	8	27	0	56	0	1	0	0	2	0	0	106
Aug.	10	4	8	0	4	0	0	0	0	43	0	0	79
Sept.	1	0	8	0	0	0	0	0	0	10	1	0	20
Oct.	0	6	17	0	0	0	0	0	0	0	0	0	17
Nov.	0	0	95	0	0	0	0	0	0	0	0	0	95
Dec.	138	98	237	0	138	30	88	23	0	25	117	293	1,157
Total	161	110	392	0	198	30	89	23	0	80	118	293	1,471

REPORT OF INFECTIOUS DISEASES FOR THE FIRST SIX MONTHS OF THE YEAR, 1908.

Month	Scarlet Fever	Diphtheria	Smallpox	Cerebrosp'l Meningitis	Measles	Whooping cough	Chickenpox	Mumps	Puerperal Fever	Typhoid Fever	Tuberculosis	Pneumonia	Total
Jan.	272	139	410	17	287	72	102	20	1	37	19	55	1,431
Feb.	285	143	573	16	584	107	145	27	0	24	20	103	2,023
March	232	79	478	31	747	120	98	87	0	16	24	57	1,999
April	227	67	508	21	1,088	70	146	35	0	49	17	45	2,281
May	184	77	357	15	1,095	70	89	79	0	37	25	29	2,037
June	62	33	142	4	465	35	39	10	2	20	13	5	835
Total	1,272	544	2,468	107	4,266	483	619	258	3	183	118	294	10,506

By referring to the report of the Department of Vital Statistics (elsewhere in this volume), it will be seen that during the biennial period ending June 30, 1908, 10,547 deaths were caused by preventable diseases as follows:

Pneumonia	4,222
Tuberculosis	3,150
Meningitis	853
Influenza	699
Typhoid Fever	538
Diphtheria	423
Whooping Cough	222
Scarlet Fever	177
Measles	139
Puerperal Septicemia	110
Smallpox	14
Total	10,547

PNEUMONIA AND INFLUENZA.

While pneumonia and influenza are not generally recognized by the laity as infectious diseases, the medical profession has for years known that both are communicable from one person to another. Persons affected with either of these diseases should be isolated so far as possible from other members of the family and precautions taken to disinfect the sputum and nasal discharges. The sickroom should also be properly disinfected after death or recovery of the patient.

If the general public would heed the suggestions of the Board concerning isolation and disinfection, a large proportion of the present death rate could be prevented.

CEREBROSPINAL MENINGITIS.

The 853 deaths caused by Meningitis include all types of the disease but as the reports received at this office are not sufficiently explanatory, it is impossible to determine the actual number of deaths due to epidemic Cerebrospinal Meningitis.

If physicians would exercise more diligence and care in defining the actual cause of death they would add much to the value of statistics. Since January 1, 1908, 107 cases of epidemic Cerebrospinal Meningitis have been reported officially but it is probable others occurred that were not recognized as being of the epidemic type.

In April, 1907, the disease made its appearance in Appanoose County, within a few miles of the Missouri line, in which State it was reported to be alarmingly prevalent. Later cases were reported in Wapello, Ankeny, Council Bluffs, and other points in the Southern portion of the State, the disease invariably proving fatal.

Upon the first appearance of the disease the local authorities failed to realize its infectious character, and consequently neglected to adopt preventative measures. Numerous letters from physicians in the Southern part of the State indicated that the disease had gained a foothold in numerous localities and was fast assuming epidemic proportions.

As the funds at the disposal of the State Board of Health would not permit an extensive investigation, the Executive Council was appealed to in the hope that some financial assistance might be obtained; but there were no available funds that could be legally used for this purpose, and although the Executive Council fully appreciated the serious danger of an epidemic, it was without authority to convert money for this purpose.

Drs. Linn, Moerke and Eiker, at their own expense, made a number of investigations and reported their findings to the Board.

Up to the present time science has been unable to determine the exact point of invasion or mode of transmission of Cerebrospinal Meningitis; but reasoning from the experience gained during the epidemics in some of the Eastern States, it seems probable that the germ enters the system through the nasal membranes, eventually traversing to the coverings of the brain. As to the means by which it is transmitted, we are almost entirely in the dark.

Fortunately the organism appears to be of low vitality and mildly resistant to ordinary disinfectants, but its rapid invasion and invariably fatal results demonstrate the necessity for prompt and heroic measures of suppression.

In view of these facts the State Board of Health has adopted a regulation providing for strict quarantine of all premises where this disease appears, and of all persons and effects thereon. Public funerals of persons dying from this disease are prohibited, and disinfection of the premises is required before the release of quarantine. It is also recommended that the nose and throat of all persons, especially children, exposed to the disease, be sprayed or washed every few hours with a mild antiseptic solution and that wherever the disease develops the patient should be isolated from other members of the family.

It is probable that Cerebrospinal Meningitis of the lower animals may prove to be identical with that of the human species. There is a marked similarity in the course of the disease, as well as its onset and termination. Of those attacked, few survive, and it is seldom that any escape serious permanent disabilities. Whenever a case appears it should be promptly reported for quarantine, and local authorities should immediately notify the Secretary of the State Board of Health.

In another part of this report will be found an article on Cerebrospinal Meningitis.

TYPHOID FEVER.

This disease was responsible for 538 deaths, many of which were probably due to the consumption of contaminated water or milk, and directly to the negligence of local officials. The report on Water Analysis (page 35) and the article on Sanitary Water Analysis and Purification (elsewhere) will explain the mode of infection, and the number of deaths reported is a strong argument in support of the recommendation for a Chemical Laboratory.

MEASLES.

In the roll of mortality Measles claims 139 as its share of deaths, 38 less than Scarlet Fever, and 125 more than Smallpox.

The above figures do not include the probable scores of deaths caused by conditions arising as the direct result of Measles, nor do they denote the frequent and serious permanent disabilities resulting therefrom.

Many a mother has been known to wilfully expose her child to Mealses upon the first favorable opportunity, believing that the disease is a natural heritage to childhood, and that Measles contracted before the child entered its "teens" would not only be harmless, but insure permanent immunity from subsequent attacks. Experience has demonstrated the fallacy of these theories.

It is true that many children who contract the disease make uneventful recoveries and apparently regain their former standard of health, but these should be regarded as fortunate exceptions. All febrile diseases, especially those of an infectious character, have a tendency to injure or destroy certain tissue cells, and thus lower the resisting power of the individual. As nature does not always repair this damage, more or less permanent weakness or actual injury follows, frequently resulting in serious impairment to one or more important organs. As sequent maladies are usually insidious, permanent infirmities generally develop before the child or its parents recognize that anything is seriously wrong. It may be weeks, months, or years before such defects develop, and the remote origin is forgotten until the physician's interrogations as to the past history of the patient unfolds the shroud of mystery. It may then be too late to remove or overcome the defects and the innocent child must suffer the consequences of its parent's negligence.

Measles is a highly infectious disease, capable of rapid and wide dissemination, but if Local Boards of Health, and the public generally, heed and promptly comply with the requirements of the State Board concerning isolation and disinfection, there need be no epidemics; for it is possible to limit the exposures if active measures are taken upon the first appearance of the disease in the community.

In some few instances the Board has been severely criticized for requiring isolation and disinfection in cases of Measles and Whooping Cough, it being claimed that both precautions "are unnecessary and an unwarrantable assumption of authority." Fifteen years ago the same criticisms were heard concerning regulations for the prevention of Diphtheria and Scarlet Fever, but today the public recognize the value and importance of preventative measures in these diseases.

RULES AND REGULATIONS.
DISINFECTION AND PAYMENT OF EXPENSES.

As before stated, the State Board of Health was organized in 1880, and proceeded to adopt Rules and Regulations from time to time as circumstances required. These have been added to and amended and re-amended until little of the original remained.

Increased density of population, changed environments in every community, and improved methods of sanitation rendered the former regulations obsolete and ineffective and the numerous amendments created conflicts and inevitable perplexity for the local officials.

When the present Secretary was installed in office, he was besieged with requests for interpretations and instructions as to how Local Boards should proceed to enforce the regulations. It soon became apparent that prompt measures must be taken to disentangle the mesh of confusion. The matter was laid before the Board at its next meeting and after a careful analysis of the situation it was decided that the only practical way to accomplish this was to repeal all existing regulations and adopt a complete new set. This work was at once undertaken and concluded at a special meeting held August 28, 1907.

The adoption of the New Code of Regulations by the State Board repealed all former rules and regulations. Local Boards were at once notified of this action, and instructed as to their duties prescribed by Sections 2565, 2571 and 2572 of the Code.

The Secretary was instructed to publish the Code of Regulations in pamphlet form together with the laws pertaining to the Board of Health, and distribute the same to all Local Boards, Health Officers, and other officials. An issue of 18,000 copies was printed. 16,000 of which were distributed in November. Seven and one-half tons of paper was required for the edition and the total cost of printing and publishing same amounted to $736.75.

As the postage on this issue at the usual rates for pamphlets would have amounted to over $700.00, it was decided to publish the

Code as a Supplement to the "Iowa Health Bulletin." By this means almost $600.00 was saved to the State.

Section 2572 of the Code provides that Local Boards of Health "shall obey and enforce the Rules and Regulations of the State Board." Section 2571 provides that "they," the Local Boards, "shall give notice of all regulations adopted by publication thereof in some newspaper, printed and circulated in the Town, City, or Township, or, if there be none, by posting a copy thereof in five public places therein."

The rules pertaining to prevention of infectious diseases and disinfection are contained in the first two chapters of the Code of Regulations, and include all that the Local Boards are required to publish. After the Local Boards had been instructed by this office in their duties concerning publication, we were besieged with inquiries concerning the law, and referred the matter to the Attorney General for an official opinion.

The following is his reply to letters upon this subject:

DES MOINES, IOWA, February 11, 1908.

DEAR SIR: I am in receipt of your communication of February 7th requesting an opinion as to the necessity of local boards of health publishing Chapters 1 and 2 of the Rules and Regulations of the State Board of Health. I note what you say with reference to the fact that the publication of these rules by the various local boards will involve considerable expense to such boards. While this is a matter not to be ignored, it is nevertheless my opinion that the law contemplates the publication of all rules and regulations made by your local board of health or the State Board of Health, which you expect to enforce in your community.

Section 2571 of the Code Supplement provides that local boards of health shall give notice of all regulations adopted by publication thereof in some newspaper printed and circulated in the town, city or township, or if there is none, by posting a copy in five public places therein.

Section 2572 of the Code Supplement provides that local boards of health shall obey and enforce the rules and regulations of the State Board.

It seems to me that all rules and regulations of the State Board which local boards intend to enforce in their communities must of necessity be adopted, and if adopted, must be published pursuant to the provisions of Section 2571 aforesaid. This position is made clear by the provisions of Section 2573 of the Code, which provides among other things, that any person who knowingly fails, neglects or refuses to comply with and obey any order, rule or regulation of the State or local board of health, or any provision of Chapter 16, Title 12, which prescribes the rules and regulations of the State and local boards of health, after notice thereof has been given as in said chapter provided, shall be guilty of a misdemeanor and subject to penalties therein applied. In other words, before any person may be criminally punished or subjected to the penalty prescribed in Section 2573 of the Code, notices must have been published as provided in said chapter, and the only provision in said chapter for publication of notice is that found in Section 2571 aforesaid. The very purpose of the publication is that every person in the community may know, or have an opportunity to know, what the rules and regulations are which the local board of health expects to enforce in that community, regardless of whether the same is made by the local board of health itself, or whether it is made by the State Board of Health and of such a nature as to be applicable to every community, and therefore to be adopted and enforced by the local board of health.

An examination of the original acts of the legislature and the Code of 1873 leaves no doubt that this was the legislative intent. The Code Revisioners have rearranged certain sections and chapters, but nothing has been done which warrants the conclusion that there was any intention to repeal the original provisions of the law which requires publication by local boards of health. This has been the ruling of this department since 1896 when Milton Remley, then Attorney General, gave an opinion to Dr. J. F. Kennedy, Secretary of the State Board of Health, upon this question and took the position herein maintained.

The practical thing to do is for several local boards in the same county to join together in one publication, each local board to adopt the same separately and have a separate certification. If this method is pursued it should be done in such a manner that the provisions of Section 2571 of the Code are not violated.

Very truly yours,

H. W. BYERS,
Attorney General of Iowa.

Prior to the adoption of the new Regulations the Board had not prescribed any special method for disinfection. It did require that persons and premises infected with an infectious disease should be disinfected before the release of quarantine, but the means employed and the quantity and quality of the material to be used were left to the discretion of the family or the attending physician. This, as a general rule, resulted in the work being imperfectly performed and often entirely neglected.

At this period the Statutes did not provide for the payment of expenses incurred for disinfection, and the parties in quarantine were not always disposed to expend money to protect their neighbors from a disease they themselves had contracted from others equally negligent.

Section 2570-a of the Supplement to the Code (1907) provides that "When *any person* shall be *sick or infected* with smallpox *or other infectious or contagious disease dangerous to the public health*, whether a resident or otherwise, the Local Board of Health *shall* make such provisions as are best calculated to protect the inhabitants therefrom," * * * "and *shall* provide *needful* assistance and

supplies." "*All* bills for expenses *incurred in carrying out the provisions of this Section and in establishing, maintaining or raising* a quarantine, *including disinfection*" * * * "shall be filed with the Clerk of the Local Board of Health, which Board shall examine the same and act thereon" * * * "and shall certify the amount allowed by it thereon to the County Auditor, and the County Board of Supervisors *shall* act upon said *bills as thus certified at its first regular meeting thereafter.*"

NOTE.—(Section 2570 of the Code of 1897 was repealed by the Twenty-ninth General Assembly and a substitute therefor enacted. The Thirtieth General Assembly amended the enactment of the Twenty-ninth General Assembly. The Thirty-first General Assembly repealed the amendment of the Thirtieth General Assembly and also the substitute enacted by the Twenty-ninth General Assembly, and enacted in lieu thereof what is now known as Section 2570-a of the Supplement to the Code.)

By enacting the last mentioned substitute the Legislature decided that disinfection, after infectious diseases, is a precautionary measure necessary to protect the public health and therefore expenses thus incurred should be paid from the public funds.

To attain the results desired by the Legislature the various details incident to disinfection must be thorough and exact in every particular, and to insure this, the work must necessarily be performed or supervised by competent persons.

In order to determine the most reliable and economical method of disinfecting, the Board caused a series of experiments and demonstrations to be made in the Bacteriological Laboratory under the direction of Dr. Henry Albert; and on the basis of his report formulated and adopted certain rules concerning the detail to be followed, and the agents and quantity of each to be used.

As the Statutes provide that every Local Board "*shall appoint a competent physician as its Health Officer*" such official is the logical person to supervise disinfection. The rules therefore provide that all disinfection before the release of quarantine shall be done by the Health Officer, or under his personal supervision. The official method of disinfecting as prescribed by the State Board is set forth in Chapter II of the Regulations.

There are 810 incorporated cities and towns, and 1,614 townships in this State, making a total of 2,424 Local Boards of Health. These are all under the direct supervision of the State Board. In a few of the smaller towns and in some townships the Local Boards have neglected to conform to the requirements of Sections 2568 and 2571 of the Code. In others the organization is imperfect and the Regulations of the State Board are not promptly or properly enforced. This is entirely due to the negligence of the local officials and their laxness in discharging their duties to the people who elected them to office. In many instances Local Boards have been repressed, or seriously hindered in the discharge of their duties, by the action of the County Board of Supervisors in refusing to pay bills incurred in accordance with the provisions of Section 2570 of the Code. This is an assumption of authority not contemplated by the Statute and has led to many unfortunate complications.

With a view of avoiding further misunderstandings between the Local Boards of Health and the Boards of Supervisors, the Secretary sent a copy of the following letter to every County Auditor with the request that he read it to the Board at its next meeting:

DES MOINES, IOWA, March 18, 1908.

TO THE CHAIRMAN AND MEMBERS OF THE BOARD OF SUPERVISORS:

Gentlemen,—The numerous inquiries received at this office and that of the Attorney-General relative to the payment of quarantine and other expenses of the Local Boards of Health, indicate that many of the local officials are laboring under a serious misunderstanding of the laws bearing upon these subjects, resulting in undesirable complications and obstructions or delays in enforcing the sanitary regulations. In view of these conditions it has become necessary to call your attention to the provisions of the Statutes defining the duties of Local Boards of Health, and also the extent to which a County Board of Supervisors is authorized to participate in these matters.

Section 2572 of the Code provides as follows: "Local Boards of Health shall obey and enforce the rules and regulations of the State Board; and peace and police officers within their respective jurisdictions when called upon by the Local Boards, shall execute the orders of such Board."

Section 2571 as amended provides for regular meetings of Local Boards in April and November of each year and special meetings at other times as may seem necessary; also for publication of all regulations adopted, and for reports to the State Board of Health. All expenses incurred in the enforcement of the provisions of this Chapter, when not otherwise provided, shall be paid by the town, city or township; *in the case of townships*, the trustees (Local Board of Health), shall certify the amount required to pay such expenses to the Board of Supervisors of the County and it *shall advance the same*, and at the time it levies the general taxes, shall levy on the property of such township a sufficient tax to reimburse the county for the whole amount advanced. (See Section 2571 as amended by the 28th G. A.) Under the provisions of this Section you will see that the Local Boards are obliged to publish the regulations, (see also copy of opinion by the Attorney-General, attached), that in the case of cities and unincorporated towns, the expenses thus incurred must be paid from the general fund of the municipality and that the expenses incurred by the *townships* shall be advanced by the Board of Supervisors as a loan to the township.

Section 2568 provides for the organization of Local Boards of Health and prescribes their authority and duties in general as well as that of the Mayor and Township Clerk in relation to quarantine. This section also provides that every Local Board "shall appoint a competent physician as its Health Officer," and also that "it (the Local Board) shall regulate all fees and charges of persons employed by it in the execution of health laws and its own regulations and those of the State Board of Health." Under these provisions the Local Board of Health must determine the compensation to be paid its Health Officer, either in fees or annual salary, and the amount so allowed must be paid in the manner prescribed in Section 2571, Supplement to the Code. In the case of *Lacey vs. Kossuth County*, Ia., 106-16, the Supreme Court held that the physician appointed Health Officer of a Local Board of Health becomes simply an officer to assist in the administration of the law and the enforcement of the regulations of the Board and is not required to treat the sick in his professional capacity. If called into service by the *Local Board to treat* persons infected with contagious disease he is entitled to (additional) compensation, although the County may have had a contract with another physician to treat all the paupers of the county. The fact that the patient is a pauper is material in determining who shall pay the bill and not with reference to who shall perform the service. Thus it has been definitely settled that a county contract for medical service cannot legally include attendance upon cases of contagious or infectious diseases, and that where the services of a physician are required, at public expense, by persons in quarantine, the Local Board having jurisdiction, must designate the physician to render such service regardless of any contracts or orders made by the Board of Supervisors.

The State Board of Health, under the provisions of Section 2565 of the Code, is given general charge and supervision over the interests of the health and life of the citizens of the State and matters pertaining to quarantine and authorized to make such rules and regulations as it may find necessary for the preservation and improvement of the public health, and when such regulations are made they shall be enforced by Local Boards and peace officers of the State.

At an adjourned meeting held August 28th, 1907, the State Board *repealed all rules and regulations in force prior to that date* and adopted what is known as the Revised Code of 1907, copies of which have been supplied to all Local Boards. Chapters 1 and 2 of the Revised Code relating to quarantine and disinfection, must be adopted, obeyed, published and enforced by all Local Boards. The publication must be in accordance with the provisions of Section 2571 of the Code in order that the people of every community of the State may be properly informed as to the sanitary regulations. While this will necessarily entail considerable expense upon every community, it is the act of the legislature and the law of Iowa, and must be strictly complied with.

QUARANTINE EXPENSES.

Section 2570 of the Code as amended by Chapter III, Acts of the Thirty-first General Assembly, provides for the payment of expenses incurred by Local Boards in establishing, maintaining or raising a quarantine, including disinfection and the building and furnishing of a detention hospital. The Local Board is here required to protect the public from infectious diseases and provide for persons in quarantine. From the reading of this section it is evident that the Legislature regarded quarantine of persons affected with an infectious disease as necessary for the benefit and protection of the public and consequently expenses thus incurred should be paid by the public regardless of the affected person's financial ability.

The provisions or orders for needful assistance, nurses, medical attendance and supplies must under all circumstances be made by the Local Board of Health, or its authorized official, *before such are supplied to the persons in quarantine*, otherwise it is doubtful if the county or the town or township could be held liable for any part of such expenses. Persons engaging attendance or ordering supplies upon their own motion without a *special order* from the Local Board of Health or its duly authorized official, should be required to pay for the same. Local Boards of Health when ordering supplies should exercise good discretion as to quantity and quality and see that the price agreed upon does not exceed the reasonable value of the property furnished. The compensation to be allowed physicians and nurses or other necessary attendants should be determined by the Local Board, preferably by standing regulation, and should not exceed the amount usually paid for such service in the community. All bills incurred and allowed under the provisions of this section, shall be certified by the Local Board of Health to the Board of Supervisors who may revise (increase or reduce) the amounts so allowed, the intent of the law being to insure justice to all persons concerned and to prevent unreasonable or exorbitant charges. If the Local Boards of Health and the County Board of Supervisors would diligently observe both the letter and the spirit of the law, there could be no contention between these bodies, and no criticism of their actions.

The regulations of the State Board of Health direct that all quarantines shall be visited at least once in every twenty-four hours. This is for the purpose of seeing that the regulations are being properly observed and to ascertain the wants of the persons confined on the premises. In cities and incorporated towns this service should be included in the duties and compensation of the sanitary police; but in the case of townships the duty must devolve upon the Township Clerk or some responsible person designated by him. As these duties come under the police powers of the State the Township Clerk or person designated by him is entitled to receive the same compensation as when discharging other duties of his office.

In all cases the Local Board of Health has full authority to determine the needs of its own community, and, provided the bills incurred are reasonable and properly certified to, and in accordance with the Statutes, the Board of Supervisors have no authority to refuse payment.

All disinfection before the release of quarantine must be done at public expense, and in accordance with the provisions of Chapter 2 of the Regulations of the State Board of Health. The disinfecting must be done by the Health Officer or by a competent person under his supervision. His compensation for this service should be included in his salary or provided for by fixed fees to be determined by the Local Board.

In matters pertaining to quarantine and sanitation, the Local Board of Health has superior jurisdiction over all other bodies within its community; but if a Local Board should fail or neglect to properly enforce the Regulations of the State Board of Health, the State Board is authorized by Section 2572 to enter the jurisdiction of such Local Board and enforce the said regulations. All expenses thus incurred shall be paid in the same manner as expenses of the Local Board.

Misunderstandings and friction between Local Boards and Boards of Supervisors need not and should not occur; each has its proper duties to perform, and neither should attempt to usurp the authority or rights of the other. By co-operation a uniform system can be devised such as will insure satisfaction to all parties concerned. I would therefore recommend that you invite the Clerk of each township and the Mayor of each incorporated town in your county to meet with you at the county seat and agree upon a uniform scale of fees and charges to be allowed for service and supplies furnished to persons in quarantine, and that the Board of Supervisors agree to audit and pay bills certified in accordance therewith.

I would also suggest that the township Local Boards *authorize* the Board of Supervisors to contract for all printing and for the purchase of disinfecting materials, and that they supply the same to the Local Boards, charging each with the actual cost of the amounts required. Such an arrangement would be legal and insure the purchase of these articles at the lowest discount, and under a guarantee as to quality, thus improving the public service and materially reducing the expenses for these items.

Trusting you will consider these suggestions as made solely in the interest of the public service.

Respectfully,

LOUIS A. THOMAS,
Secretary State Board of Health.

The following letter and the opinion of the Attorney General given in reply will be of interest:

IOWA STATE BOARD OF HEALTH.
DES MOINES, IOWA, July 22, 1908.

HON. H. W. BYERS, Attorney General State of Iowa, Des Moines, Iowa.

MY DEAR SIR: I herewith enclose a communication from Mr. J. E. Varnum, Clerk of the town of Eldon, Iowa. Will you please give me your opinion as to what course should be pursued by the Local Board of Health of the town of Eldon, under the following circumstances:

The Local Board of Health of the town of Eldon authorized its Health Officer to attend and disinfect certain cases of Measles. The amounts agreed upon for said services are considered by the Local Board of Health to be reasonable, and the bills for said services were promptly certified

to the County Board of Supervisors for payment; the said County Board of Supervisors refused to pay the said bills. As the Health Officer failed to receive compensation for his services as authorized by the Local Board of Health, he resigned his position as Health Officer.

The Local Board of Health has offered the position to other physicians, all of whom refused to serve, on the ground that they could not receive compensation for their services owing to the action of the Board of Supervisors. The Local Board is thus without a Health Officer.

It has been held that a Local Board of Health could not be considered legally organized unless it appointed a qualified physician as its Health Officer, and unless properly organized, the Board could not enforce its Rules and Regulations nor those of the State Board of Health. While the disease known as Measles is not placed in the list of quarantinable diseases such as Scarlet Fever, the Regulations of the State Board of Health require that all persons affected with Measles shall be isolated from other persons of the household, and that all persons infected with and all children known to have been exposed to this disease shall be confined to the premises. This in reality amounts to a quarantine of all infected persons.

Measles is one of the most infectious diseases that health authorities have to contend with, and while it is true that many of these cases terminate in recovery without leaving any ill effects, it is also true that many of the serious complications found in severe cases of Scarlet Fever or subsequently developing as sequel thereto are frequently found during and following attacks of Measles.

The statistics of this State show that during the year commencing July 1, 1906, and ending June 30, 1907, more deaths were caused by Measles than by either Scarlet Fever or Smallpox.

I should also be obliged if you will give your opinion as to the action of the County Board of Supervisors in refusing to pay the above mentioned bills on the ground that the State Board of Health exceeded its rights and authority when it adopted its Rules and Regulations.

Very truly yours,

LOUIS A. THOMAS,
Secretary.

STATE OF IOWA.
OFFICE OF ATTORNEY GENERAL.

DES MOINES, IOWA, July 30, 1908.

LOUIS A. THOMAS, Secretary State Board of Health, Des Moines, Iowa.

SIR: I am in receipt of your communication of the 22d instant advising that the Local Board of Health of the town of Eldon, Iowa, authorized its Health Officer to attend and disinfect certain cases of Measles. That thereafter the Health Officer filed his bill for services with the Local Board of Health and the Local Board of Health duly approved the same and certified said bill to the Board of Supervisors for payment. That the said Board of Supervisors refused to pay said bill upon the ground that the State Board of Health exceeded its authority when it adopted its Rules and Regulations under which Local Boards of Health are now governed.

You request an opinion as to whether the action of said Board of Supervisors in rejecting said bill for the reason stated is legal.

It is my opinion that the State Board of Health had full authority to pass its said Rules and Regulations, and that the action of the Board of Supervisors in rejecting the aforesaid bill for the reason heretofore stated is erroneous.

Respectfully,

H. W. BYERS,
Attorney General of Iowa.

DISINFECTION OF SCHOOL HOUSES.

Attention is called to the following opinion of the Attorney General concerning the payment of expenses for disinfecting school houses.

"SIR: I beg to acknowledge receipt of your communication asking for an opinion as to whether the expense of disinfecting public school buildings should be paid from the funds of the school district or by the Local Board of Health.

In response thereto I have to say that since the rules of the State Board of Health require the disinfection to be under the personal supervision of the Health Officer, and since by the same rules School Boards are required to keep the school buildings and premises in a sanitary condition, it is my opinion that the disinfecting material should be furnished by the School Board, and the cost thereof paid from the funds of the school district, and that the work of disinfection and supervision thereof should be done by the Local Board of Health.

Respectfully,

H. W. BYERS,
Attorney General of Iowa.

January 13, 1908.

To Dr. Louis A. Thomas, Secretary State Board of Health.

ANALYSIS OF PUBLIC WATER SUPPLIES.

With the view to prevent Typhoid Fever and other ailments caused by polluted drinking water, the State Board of Health has adopted the following regulations concerning analysis of water supplied to the public:

SAMPLES FOR ANALYSIS.

RULE 1. The local manager of any private corporation owning or operating a plant from which water is supplied to the public, and the superintendent of any water works or public wells owned or operated by any municipality in the State of Iowa, shall cause a sample of the water so supplied to be submitted to the Chemist of the State Board of Health for sanitary analysis. Said sample shall be accompanied with the collection blank properly filled out.

WHEN TO BE SUBMITTED.

RULE 2. The samples provided for in Rule 1 of this Chapter shall be submitted between the 1st day of August and the 1st day of November of each year, and at such other times as the State or Local Board may direct. All samples for analysis shall be in accordance with the instructions set forth in Rule 6 of this Chapter.

REPORT AND FEES.

RULE 3. The Chemist of the State Board of Health shall make a written report of each analysis conducted under the provisions of this Chapter, said report shall be made in duplicate and upon proper forms adopted by this Board, one copy being filed with the Secretary of the State Board of Health, and one copy with the Clerk of the Local Board from whose jurisdiction the sample of water was obtained. The Chemist of the State Board of Health shall be entitled to a fee of $10.00 for each sample of water analyzed, said fee to be paid by the corporation, municipality or individual for whom the analysis is made.

HOTELS, RESTAURANTS, ETC.

RULE 4. The provisions of Rules 1-2-3 of this Chapter shall also apply to hotels, restaurants and boarding houses, and to the proprietors of every such establishment, whenever the water furnished to the patrons thereof is procured from private wells or sources other than the public water supply of the city or town.

ACTION TO BE TAKEN ON REPORT.

RULE 5. Whenever any analysis provided for in this Chapter shall reveal the presence of sewage, or other forms of pollution, rendering such water unfit or dangerous for domestic uses, the Secretary of the State Board of Health shall so notify the proper officials of the city, town or township concerned and direct them to make a proper investigation as to the cause of such pollution and forthwith report their findings. All such reports shall be forwarded to the Engineer of this Board, who will advise as to the proper and most economical method to be pursued to protect the public health.

COLLECTION BLANKS.

RULE 6. The following circular of instructions concerning collection and shipment of samples of water for sanitary analysis shall be supplied to Local Boards upon application:

DIRECTIONS FOR THE COLLECTION OF SAMPLES OF WATER FOR SANITARY ANALYSIS.

Containers for samples of water must be *perfectly clean*, ground glass stoppered bottles—if possible bottles that have never been used and not less than one gallon in size. If it is impossible to obtain the above, a clean new gallon jug may be used. Jugs can be sent directly by express by properly tagging, but bottles must be properly boxed and packed for shipment. Corks used in cases of necessity must be new and well washed.

Our own containers, prepared, boxed and packed, will be sent out on request. The parties making the request will be expected to pay for expressage of same.

COLLECTION OF SAMPLES.

(a) *From Well*—Water should be pumped out freely for a few minutes before collecting.

The previously thoroughly cleaned bottle is placed in such a position that the water from the spout may fall directly into the bottle; rinse out the bottle thoroughly, three times, with the water to be analyzed, before the final collection. The bottle is then to be filled to over-flowing, a small quantity poured out so as to leave an air space of about an inch under the stopper. The stopper should then be thoroughly rinsed with the flowing water and inserted firmly while wet. The stopper is then secured by tying over it a piece of clean cotton cloth, the ends of the strings used must be sealed on top of the stopper with sealing wax.

Under no circumstances must the inside of the neck of the bottle or the stem of the stopper be touched with the hand or wiped with a cloth.

(b) *From Waterworks, Hydrants or Taps*—Allow the water to run freely a few minutes and then proceed precisely as given above under (a).

If the sample is to represent the average water of a town, it should not be taken from a "dead end" of a main, reservoir or tank, other than the main source of supply, but from a tap directly connected with the street main in active use and circulation.

If it is desired to get the extremes in any water system, the samples should be taken as follows: one from tap on a dead end, the other from the pumps directly.

In cases where the high reservoir tank system is used for fire protection, the tanks are often left uncovered where dust, dead sparrows, dead algae and all sorts of debris collect. Samples should be collected with this condition in mind. If the tanks are not frequently cleaned out it furnishes a dangerous culture bed for the whole water system. In such cases the water should be collected as near the bottom of the tank as possible.

(c) *From Stream, Pond, Tank or Reservoir*—The bottle and stopper should be rinsed with the water to be collected, if this can be done without stirring up the sediment on bottom. The bottle, with the stopper in place, should then be entirely submerged in the water and the stopper taken out at a distance of twelve inches or more below the surface. When the bottle is full, the stopper is replaced (below the surface, if possible), and finally secured as above. It is important that the sample should be obtained free from the sediment at the bottom of a stream and from the scum on the surface. If a stream should not be deep enough to admit of taking a sample in this way, the water must be dipped up with an absolutely clean vessel and poured into the bottle after it has been rinsed.

If the sample be ice, melt the ice naturally—not by artificial heat—in a porcelain lined, or glass or vitrified vessel, and pour the entire contents (with sediment) into the bottle.

It is important that the sample reach the laboratory as quickly as possible after collecting, and all care must be used to secure this end. Prior notice of at least a day should be sent the Chemist that the sample will reach the city on such and such a train if possible.

In case an interpretation of the results of an analysis is desired, a certificate for collection will be forwarded and on its return properly filled out the character of water will be reviewed.

An explicit statement of what is desired in the sending of each sample is requested, that the work may be expedited and no misunderstanding occur. In some cases a bacteriological examination of the water is desired, in which cases specially collected samples are necessary and cannot be taken from the samples for chemical analysis. If a microscopical analysis is desired it should be in like manner indicated.

For a mineral analysis of water or for boiler scale, hardness or other determination not less than two gallons must be sent. Price and directions will be forwarded on application.

The expense of a sanitary analysis will be $10.00 and must be paid by the parties for whom it is made, remittance for which should be made at time of sending sample. Inquiry regarding the chemical analysis of any substance will receive prompt attention, communications regarding which should be addressed direct to the chemist.

MANNER OF LABELING AND SHIPPING.

All bottles, jugs and containers should be labeled distinctly and numbered. Collect immediately before the time for shipment and express prepaid direct and by the shortest route to Professor Charles N. Kinney, Chemist of the Iowa State Board of Health, Des Moines, Iowa.

REPORTS TO BE PUBLISHED AND RECORDED.

When the analysis is made for any municipality or Board of Health or in the interests of the public health, the report should be published in some local paper and filed with the Clerk for future reference. Record of analysis is also filed with the Secretary of the State Board of Health.

Since the adoption of the foregoing rules, 97 reports of analyses have been filed in this office. Of these, 80 show that the water supplied to the inhabitants of that number of towns is contaminated with sewage or other pollution rendering it unfit, or dangerous for consumption by human beings.

There are 810 incorporated towns in the State, but only 97 have taken the necessary steps to ascertain the true quality of the water furnished their citizens. There is no data from which to determine how many towns in Iowa have public water supplies; however, it is estimated that at least 50 per cent have installed water and sewerage systems. Others have established water systems but not sewerage, the remainder being still dependent upon private wells or cisterns. In many instances the river towns obtain their supply direct from the river, disregarding the chances for probable contamination by sewage, wilfully discharged into it by communities further up stream.

The article on "Sanitary Water Analysis and Purification," by Prof. C. N. Kinney, Analytical Chemist to the Board (published in this report), is of vital importance and interest to every community, for if the percentage of pollution noted in the reports filed in this office is indicative of conditions throughout the State, the urgent need of determining the actual facts and adopting means for purification is evident.

The installation of a water system without an accompanying sewerage system is a short-sighted policy, for the convenience incident to water pressure, etc., to encourage the installation of bathrooms and water-closets, and as the increased volume of water used in these fixtures necessitates provision for outflow, a cesspool dug in close proximity to the house is the result; or an abandoned well is requisitioned for this purpose.

Sewage thus temporarily disposed of may, and generally does, become a serious menace to public health. The continual seeping from these cesspools gradually permeates the underlying strata and eventually finds its way into water veins and thence to wells or streams, the character of the soil often being such as to render purification improbable and frequently impossible.

In towns where there is no sewerage system the whole area of subsoil will sooner or later become saturated with domestic waste, thus polluting the wells and water supply of a whole district. The practice of discharging unpurified sewage into the streams and lakes should be absolutely prohibited by legislative enactment. A bill providing for this is now being prepared by a committee of the State Board of Health and will be presented to the Thirty-third General Assembly.

Owing to the increased density of population, the time has arrived when every incorporated town must pay close attention to its water supply, and take the necessary precautions to guard its source, improve its quality, and insure its delivery to the consumer unpolluted.

The regulations of this Board providing for an annual analysis should be willingly and regularly complied with by all municipalities, for a chemical analysis is the only means of determining the actual condition and quality of the water. If the presence of sewage or other forms of pollution is detected, prompt and intelligent measures must be taken to remedy the defects or serious consequences are sure to follow.

One of the best assets a town can possess is a good and abundant supply of pure water, therefore every reasonable effort should be made to obtain the same and insure its protection from contamination. To accomplish this purpose more or less expense must be incurred by the municipalities or the corporations owning water works plants, but where the public health and prosperity of the community is at stake, the argument of expense should not be considered germane to the subject, granted of course good business methods are pursued by the officials in charge.

RECOMMENDATIONS.

In view of the importance of this matter it is suggested that the State Board of Health be authorized by special act of the legislature to establish and equip a Chemical Laboratory for the analysis of water, and that a fee sufficient to cover the actual expenses of each analysis be charged.

Since the analysis should be made as soon as possible after the specimen is obtained, the Laboratory, if established, should be located in Des Moines, that being the most readily accessible point for the whole State. In addition to this the chemist could promptly communicate with the executive office of the Board and its records.

It is probable that advantageous arrangements for suitable rooms, etc., can be made without expense to the State, and the fees received would pay for the equipment and other operating and contingent expenses. Thus a Chemical Laboratory of ample capacity could be established, equipped, and maintained without expense to the State.

EMBALMERS DEPARTMENT.

For some years the State Board of Health has been conducting State Examinations for Embalmers, issuing certificates to such as proved themselves competent. The examinations were entirely voluntary on the part of the candidates, and were inaugurated for the purpose of giving some legal standing to persons residing in Iowa and engaged in business as undertakers.

A number of States had enacted laws providing for examination and license of embalmers, and prohibiting the preparation and shipment of dead bodies unless previously prepared, according to prescribed regulations, by a licensed embalmer. These laws placed the undertakers of Iowa at a serious disadvantage, for they were prevented from shipping bodies into certain States, and the public was correspondingly subjected to annoyance and inconvenience.

In view of these facts the State Board of Health decided to relieve the situation as far as possible by examining and licensing embalmers. As embalming is a sanitary measure performed for the purpose of protecting the living from possible infection from the dead, it was decided that under the general powers conferred upon it by the Statute, the Board had authority to determine the competency of persons whose business required them to prepare the dead for burial or shipment by public conveyance. This, to a certain extent, relieved the embargo, but as the examination was not compulsory, and could not be made so except by legislative enactment, it did not always give an Iowa embalmer the desired standing with other States.

Early in the session of the Thirty-second General Assembly these facts were laid before it and a bill providing for examination and State License of Embalmers was introduced by Representative Sidey. This was promptly considered and on February 23, 1907, became a law.

At the time this law went into effect, July 4, 1907, nine hundred and seventeen embalmers had taken the examination provided for under regulations of the Board. Of these 640 held certificates of good standing on July 1st.

The act of the legislature legalized these certificates, provided the renewal fee of $1.00 was paid before August 1, 1907. With few exceptions the parties concerned promptly availed themselves of this privilege.

The first Examining Committee appointed under the provisions of the new law consisted of Drs. A. C. Moerke and A. M. Linn, and Messrs. T. R. Osborne and A. A. Taylor, Embalmers. The membership of the committee changes each year, but the Secretary of the State Board of Health is made a permanent member.

Examinations are held in January and July of each year. The written examination consists of 50 questions upon the following subjects:

Anatomy, Sanitary Science, the care, disinfection, preservation, transportation of and burial, or other final disposition of dead bodies, and the Rules and Regulations of the State Board of Health relating to infectious diseases and quarantine.

The Practical Examination is conducted by the two embalmers, and the Oral, on the Rules and Regulations, by the Secretary.

Since this law went into effect there have been 253 licenses issued, and on August 1, 1908, there was a total of 901 Licensed Embalmers in good standing.

A general summary of the receipts and expenses of this department is herewith presented:

SUMMARY OF CLASSIFIED EXPENDITURES.

Fiscal Year from July 1, 1907, to June 30, 1908.

Members' and Examiners' Expense and Per Diem	$ 437.02
Salary and Clerk Hire	311.25
Postage	130.00
Stationery, Printing and Binding, and Engraving	434.62
Books and Miscellaneous	132.46
Express	.65
Total expense of the year	$1,446.00
Total amount of fees collected and deposited with State Treasurer	$1,446.00
Total amount expended	1,446.00

RECOMMENDATIONS.

As this department is self-sustaining, and the law creating it has proven entirely satisfactory, we have no recommendations to offer.

DISINTERMENTS.

During the biennial period ending June 30, 1908, a total of 2,131 disinterment permits were issued from this office. The following are the Rules and Regulations pertaining to disinterments:

PERMITS REQUIRED IN ALL CASES.

RULE 1. No person shall disinter the dead body of a human being unless he be in possession of a written permit issued by the State Board of Health, and countersigned by the Health Officer of the Local Board of Health in whose jurisdiction the disinterment is to be made.

PARTICULARS REQUIRED.

RULE 2. When it is desired to disinter a body for removal from one grave to another in the same cemetery, or for removal to another cemetery, application for permit therefor must be made to the State Board of Health. Such application shall give the name of the person whose body is to be disinterred, together with the age, date of burial and cause of death, the name and location of the cemetery, township and county from which it is to be removed, and the name of the cemetery and location thereof where such body is to be reinterred. All applications provided for in this rule must be made upon the proper blank forms provided by the State Board of Health and must in all cases be signed by the licensed embalmer who is to do the disinterment.

DISINTERMENT PROHIBITED.

RULE 3. No permit shall be granted for the disinterment of a body dead from either Smallpox, Asiatic Cholera, Yellow Fever, Leprosy or Bubonic Plague.

SPECIAL PERMITS REQUIRED.

RULE 4. Bodies dead from Diphtheria, including Membranous Croup, Scarlet Fever, including Scarlatina and Scarlet Rash, may be disinterred upon a special permit granted by the State Board of Health when in session, but all such disinterments shall be done in strict conformity with the following requirements:

1. The disinterment and removal must be under the direction of a licensed embalmer.

2. The removal shall be done at an hour when there is the least possible exposure of other persons.

3. No children shall be present, and only such persons as are actually necessary.

4. The coffin shall not be opened, either at place of disinterment or place of destination.

5. When the body is to be removed from the cemetery where disinterred the coffin and remains must be inclosed in a metallic lined box.

6. The sexton and all other persons engaged in such removal shall immediately thereafter change their clothing and properly disinfect or burn the same, and shall thoroughly disinfect their hands, head and face.

7. The embalmer authorized to conduct the disinterment shall be held personally responsible for the enforcement of these requirements.

GENERAL PERMITS.

RULE 5. Bodies dead from diseases other than named in Rules 3 and 4 may be disinterred upon receipt of a written permit issued by the Secretary of the State Board of Health, provided such permit is countersigned by the Health Officer of the Local Board of Health.

ALL DISINTERMENTS MUST BE DONE BY A LICENSED EMBALMER.

RULE 6. All disinterments provided for in this Chapter, shall be done under the personal supervision of a regularly licensed embalmer, and under no circumstances shall a permit for disinterment be issued to any person unless he be the legal holder of an embalmer's license in good standing, and regularly issued under the authority of the Iowa State Board of Health, and unless such license and renewal is properly recorded in the office of the clerk of the Local Board of Health in whose jurisdiction the disinterment is to take place, provided that when a disinterment is to be done outside the limits of an incorporated city or town, the embalmer's license need not be recorded with the township clerk, the record at the nearest city or town being deemed sufficient.

BODIES DEPOSITED IN A RECEIVING VAULT.

RULE 7. Bodies that have been temporarily deposited in a receiving vault may be removed therefrom without a disinterment permit, provided that such body before being deposited in said receiving vault, was properly embalmed, by a licensed embalmer, and provided that not more than 30 days has expired since the date upon which such body was so deposited. After the expiration of 30 days, a disinterment permit shall be obtained before removal of any dead body named in this rule.

SEPARATE APPLICATIONS.

RULE 8. A separate application must be made for each body to be disinterred.

BODIES DISINTERRED OUTSIDE OF IOWA.

The Regulations also provide that all bodies buried in another State and disinterred for shipment into Iowa shall be prepared in accordance with the provisions of Rules 1, 2, 3 and 5, Chapter VI., and in addition thereto, the party in charge thereof shall apply for and obtain from the Secretary of the Iowa State Board of Health a written permit, which when received must be pasted on the end of

the outside box containing the casket and remains. In order to insure the issuance of such permit, the certificate of death together with the shipping papers properly completed must be forwarded with the request.

As it is a violation of the Iowa Statutes to disregard these regulations, Baggage, Express, and Railroad Agents are cautioned not to accept disinterred bodies, or such as have died from any infectious or contagious disease, for shipment into Iowa unless the permit above referred to has been obtained and is attached to the outer box.

For the purpose of informing the various officials concerned in the transportation of bodies, a copy of the following circular letter was forwarded to the General Superintendent of each Railroad Company and Express Company doing business in Iowa:

IOWA STATE BOARD OF HEALTH, DES MOINES, January 15, 1908.

DEAR SIR,—Under separate cover I have today mailed you a copy of the Revised Code of Rules and Regulations of the Iowa State Board of Health, also a copy of the official list of Licensed Embalmers.

I am directed by the State Board of Health to call your especial attention to the following Regulations, and to request that you promulgate a general order to your Agents, Baggagemen and Conductors in Iowa, instructing them to strictly comply with the requirements contained therein.

Chapter 6, pages 40 to 46, inclusive—Relating to Transportation of Corpses.

Chapter 1, Rule 22, page 18—Prevention of Tuberculosis.

Chapter 1, Rule 23, page 19—Persons affected with Tuberculosis. Restrictions as to employment of.

Chapter 1, Rule 24, page 19—Car Sanitation.

Chapter 2, Rule 9—Disinfection of Vehicles.

You are also informed that in future all transportation permits for the regular shipment of corpses must be upon the official forms issued from this office. These forms are printed upon Golden Rod paper, numbered consecutively and issued only to Licensed Embalmers in good standing. Every permit is registered for identification before leaving this office. For the shipment of bodies intended for anatomical purposes a special permit printed on white paper is issued. Sample copies of both have been mailed to you with the Regulations.

As the Regulations referred to, when properly enforced, will afford a large measure of protection to your employees as well as to your patrons and the general public residing in the territory traversed by your road, we believe you will appreciate the responsibility resting upon you and your Company, and endeavor through your position and influence to co-operate with the State Board of Health and its Officials in the enforcement of the Regulations.

Should you desire additional copies of the Regulations or the official list of Licensed Embalmers, I shall be glad to supply you. Will you kindly inform me as to the number required?

I am,

Very truly yours,

LOUIS A. THOMAS,

Secretary Iowa State Board of Health.

The satisfactory replies received to this communication is an assurance that the officials will use their best efforts to see that the employees conform to the requirements.

MATERNITY HOSPITALS.

This department was organized by the State Board of Health July 14-16, 1907, under the provisions of Chapter 138, Acts of the Thirty-second General Assembly.

During the year ending June 30, 1908, five applications for license were received, two of which were refused.

Licenses were issued to the following:

GEORGE W. PANGLE, Council Bluffs.
MRS. S. J. JONES, Des Moines.
SALVATION ARMY HOME, Des Moines.

The person to whom a Maternity Hospital License is issued is required by law to report all births and deaths occurring in his institution to the Secretary of the State Board of Health within twenty-four hours after the date thereof.

The following is a statement of the reports received at this office for the year commencing July 1, 1907, and ending June 30, 1908:

Sex	Geo. W. Pangle, Council Bluffs	Mrs. S. J. Jones, Des Moines	Salvation Army Home, Des Moines	Total
Births, Males	42	16	16	74
Births, Females	32	13	14	59
Total births	74	29	30	133
Deaths, Males	5	1	1	10
Deaths, Females	4	0	1	5
Deaths, Mothers	2	0	0	2
Total deaths	11	1	2	17

The License Fees received, amounting to $50.00, were paid over to the Treasurer of State and credited to the Funds of the State Board of Health.

ADDITIONAL REGULATIONS.

In addition to the requirements prescribed by the Statutes, the State Board of Health adopted the following regulations:

RULE I. As a condition to the issuance of a Maternity Hospital License by this Board, the applicant shall show satisfactory evidence that at least one trained and legally Registered Nurse is continually employed by the said institution to care for its patients.

Adopted October 22, 1907.

RULE II. Every Maternity Hospital licensed by this Board shall provide ample accommodations according to the number of patients residing therein, and each sleeping room shall contain not less than 1,000 cubic feet of air space for each occupant thereof, and be provided with at least one outside window, the dimensions of which shall not be less than 4 ft. 6 in. by 2 ft. 6 in. or its equivalent.

Adopted July 14, 1908.

NURSES DEPARTMENT.

In accordance with Chapter 139, Acts of the Thirty-second General Assembly, the Nurses' Department was reorganized at the annual meeting of the Board held July 14-15-16, 1907. The first Examining Committee consisted of Drs. F. W. Powers and B. L. Eiker, Miss Clara M. Craine, of Davenport, and Sister Mechtildes, of Des Moines, and the Secretary of the State Board of Health.

At the October meeting of the Board the following Training Schools were declared to be in good standing, and the graduates thereof, prior to July 1, 1907, entitled to registration without examination:

Atlantic Hospital Training School for Nurses, Atlantic, Iowa.
Burlington Hospital Training School, Burlington, Iowa.
Mercy Hospital, Burlington, Iowa.
Waterloo Emergency Hospital Training School, Waterloo, Iowa.
Synodical Presbyterian Hospital, Waterloo, Iowa.
Mercy Hospital Training School, Marshalltown, Iowa.
St. Luke's Hospital Training School for Nurses, Cedar Rapids, Iowa.
Mercy Hospital Training School, Cedar Rapids, Iowa.
State University of Iowa, Homeopathic Hospital, Iowa City, Iowa.
State University of Iowa, Hospital, Iowa City, Iowa.
St. Joseph's Hospital, Keokuk, Iowa.
St. Joseph's Mercy Hospital, Dubuque, Iowa.
Finley Hospital Training School for Nurses, Dubuque, Iowa.
St. Luke's Training School for Nurses, Davenport, Iowa.
Mercy Hospital Training School for Nurses, Davenport, Iowa.
Cottage Hospital of Des Moines, Iowa, (Extinct) Des Moines, Iowa.
Iowa Sanitarium Training School for Missionary Nurses, Des Moines, Iowa.
Mercy Hospital Training School for Nurses, Des Moines, Iowa.
Training School for Nurses of the Iowa Methodist Hospital, Des Moines, Iowa.
St. Joseph's Mercy Hospital Training School for Nurses, Clinton, Iowa.
Agatha Hospital Training School for Nurses, Clinton, Iowa.
Training School for Nurses, St. Anthony Hospital, Carroll, Iowa.
Cottage Hospital, Creston, Iowa.
The Woman's Christian Association Hospital Training School for Nurses, Council Bluffs, Iowa.
Mercy Hospital, Council Bluffs, Iowa.

Jennie Edmundson Memorial Hospital Training School for Nurses, Council Bluffs, Iowa.

Morning Side Sanitarium and Hospital Training School for Nurses, Sioux City, Iowa.

St. Joseph's Mercy Hospital Training School for Nurses, Sioux City, Iowa.

Samaritan Hospital Training School for Nurses, Sioux City, Iowa.

Training School for Nurses, German Lutheran General Hospital, Sioux City, Iowa.

Ottumwa Hospital, Ottumwa, Iowa.

Mount Pleasant State Hospital Training School, Mount Pleasant, Iowa.

Glenwood State Hospital Training School, Glenwood, Iowa.

Clarinda State Hospital Training School, Clarinda, Iowa.

Cherokee State Hospital Training School, Cherokee, Iowa.

Independence State Hospital Training School, Independence, Iowa.

Galesburg Cottage Hospital Training School for Nurses, Galesburg, Ill.

Cincinnati Hospital Training School for Nurses, Cincinnati, Ohio.

New York Training School for Nurses (attached to Bellevue Hospital), New York City.

Lucy Webb Hayes National Training School of the Woman's Home Missionary Society, Washington, D. C.

The Hospital of the Good Samaritan Training School for Nurses, Los Angeles, Cal.

The Training School St. Mary's Hospital, Detroit, Mich.

Cottage Hospital Training School for Nurses, Santa Barbara, Cal.

Battle Creek Sanitarium Training School for Missionary Nurses, Battle Creek, Mich.

Orthopedic and General Hospital Training School for Nurses, Los Angeles, Cal.

University Medical College Training School for Nurses, Kansas City, Mo.

Lutheran Hospital Training School for Nurses, St. Louis, Mo.

Rockford Hospital Associated Training School for Nurses, Rockford, Ill.

Union Hospital Training School for Nurses, Fall River, Mass.

The City and County Hospital, St. Paul, Minn.

Northwestern Hospital Associated Training School for Nurses, Minneapolis, Minn.

The Grace Hospital Training School, Detroit, Mich.

Presbyterian Hospital in Omaha, Neb.

Asbury Methodist Hospital Training School for Nurses, Minneapolis, Minn.

The Moline Public Hospital Training School for Nurses, Moline, Ill.

The Metropolitan Training School for Nurses, attached to the Metropolitan Hospital, New York City.

St. Louis Training School for Nurses, St. Louis, Mo.

Hartford Hospital Training School for Nurses, Hartford, Conn.

St. Peter Hospital Training School for Nurses, St. Peter, Minn.

The Sisters of the Third Order of St. Francis Hospital and Training School, Peoria, Ill.

Augusto Hospital, Berlin, Germany.

St. Francis Hospital, La Crosse, Wis.

St. John's Hospital, Cheyenne, Wyo.

St. Winifred's Sanatorium and Training School for Nurses, San Francisco, Cal.

St. Luke's Hospital Training School for Nurses, St. Paul, Minn.

Boston City Training School for Nurses, Boston, Mass.

Victoria Hospital Training School for Nurses, London, England.

Chicago Hospital Training School for Nurses, Chicago, Ill.

Training School for Nurses of Augustana Hospital, Chicago, Ill.

The Hahnemann Hospital Training School for Nurses, Chicago, Ill.

The Baptist Hospital Training School, Chicago, Ill.

Illinois Training School for Nurses, attached to Cook County Hospital, Chicago, Ill.

The Policlinic Hospital Training School for Nurses, Chicago, Ill.

The Streeter Hospital, Chicago, Ill.

School for Nurses of the Chicago Hospital for Women and Children, Chicago, Ill.

Wesley Hospital Training School for Nurses, Chicago, Ill.

The Chicago Union Hospital Training School for Nurses, Chicago, Ill.

The Josephine Training School for Nurses, Chicago, Ill.

The Post Graduate Training School for Nurses, Chicago, Ill.

Mary Thompson Hospital of Chicago School for Nurses, Chicago, Ill.

The Michael Reese Training School for Nurses, attached to the Michael Reese Hospital, Chicago, Ill.

The Peoples Hospital Training School, Chicago, Ill.

American Hospital Training School for Nurses, Chicago, Ill.

Woman's Hospital of Chicago, Chicago, Ill.

Mercy Hospital Training School for Nurses, Chicago, Ill.

Since the organization of this department, 714 nurses have presented satisfactory credentials and received certificates of registration.

The first examination was held January 29-30, 1908, at which time seven candidates who had graduated since July 1, 1907, presented themselves for examination. At the second examination held July 28-29, 1908, there were fifty-one candidates.

The examinations are written and oral and include the following subjects:

SECTION 1. Anatomy, Bacteriology, Pathology, Surgical Nursing, Gynecology, Eye and Ear, and Diseases peculiar to men, for men candidates. Ten questions.

SECTION 2. Elementary Physiology, Materia Medica and Toxicology, Medical Nursing, Chemistry and Urinary Analysis. Ten questions.

SECTION 3. Elementary Hygiene, Dietetics, Domestic Science and Food Values, Obstetrical Nursing. Ten questions.

SECTION 4. Practical Nursing, Nursing in Children's Diseases. Ten questions.

The written examinations are conducted at the Capitol and the practical at Mercy Hospital, Des Moines.

At the meeting of the State Board of Health, held January 22, 1908, the following Rules and Regulations and Schedule of Minimum Requirements were adopted and became effective February 1, 1908:

CONDITIONS FOR ADMISSION TO TRAINING SCHOOLS.

All applicants for admission to training schools for registered nurses must file credentials as follows:

1. Satisfactory evidence of good moral character.

2. A certificate showing completion of Grammar School Course (after July 1st, 1910, a High School Course will be required), or in the absence of such certificate the applicant shall pass a satisfactory examination equivalent thereto, such examination to be conducted under the supervision of the Principal of an accredited High School. An applicant failing in one or more branches in such examination may be conditioned for one year, at which time such deficiency must be removed.

REQUIREMENTS FOR TRAINING SCHOOLS.

To obtain recognition by this Board, training schools shall conform to the following requirements:

1. They shall require their matriculates to comply with the preliminary requirements prescribed by this Board, and keep an accurate record of each student's credentials.

2. The training schools must be connected with a General or State Hospital (or Sanitorium) having not less than 25 beds, and the number of beds must be at least twice the number of students in the school, depending on the character of the hospital facilities, with private or ward practice.

SPECIAL OR STATE HOSPITAL TRAINING SCHOOLS.

Graduates of training schools connected with a special or State Hospital will be admitted to examination by this Board, only upon satisfactory evidence of having completed a course of six months instructions in the General Hospital of a training school of recognized standing with this Board. Said course may be taken during the last six months preceding graduation, or within one year subsequent thereto.

BRANCHES TO BE TAUGHT.

The following branches must be taught by all training schools: (1) Elementary Anatomy; (2) Elementary Physiology; (3) Elementary Bacteriology and Pathology; (4) Elementary Materia Medica and Elementary Toxicology; (5) Elementary Hygiene; (6) Dietetics, Domestic Science and Food Values; (7) Practical Nursing; (8) Surgical Nursing, including Gynecology, and the Eye and Ear; (9) Medical Nursing, including nervous diseases and contagious diseases; (10) Nursing in children's diseases; (11) Obstetrical Nursing and practical experience in at least six cases; (12) Chemistry and Urinary Analysis; (13) Medical Jurisprudence; (14) Nursing of diseases peculiar to men for men.

NOTE—The State examination will include also the Rules and Regulations of the Iowa State Board of Health relating to infectious and contagious diseases and quarantine.

PERIOD OF TRAINING.

The period of instruction in the training school shall be not less than two (2) full years, (three (3) years being recommended.) Training schools having a three years' course, and wishing to send pupils outside the hospital in private cases, may pursue this practice only during the student's senior year; but said outside work shall not exceed three months of the course. Training schools having only a two (2) years' course will not be accorded this privilege unless they extend the course to three (3) years.

After July 1, 1910, no training school will be in good standing with this Board which does not require a three (3) years' course of study. It is earnestly recommended that all training schools forthwith adopt a three (3) year course.

SCHEDULE OF SUBJECTS.

The following schedule of subjects, together with the number of hours to be taught in each branch, is recommended by the Board; a re-arrangement of the several branches, however, may be made to meet local conditions:

FIRST YEAR.

Anatomy	15 hours
Hydrotherapy	5 hours
Practical nursing, including massage	40 hours
Physiology	15 hours
Hygiene	5 hours
Domestic Science (including dietetics and cookery—food values)	20 hours
Chemistry and Urinary Analysis	5 hours
Physical Culture	10 hours
El. Bacteriology and Pathology	10 hours
	125 hours.

SECOND YEAR.

Medical nursing, including nervous diseases, contagious diseases, and the Rules and Regulations of the Iowa State Board of Health relating to infectious diseases and quarantine	36 hours
Practical nursing	18 hours
Children's diseases	15 hours
Obstetrical Nursing and Obstetrics	10 hours
Materia Medica and Toxicology	10 hours

Surgical nursing, including Eye and Ear and Gynecology	30 hours
Preparation of food for sick	20 hours
Nursing ethics	3 hours
	142 hours

THIRD YEAR.

Medical Nursing, including nervous diseases and contagious diseases	20 hours
Surgical nursing, including eye and ear and Gynecology	20 hours
Electro Therapeutics	5 hours
Medical Jurisprudence	5 hours
Nursing Ethics	3 hours
Review	50 hours
Emergencies	15 hours
	118 hours.

Training Schools maintaining only a two-year course must arrange their schedule so as to cover the work outlined in the foregoing requirements.

NOTE. At the annual meeting of the State Board of Health, July 14-16, 1908, the credentials of such training schools as had filed application for recognition under the schedule of minimum requirements adopted January 22, 1908, were investigated and considered.

In some instances training schools recognized as in good standing before the adoption of the schedule of minimum requirements were found to be deficient in certain particulars, and others had neglected to file a sworn statement of their curriculum.

Since few states have any statutory requirements providing for examination and registration of nurses, the Board has been somewhat embarrassed in determining what standing should be accorded schools outside the state of Iowa; consequently action thereon was postponed until such time as the respective states adopt legal requirements, and determine the standing of their own schools, or until such schools furnish this Board with satisfactory evidence that their preliminary requirements, curriculum and equipment are in every respect equal to the minimum prescribed by this Board.

The following Training Schools have been declared in good standing with this Board, and the graduates thereof are now eligible to admission to State examination:

Boone.—Eleanor Moore Hospital.
Burlington.—Mercy Hospital; Burlington City Hospital.
Carroll.—St. Anthony's Hospital.
Cedar Rapids.—St. Luke's Hospital; Mercy Hospital.
Cherokee.—Cherokee State Hospital; Training School.
Clarinda.—Clarinda State Hospital; Training School.
Clinton.—St. Joseph's; Mercy Hospital.

Council Bluffs.—Mercy Hospital; Edmundson Memorial Hospital.
Creston.—Cottage Hospital.
Davenport.—St. Luke's Hospital; Mercy Hospital.
Des Moines.—Mercy Hospital; Iowa Methodist Hospital.
Dubuque.—Finley Hospital; St. Joseph's Mercy Hospital.
Glenwood.—Glenwood State Hospital; Training School.
Ida Grove.—Conn Bros. Hospital.
Independence.—Independence State Hospital; Training School.
Keokuk.—Graham Hospital; St. Joseph's Hospital.
Marshalltown.—St. Thomas' Mercy Hospital.
Muscatine.—Benj. Hershey Memorial Hospital.
Mt. Pleasant.—Mt. Pleasant State Hospital; Training School.
Ottumwa.—Ottumwa Hospital.
Sioux City.—Samaritan Hospital; St. Joseph's Mercy Hospital.
Waterloo.—Synodical Presbyterian Hospital.

The Board is pleased to report that the operation of the Nurses' Registration Law has proved satisfactory. It is evident that the sanguine expectations of its promoters will in time be fully realized. The preliminary requirements already established, and the improved facilities for teaching adopted under the direction of this Board, will attract a better class of students to the training schools and thus raise the standard of the profession and enhance its value to the public. Circumstances require that the modern nurse shall be sufficiently educated to minister to the mental as well as the physical needs of her patients, and to meet these demands, her education must be sufficiently broad to enable her to converse and conduct herself with tact. Her demeanor in the sickroom should be such as to gain the confidence and respect of the patient.

Frequently the nurse is retained through a tedious convalescence when her duties may assume the character of companion. It is necessary therefore that she possess at least average literary attainments and ability to read fluently.

Since the days of "Sary Gamp," the masses have learned to appreciate the advantages of education and its accompanying refinement, so that the nurse of today must prepare herself to meet present requirements.

A summary of the receipts and expenditures for this department since its organization is herewith submitted:

SUMMARY OF CLASSIFIED EXPENDITURES.

Fiscal year from July 1st, 1907, to June 30, 1908:

Members' and examiners' expense and per diem	$ 395 25
Clerk hire	65 75
Postage	260 00
Stationery, printing, binding and engraving	775 26
Books and miscellaneous	572 99
Express	5 75
Total expense of the year	$2,075 00
Total amount collected and deposited with State Treasurer	$3,575 00
Total amount expended	2,075 00
Balance	$1,500 00

RECOMMENDATIONS.

As all graduate nurses who were residents of Iowa on the 12th day of March, 1907, have had ample opportunity to obtain certificates of registration without examination, and as the indefinite continuance of this privilege is likely to cause much confusion and unnecessary misunderstanding, it is suggested that this provision be repealed after July 1, 1909, and thereafter all graduate nurses be required to pass the State examination in order to obtain a certificate of registration.

At the time this law was enacted, the Secretary suggested that the examination fee of $5.00 would not be sufficient to meet the expenses of this department, but in view of the fact that there would be several hundred applicants for registration upon diplomas without State examination, during the first two years, it was finally decided to place the fee at $5.00.

The balance of $1,500.00 for the year ending June 30, 1908, has been covered into the State Treasury as required by law, consequently on July 1st the department was without funds to meet its obligations. As nearly all who are entitled to registration without examination have already availed themselves of this privilege, and all future applicants will be required to come up for examination, the work and expenses of the department will be correspondingly increased.

As it is presumed that the department should be self-sustaining, it is recommended that the law be amended by making the fee for examination $10.00 in place of $5.00.

THE IOWA HEALTH BULLETIN.

The "Iowa Health Bulletin" is the official organ of the State Board of Health, and the principal means of communication between the State and Local Boards, as well as a disseminator of sanitary and hygienic information to the general public. It is published on the twentieth of each month and mailed free of expense to all City and Township Clerks, Mayors, Health Officers, County and State Officers, Judges of the Supreme and District Courts, Members of the Senate and House of Representatives, Superintendents and Principals of Schools, Registered Physicians, Osteopaths, Nurses and Embalmers; and on request, to any layman interested in sanitary matters. The regular circulation is 11,600 copies per month.

The enlarged and increasing duties of the State Board of Health and the numerous departments under its jurisdiction has necessitated that space be apportioned to each department in the "Bulletin." Under these several heads will appear notices and other matters relating thereto. As space will permit, short articles upon sanitary subjects of timely interest will be published.

Annual cost of publishing and mailing the Bulletin:

Printing	$1,200 00
Mailing list	75 00
Postage	96 00
Labor	80 00
	$1,451 00
Average monthly issue	11,500 copies
Annual total	138,000 copies

at a cost of a little over one cent each.

The following index to Volume XXI of the Iowa Health Bulletin will give some idea of its scope and the variety of subjects presented to the public through this medium:

INDEX TO VOL. XXI.

IOWA HEALTH BULLETIN.

Page

BACTERIOLOGICAL DEPARTMENT 10-98-131-167
Diagnosis of Diphtheria 168

BLANK FORMS 81
For Use of Local Boards..... 95

CONFERENCE OF
Health Officers 2
State and Local Boards of Health.....49-51-66-84
Iowa Association of Health Officers..... 100

CORRECTION, A..... 130

DEPARTMENT OF VITAL STATISTICS.....11-24-37-83-132

EDUCATIONAL
Bacteria and Milk..... 60
Best Bath for Man..... 13
Chronic Running Ears..... 111
Defects of Hearing and Sight Among School Children..... 43
Disposition of Tuberculosis Cattle, The..... 138
Foreign Bodies in the Ear..... 71
Hygiene of Young Girls..... 109
Installation of the Bath Room..... 77
Oysters 63
Public Water Supply and Sewerage..... 41
Results of Vaccination..... 122
Sanitary Plumbing 75
Sanitary Relations of the Milk Supply..... 28
Sewage Disposal 124
Should the Public be Enlightened as to Venereal Diseases?.... 73
Tubercle Bacilli in Butter..... 171
Teaching Sex Matters in Public Schools..... 143
Ventilation of Buildings..... 169
Why People Wear Glasses..... 126

EMBALMER'S DEPARTMENT 7-67-82-99-165-177
Certificate Fees 8
Communications 8
Examinations 165-177
Disinterment Points 8
How to Remit Fees..... 8
Importation of Dead Bodies..... 23
Information 7
Licensed Embalmers 150
Notice to Undertakers..... 55
Official List 83
Reciprocity 7
Record License and Renewal..... 22

EMBALMER'S DEPARTMENT—CONTINUED
Page
Register with Local Board of Health..... 8
Renewal Cards 23
Renewal Fees 177
Revised Regulations 67
Result of Examinations..... 22
Retain Numbers 7
Transportation of Corpses..... 166

GENEVA CROSS, THE..... 95

INFECTIOUS DISEASES 38
Domestic Animals 38
Important Duty 52
Report of Infectious Diseases..... 116
Typhoid Fever 46
Word of Warning, A..... 116

INTRODUCTION
Volume Twenty-one 1

ITEMS OF GENERAL INFORMATION.
An Effective Reminder..... 156
Anti-Rat Crusade 120
Are Incandescent Light Currents Dangerous?..... 69
Are Your Groceries Clean?..... 136
Bill for a National Tuberculosis Commission..... 119
Butter Germs 57
Car Sanitation 69
Danger from Arsenic in Clothing, The..... 160
Danger from Chronic Running in Ears, The..... 156
Diseased Immigrants 120
Excessive or Offensive Perspiration..... 13
For Local Boards of Health..... 52
Forgotten Use of the Nose, A..... 137
House Fly, The 70
Indoor Moisture 135
Judge, who has much Common Sense, A 12
Longevity 69
Mischief from Vermin 137
Mortality Rate in Japan 121
Nostrum Distribution Forbidden 13
Olive Oil as a Food 71
Prevention of Venereal Diseases, The 157
Prey of Quacks, The 156
Rational Treatment 59
Strictly Confidential 68
Street Cars 27
Sunlight and Digestion 121
Sunstroke and Overheating 26
Test for Bad Oysters, The 137

ITEMS OF GENERAL INFORMATION—CONTINUED

Page

Tuberculosis Among the Negroes 120
Use of Eggs, The 58
Use of Hot Solution of Soda in the Disinfection of Floors..... 69
Vacuum Apparatus for House Cleaning 70
Venereal Peril of Boys 136
Vermin in Children's Heads 59
Water for Table Use 158
What to Drink when the Water is Bad 25

LOCAL BOARDS OF HEALTH, Appointment of 161
Duties and Powers of 89-161
Expenses of 147
Information for Local Boards 97
Mayor and Township Clerk to Report 98
Payment of Expenses of 129

MATERNITY HOSPITALS 8-34
Adoption of Children 10
Application for Permit 9
Certificates of Birth and Death 10
Exceptions 9
Fees 9
Report of County Attorney 10
Revocation of Permit 9

NEW REGULATIONS 1-33
Conference of Health Officers 2
Municipal Inspection of Meats and Dairy Products 3
Place the Blame Where it Belongs 146
Public Water Supply and Collection of Samples 19
Railroad Sanitation 115

NEW YEAR'S GREETINGS 97

NOTICES
Adjourned Meeting 17
Board of Medical Examiners 68
Conference of Health Officers 17
Disinfection of School Houses 114
Examinations 25-117-151-165-166-177
Health Officers 118
Illegal Practitioners 11
Local Boards 66-114
Mayors and Township Clerks 113
Regular Meeting of State Board of Health and Medical Examiners 17-49-82-97-129-177
Results of Prompt Action 113
Septic Tank, The 161
Training Schools 117-131

Page

NURSES DEPARTMENT 5-54
Applications 6
Association 166
Examinations 5-166-178
Examining Committee 24
List of Training Schools 35
Notice to Training Schools 117-131
Qualifications for Certificate 5
Read the "Bulletin" 6
Reciprocity 6
Schools in Good Standing 83-100
Temporary Permits 6
Training Schools 6

OPEN AND READ YOUR MAIL 129

PERSONAL
Appointment of New Member 119
Retirement of Dr. Powers 118

PUBLIC WATER SUPPLY 19-41

STATE BOARD OF MEDICAL EXAMINERS..... 25
Annual Inspection of Colleges 134
Certificates Issued 25
December Examinations 118
Educational Requirements 133
Election of President 25
Examination of Physicians 151-167
Identification of Applicant 133
Illegal Practitioner Convicted 152
New Rules for Examinations 118
Non-Resident Physicians and Agents 133
Prior Examinations 133
Reciprocity 37-132
Rules for Conducting Examinations 134
Special Meeting 25
Verification of Credentials 132

SUPPLEMENT, THE 66-81
Tubercle Bacilli in Butter 171-179
Warning, A .....
Demand Pure Milk, from Tested Cows 164

SECOND BIENNIAL REPORT

OF

STATE BOARD OF HEALTH BACTERIOLOGICAL LABORATORY

For the Period Commencing July 1, 1906, and Ending June 30, 1908

The following report of the State Board of Health Bacteriological Laboratory, prepared by the Director, Dr. Henry Albert, is herewith submitted.

NUMBER AND KINDS OF EXAMINATIONS.

During the past two years 17,409 examinations were made in the laboratory, of which 8,794 were for diphtheria, 1,537 for typhoid fever, 5,709 for tuberculosis, and 1,369 miscellaneous.

DIPHTHERIA: Of the 8,794 examinations for diphtheria, data were obtained from 5,981, of which 2,966 were for diagnosis, of which 790 were positive, 1,891 negative and 141 questionable; 3,015 were made for release from quarantine, of which 575 were positive, 2,439 negative, and 43 questionable.

TYPHOID FEVER: Of the 1,537 examinations for typhoid fever, 310 were positive, 1,085 negative, and 142 questionable.

TUBERCULOSIS: Of the 5,709 examinations of sputum for the tubercle bacillus 1,513 were positive and 4,196 negative.

MISCELLANEOUS: The 1,369 miscellaneous examinations are divided as follows: Water 333, milk 120, meat and tissue 65, rabies 26, glanders 12, cerebrospinal meningitis 17, actinomycosis 14, secretions, excretions and exudates 828.

TABLE No. 1

REPORT OF EXAMINATIONS MADE IN THE STATE BOARD OF HEALTH LABORATORY, JULY 1, 1906, TO JUNE 30, 1908.

Dates	Diphtheria									Typhoid Fever				Tuberculosis			Grand Total
	Diagnosis					Release				Diagnosis				Release			
	Total Examined	Total	Positive	Negative	Questionable	Total	Positive	Negative	Questionable	Total	Positive	Negative	Questionable	Total	Positive	Negative	
July, 1906	103	51	21	20	10	52	13	35	4	38	7	25	6	181	63	118	415
July, 1907	70	38	15	20	3	30	11	21	---	39	2	36	1	222	66	156	416
Aug., 1906	91	44	12	19	13	47	7	40	---	82	10	53	19	206	80	126	439
Aug., 1907	99	44	22	19	3	55	14	41	---	80	14	64	4	180	63	117	496
Sept., 1906	153	86	32	33	21	67	18	46	3	120	33	67	20	175	60	115	481
Sept., 1907	120	79	30	48	1	41	5	36	---	132	40	80	12	205	72	154	569
Oct., 1906	640	282	104	163	15	358	89	253	16	79	18	53	8	160	48	112	915
Oct., 1907	198	99	38	59	2	77	12	63	2	97	27	62	8	226	47	173	597
Nov., 1906	629	328	115	196	16	301	73	221	7	64	17	41	6	142	35	107	858
Nov., 1907	407	218	38	173	7	103	14	89	1	70	19	37	14	178	40	138	945
Dec., 1906	592	307	92	201	14	275	60	214	1	45	9	30	6	163	47	116	852
Dec., 1907	319	129	41	87	1	190	28	161	1	58	15	37	6	230	55	175	648

TABLE No. 2.

Jan., 1907	448	165	35	125	5	192	34	156	2	62	38	45	9	221	58	163	737
Jan., 1908	439	174	55	120	4	265	20	245	---	54	12	35	7	225	42	183	798
Feb., 1907	223	106	27	74	5	69	9	57	3	46	7	36	3	209	42	156	538
Feb., 1908	444	111	20	90	1	195	26	169	---	42	3	36	3	302	62	240	843
Mar., 1907	226	82	20	56	6	70	9	61	---	42	4	36	2	303	72	231	685
Mar., 1908	354	170	46	121	3	111	19	192	---	62	3	57	2	336	73	263	903
April, 1907	161	64	16	45	3	67	12	57	---	42	7	30	1	283	72	211	554
April, 1908	445	90	21	68	1	164	35	127	2	79	21	42	2	357	92	265	927
May, 1907	214	172	42	29	1	88	19	69	---	58	8	50	---	347	83	263	895
May, 1908	438	108	24	83	1	66	15	50	1	44	4	39	1	302	77	225	853
June, 1907	150	65	17	44	4	48	7	41	---	31	5	25	1	253	80	173	479
June, 1908	152	45	17	28	---	84	29	55	---	50	6	43	1	293	91	202	548

TABLE No. 3.

MISCELLANEOUS.

Dates	Water	Milk	Meat and tissue	Rabies	Glanders	Cerebro spinal men	Actinomycosis	Excretions, secretions and exudates	Total	Total—Regular and miscellaneous
July, 1906	47	4						22	73	488
July, 1907	14	2	2	1	8	1	1	28	57	468
Aug., 1906	28		5	4			4	29	70	509
Aug., 1907	15	23	2		1			24	67	563
Sept., 1906	19	1		2				11	33	514
Sept., 1907	18	2		2	3			28	53	622
Oct., 1906	24	1	5					10	40	955
Oct., 1907	15	5		4				57	81	678
Nov., 1906	5	11	5					17	38	881
Nov., 1907	14	20	4			2		20	45	990
Dec., 1906	5	2	6	1				28	42	894
Dec., 1907	10	3	1					25	41	689

TABLE No. 4.

MISCELLANEOUS.

Dates	Water	Milk	Meat and tissue	Rabies	Glanders	Cerebro spinal men	Actinomycosis	Excretions, secretions and exudates	Total	Total—Regular and miscellaneous
Jan., 1907	12	11	4					29	56	843
Jan., 1908	4	6	16					43	69	865
Feb., 1907	15	2	8					38	63	601
Feb., 1908	7			2		2		42	55	808
Mar., 1907	21	6	2			1		70	112	797
Mar., 1908	2	3	7	2				27	41	844
April, 1907	16	1				6		41	64	618
April, 1908	5	7	1	5		2		39	59	986
May, 1907	12	3	1	1		5		48	69	964
May, 1908	7	6						58	72	925
June, 1907	11	7	1					24	34	513
June, 1908	12	2		4				35	53	602

Table giving in a comparative way the number of examinations made for the two biennial periods since the laboratory has been in operation.

	First Biennial		Second Biennial	
Diphtheria		3,666		8,794
Diagnosis	1,188		2,966	
Positive	425		790	
Negative	737		1,801	
Questionable	2		141	
Release	1,007		3,015	
Positive	283		575	
Negative	784		2,439	
Questionable	0		43	
Typhoid Fever		1,129		1,537
Positive	336		293	
Negative	650		1,185	
Questionable	81		142	
Tuberculosis		2,502		5,709
Positive	1,111		1,509	
Negative	2,452		4,196	
Miscellaneous		427		1,369
Water and Sewage	98		333	
Milk	22		120	
Meat and Tissue	44		65	
Rabies	6		36	
Glanders	0		12	
Cerebrospinal Meningitis	5		17	
Actinomycosis	4		14	
Secretions, excretions and exudates	248		828	
Total		7,778		17,409

SPECIAL EXAMINATIONS.

WATER EXAMINATIONS.

The water examinations made in the laboratory have all been in connection with cases or epidemics of typhoid fever,—the object of the examination being to discover the possible source of infection. Personal investigations of epidemic of typhoid fever have been made in Waterloo, Mt. Vernon, and Rose Hill, and an epidemic of dysentry in Arcadia.

RABIES.

Of the twenty-six specimens examined for rabies, 14 were positive. Most of the specimens were from dogs, in a few instances from cattle and in two instances from horses. Of the cases which proved to be positive the most important are (a) Madrid, Iowa; the dog had bitten seven people. The brain of the dog was examined and proved that the animal had rabies. The seven people who were bitten and four more of the people who had skinned some of the cattle which had been bitten by the dog and which later developed the disease, took the Pasteur treatment in Chicago. (b) Belle Plaine, Iowa; the dog had bitten a small girl and a man. The dog was sent to the laboratory and proved to be affected with hydrophobia. Both of the people took the Pasteur treatment in Chicago. In all of the other cases which proved to be positive the animals had bitten other dogs and in some instances human beings had been bitten, the bite simply going through the clothing and not producing an actual wound. Most of the specimens were received through the State Veterinary department.

GLANDERS.

Of the twelve specimens examined for Glanders, four proved to be positive; three of these were from horses and one in the human being. This occurred in Clinton, Iowa, in the case of the teamster who succumbed to the disease after an acute attack of about ten days. An investigation of his four horses by the State Veterinary department proved that three were also affected with the disease.

AUXILIARY LABORATORIES.

The conditions under which auxiliary laboratories are established are as follows:

***First*. The auxiliary laboratory is to be equipped with all apparatus necessary to do thorough bacteriological work.**

Second. The auxiliary laboratory is to be placed in charge of a bacteriologist who is competent to make all necessary examinations. To determine his competency, it will be necessary that he appear in person at the central laboratory in Iowa City, and pass an examination.

Third. The bacteriologist must submit to the Director of the Laboratory a monthly (1st of each month) report of all examinations made, accompanied by the corresponding slide preparations, except for the Widal tests for typhoid fever.

Fourth. A fee of twenty-five cents may be charged for each examination for diphtheria, typhoid fever, and tuberculosis made for physicians living in the city where the auxiliary laboratory is located and fifty cents for physicians located elsewhere.

Fifth. The State Board of Health or the Bacteriological laboratory of the State Board of Health shall in no way be responsible for any charges made; the fees collected shall be the compensation of the bacteriologist of the auxiliary laboratory.

Sixth. When several hundred "used" tuberculosis and diphtheria outfits have accumulated they should be returned to the central laboratory express "collect." Tuberculosis bottles and diphtheria test tubes must be sterilized by boiling for one-half hour and cleansed before being returned. On returning the outfits the empty containers shall be sent in one box, and the sterilized test tubes and tuberculosis bottles, properly packed to prevent breakage, in another.

Whenever an auxiliary laboratory agrees to comply with the above conditions, the central laboratory will supply such laboratory with outfits for the diagnosis of diphtheria, typhoid fever and tuberculosis—and slides for making slide preparations which are to be returned to the laboratory. All other articles and apparatus for equipment, all printed sheets or outlines not already on hand at the central laboratory and the compensation of the local bacteriologist must be provided for by the local authorities.

There are now six auxiliary laboratories of the State Board of Health located as follows: Des Moines, in charge of Prof. L. S. Ross; Mason City, in charge of Dr. Fred Albert; Davenport, in charge of Dr. H. M. Decker; Sioux City, in charge of Dr. E. W. Meis; Burlington, in charge of Dr. E. H. Wehman; and Dubuque, in charge of Dr. J. R. Schrup. Reports from these indicate examinations made as follows:

Des Moines—
Examinations 1,525, of which 1,302 were for diphtheria, of which 535 were positive, 684 negative and 83 questionable; 157 for tuberculosis, of which 35 were positive, 121 negative and 1 questionable; 63 for typhoid fever, of which 13 were positive, 56 negative and 4 questionable; and 3 miscellaneous specimens.

Mason City—
Examinations 436, of which 399 were for diphtheria, of which 280 were for diagnosis, 119 for release, 85 were positive, and 314 negative, and 37 sputum examinations of which 8 were positive and 29 negative.

Davenport—
Examinations 213, of which 163 were for diphtheria, 48 for tuberculosis, and two for typhoid fever.

Sioux City—
Examinations 118, 73 were for diphtheria, of which 28 were positive and 45 negative, 11 for typhoid fever, 2 of which were positive, 9 negative, and 40 for tuberculosis, 14 of which were positive and 26 negative.

Burlington—
Examinations 108, 26 for diphtheria, 66 for tuberculosis, and 16 for typhoid fever.

Dubuque—
Examinations 17 for tuberculosis, 12 of which were positive and 5 negative.

So far as I have been able to learn, the auxiliary laboratories are serving their respective communities well, and believe that their continuance is advisable.

The laboratory recently received copies of resolutions from the Secretary of the Iowa Academy of Science commending the policy of the laboratory in the establishment of auxiliary laboratories.

RESEARCH WORK OF THE LABORATORY.

There is no field of scientific work in which more discoveries or improvements in the technique of examination occurs than in bacteriology. This makes it necessary that we must do considerable research work, in the first place to confirm results but recently obtained and to determine whether or not such are either reliable or may be adaptable to our work, and in the second place, since it is necessary to do more or less research work in order to have our laboratory meet the local needs and demands of this State.

At the present time we are using every possible opportunity of determining the practical significance of the finding of negri bodies in hydrophobia. If it is found that the finding of these bodies is sufficient for a diagnosis of this condition, it would not only lessen the time necessary for the result to be obtained from about two weeks to several hours, but will mean much to those who may have been bitten by a rabid animal. Investigation is also being made to determine if by the use of digestive and destructive agents together with the centrifugalization, it is not possible to find tubercle bacilli in sputum more frequently than is done at the present time. Investigation as to the amount of para-typhoid fever in the State is also being made. All of this work requires a great deal of time and it is found impossible to find sufficient time to do but a small part of the work of this nature that should be done.

Number of Physicians who have submitted specimens to the laboratory (approximate), since its establishment in 1904. According to our records 3,122 physicians of the 3,517 physicians of the State have submitted specimens for examination.

Number of People from whom specimens have been submitted for examination (approximate). Specimens have been submitted from 10,868 people during the past two years, divided as regards examinations as follows: Diphtheria 4,210, typhoid fever 1,409, and 5,249 for tuberculosis.

Number of Culture Stations. There are at the present time 762 culture stations of the bacteriological laboratory located in 718 cities and towns. All except 234 localities of the State in which there is a physician as determined from the directory of the American Medical Association, and the Iowa Medical Journal, have been supplied with outfits.

Number of Diagnosis Outfits sent to culture stations during the past two years. During the past biennium, 34,220 diagnosis outfits have been supplied to the various culture stations of the State. Of these 15,783 were diphtheria outfits, 5,538 typhoid fever, and 12,899 tuberculosis outfits.

FINANCIAL REPORT.

The appropriation available for the use of the bacteriological laboratory for the past biennium was $10,375, of which $3,500 was available for the year 1906-'07 as the regular appropriation made by the Thirty-first General Assembly. To meet a deficit of that year, the Thirty-second General Assembly made a special appropriation of $875.00; the balance, viz., $6,000.00 represented the regular appropriation for the year July 1, 1907-'08, and represents the annual appropriation of the laboratory as determined by the Thirty-second General Assembly. This appropriation has been entirely expended. In order to remain within the appropriation it has not been necessary to curtail any of the actual work of the laboratory, although some of the work could have been carried out with greater facility and the laboratory be provided with proper equipment for a greater variety of work if somewhat more had been available. A summary of the expenses (classified) is as follows:

CLASSIFIED SUMMARY OF EXPENSES.

Salaries	$ 6,044.57
Traveling expenses of Director, attending Board Meetings	198.80
Postage	580.05
Expressage	605.66
Stationery, printing, etc.	360.30
Books	6.25
Telephone and telegraph	43.70
Apparatus	1,087.33
Diagnosis outfits	634.36
Animals and feed	118.42
General Laboratory expenses	285.37
Furniture and filing cases	522.58
Total	$10,487.39

An itemized account of all of the expenditures made during the biennium has been submitted to the Executive Council.

PERSONNEL OF LABORATORY.

Henry Albert has remained as Director of the Laboratory since its beginning. As First Assistant Bacteriologist, S. M. Gunn served from July 1, 1907, to March 1, 1908, when he resigned to accept the position of Health Officer of Orange City, New Jersey, a position to which was attached a considerable increase in salary. From March 1, 1908, to July 1, 1908, F. A. Slyfield acted as Assistant Bacteriologist; Anna Stach has been secretary and stenographer during the entire period; the place of attendant was occupied by F. A. Slyfield from July 1, 1907, to March 1, 1908, and by Mrs. F. A. Slyfield from March 1, 1908, to July 1, 1908. The several employees of the laboratory have worked faithfully and efficiently, appreciating at all times the responsibility associated with the nature of the work.

During the past biennium the Bacteriological Laboratory has in addition to the routine work in connection with diphtheria, typhoid fever and tuberculosis made a large number of special examinations, i. e., examinations of various miscellaneous specimens. In all the work has greatly increased, as is evidenced by the fact that during the past biennium 17,409 examinations were made as compared with 7,778 during the previous biennial period. The amount of work at the present time is such that it requires the strenuous efforts of all who are connected with it, and if it should be markedly increased it will require the service of additional assistants and an additional support fund.

Although the laboratory is at present doing the work that is of greatest importance to the public health, there are many problems the solution of which will require bacteriological laboratory work; among which may be mentioned the institution of a Pasteur Institute for the treatment of hydrophobia, the making of a sanitary water survey of the State and the aiding in the establishment of a proper standard and supply of milk. Other problems might be mentioned, but these are among the more important.

If it should be deemed wise to carry out any of these plans, it would necessitate a larger appropriation for the maintenance of the Laboratory of the Board of Health.

DIPHTHERIA STATISTICAL DATA.

Statistical Data and Interpretation of certain Laboratory Findings and Clinical Observations in Diphtheria, based on 2,660 examinations for diphtheria bacilli made in the Bacteriological Laboratory of the Iowa State Board of Health during the year July 1, 1907-July 1, 1908.

Every diphtheria specimen sent to the Laboratory is accompanied by a card which has been filled out by the physician sending same and which presents certain clinical data relative to the case in question. The result of the bacteriological examination is later recorded on the same

card. From these cards the following interesting and instructive tables have been compiled. They are based on 2,660 examinations, of which 1,140 were for diagnosis (Tables 1-10), and 1,520 for release from quarantine (Table 11). Tables No. 1 and 10 are based on all specimens sent for diagnosis; Tables 2-9, inclusive, are based only on those specimens for diagnosis in which diphtheria bacilli are found; Tables 5, 6, 7, 8 and 9 represent data as given when the specimen for diagnosis was submitted. Such data may of course have changed during the course of the disease. Only one culture was submitted for diagnosis from 1,112 patients; two cultures from 28 patients. Of those which proved to be positive, 145 were males, 199 females; 418 were married, 182 unmarried and 4 widowed; 51 were from patients 1 to 5 years old; 148 from 6 to 15 years; 118 from 16 to 60 years, and 5 from patients over 60 years of age.

TABLE 1.

Diagnosis by Physician and Laboratory Findings.

A.—Diphtheria (by physician):	
Laboratory found diphtheria bacilli	230
Laboratory did not find diphtheria bacilli	64
B.—Not diphtheria (by physician):	
Laboratory found diphtheria bacilli	27
Laboratory did not find diphtheria bacilli	74
C.—Possibly diphtheria (by physician):	
Laboratory found diphtheria bacilli	16
Laboratory did not find diphtheria bacilli	13
D.—Uncertainty (by physician):	
Laboratory found diphtheria bacilli	18
Laboratory did not find diphtheria bacilli	11

This table is very interesting and instructive. It shows that diphtheria bacilli were found in 78 per cent of cases in which the clinical diagnosis of diphtheria was made; in 26.7 per cent of cases in which the clinical diagnosis of a non-diphtheric inflammation of the tonsil pharynx, larynx or nose was made; in 55 per cent of cases where the physician made a diagnosis of "possibly diphtheria"; and in 64.2 per cent of cases where the diagnosis was "questionable" in the mind of the physician. It is especially interesting to know that during the course of the past year the laboratory found diphtheria in 78 per cent of all cases diagnosed by the attending physician as diphtheria. The records of the first two years indicate that the percentage at that time was only 60 per cent. The higher percentage given in our present table may be accounted for by the fact that physicians have been more careful in the making of their clinical diagnosis, especially by not calling every pseudo-membranous inflammation of the throat diphtheria, as was true of our former records. This more conservative attitude on the part of the physician in making a positive diagnosis of diphtheria has led to our finding the diphtheria bacilli in a higher percentage of the cases diagnosed by the physician as "not diphtheria", "possibly diphtheria" and "uncertain" than was formerly the case. It does not mean, however, that the physician because

of being more conservative has been less cautious as regards the care of the patient or its bearing on the public health, as is suggested by the fact that according to the present tables antitoxin was given in 43.4 per cent of all cases which proved to be diphtheria before the specimen was sent for diagnosis. According to the statistics based upon the examinations made from July 1, 1904, to July 1, 1906, antitoxin had been given to only 32.8 per cent of the cases before the time the specimen was submitted for diagnosis. In this connection also it is of interest to note that according to the figures of the Department of Health of the City of Chicago, as given in the biennial report for the year 1904-05, diphtheria bacilli were found in only 37 per cent of cases that were clinically diagnosed as diphtheria; in 16 per cent of cases clinically diagnosed as not diphtheria, and in 27 per cent in which the clinical diagnosis was not given.

TABLE 2.

Occupation.

Barbers	2
Business (indoors)	14
Housekeepers	33
Laborers (outside)	26
Physicians	1
Pupils and students	105
Teachers	9

This table brings out the fact that 105, or 54 per cent of the cases in which diphtheria bacilli were found were among school children or students and that nine occurred among teachers. These figures, together with the data of Table No. 4, indicate the important part which the school room plays in the transmission of diphtheria.

The recent observations with reference to "bacillus carriers"—individuals who after recovery from the disease carry in their nose, mouth and throat virulent germs of the disease for a long time and during that entire time are capable of transmitting such to others—should be well recognized by the physicians. "Bacillus carriers" are not only those who have had the disease, but also individuals who have been exposed to the germs but who have never contracted the disease. It has been found that during epidemics of the disease up to 5 per cent of the general healthy public carry the germs in the nose or mouth. This all emphasizes the great importance of not releasing any person from quarantine so long as they are the bearers of virulent diphtheria bacilli as determined by bacteriological examinations. Two consecutive negative reports should be obtained. So long as such is not done—and that it is not done is evidenced by Table No. 11—we can scarcely hope to stamp out diphtheria for a long time to come.

TABLE 3.

Length of time after beginning of disease that first culture was sent.

1 day	94
2 days	70
3 days	33
4 days	23
5 days	11
6 days	4
7 days	18
8 days	2
9 days	3
10 days	33

Although the vast majority of the specimens for diagnosis are submitted during the first two days after the beginning of the disease, and although it is also true that in many instances the physician has not been called in time to take a specimen during the first few days, this table suggests that in some instances at least there was considerable delay in the sending of the specimens. In diphtheria, above all other diseases where so much depends upon the early administration of antitoxin and the early isolation of the patient, every means possible should be taken advantage of to make the diagnosis as early as possible.

TABLE 4.

Source of Infection.

Not known	78
School	36
Family	4
Physician	1

The fact that in the majority of the cases of diphtheria the source of infection is not known suggests that probably many of our cases of diphtheria are transmitted by bacillus carriers. (See above.)

TABLE 5.

Number of Other Cases of Diphtheria in the House.

None	121
1	28
2	17
3	2
4	1

This table speaks well, I believe, for the care used by physicians in limiting the disease to but one member in a family or house in such a large proportion of cases to the recognition of the disease, the early isolation of the patient and the giving of immunizing doses of antitoxin to those exposed.

TABLE 6.

Local Changes.

A. Membrane (fibrinous exudate) present.	
Nares	25
Pharynx	90
Tonsils	120
Larynx	16
B. Exudate (sero-mucous) present.	
Nares	22
Pharynx	63
Tonsils	114
Larynx	21
C. No membrane, no exudate, but Hyperemia	70
D. No inflammation of any kind	35

This table well serves to illustrate the fact that by no means are all cases of diphtheria characterized by the formation of a distinct membrane. It is true that the figures here given are based upon observations made early in the disease, when the specimen was taken for bacteriological examination. It may be that in some cases a distinct membrane developed later in the disease after a certain number of days' existence. It is just as important, however, to remember that all cases of diphtheria are not accompanied by the formation of a false membrane any more than that all pseudo-membranous inflammations are due to diphtheria bacilli.

TABLE 7.

Temperature.

98	23	102	47
99	67	103	20
100	44	104	10
101	52	105	1

TABLE 8.

Constitutional Symptoms.

Poor appetite	16
Sleeplessness	43
Cough	54
Headache	65
Weakness	30
Pain in neck	31

TABLE 9.

Antitoxin used at time specimen was sent.

Yes	107
No	139

TABLE 10.

Number of time bacteria were found in pure culture (practically).

Diphtheria	193
Streptococcus	142
Straphylococcus	215
Pneumococcus	8

This table is based on all specimens submitted for diagnosis for the diphtheria bacillus. As a rule the specimens examined are found to contain a number of different bacteria. Occasionally, however, they are found in practically pure culture. These figures refer, of course, to the examination of the material grown on blood serum rather than the examination of the membrane itself.

TABLE 11.

Release from Quarantine.

A. Number of specimens sent to obtain release from quarantine.

1 specimen	600
2 specimens	312
3 specimens	168
4 specimens	23

B. Release from quarantine in number of days after beginning of disease.

1-14th day	231
15-21st day	250
21-28th day	179
29-35th day	61
36th day	37

In explanation of this table it should be said that the time of release from quarantine was computed from the date on which the physician received the report of the last specimen submitted for release from quarantine. It should also be stated that the rules upon which release from quarantine is based are as follows:

(Rule 18, Secs. 1, 2 and 3. Rules and Regulations, Iowa State Board of Health.)

RULE 18. Section 1. Where possible laboratory findings shall be used to determine the period of quarantine for each individual case of Diphtheria. Specimens for culture shall be taken by the attending physician from the nose and throat of each suspected patient, and forwarded to the State Board of Health Laboratory for diagnosis. Quarantine and isolation shall be established immediately upon the appearance of suspicious symptoms. In districts where it is not possible for the physician to avail himself of the laboratory tests, and the clinical symptoms are those of Diphtheria, quarantine shall be established and maintained for the regular period of thirty-five (35) days, provided, however, that if antitoxin was administered within the first twenty-four hours from the discovery of the initial symptoms, the quarantine may be released at the expiration of twenty-eight (28) days, provided the patient has made a complete recovery and these facts are certified to by the attending physician.

SEC. 2. Cultures for the release of quarantine shall not be taken until after fourteen (14) days from the date of initial symptoms. When release from quarantine is to be determined by laboratory findings, all infected persons on the premises must show two consecutive negative results from cultures taken synchronously from the nose and throat of each. The second and subsequent cultures for release of quarantine shall not be taken until after the expiration of forty-eight (48) hours after the first or subsequent cultures were obtained.

SEC. 3. All culture examinations for the release of quarantine must be made by a bacteriologist of the State Board of Health, and the reports thereof shall be filed with the Local Board of Health. Before the release of any person or persons quarantined on account of Diphtheria, the rules of this Board relative to disinfection must be fully complied with. (See Chapter II.)

It will be noticed (Table 11-A) that many patients have been released from quarantine on one examination; many of these represent members of families or nurses who have been exposed to diphtheria and who have been released from quarantine upon a single examination taken after a period of incubation of seven days. In some instances, however, the physician has not complied with the rule of obtaining two consecutive negative reports and has allowed the patient to be released from quarantine on a single examination. It can readily be understood that in rural communities a strict observance of the law relative to the receiving of two consecutive reports cannot always be enforced. When the time comes when physicians and the public in general will appreciate the importance of "bacillus carriers" they must consider it as a duty not only to those with whom the patients intimately associate, but to the public at large, to permit no one to be released from quarantine so long as they are the bearers of virulent diphtheria bacilli.

Experience has shown that we cannot always depend upon a single negative report and that at least two consecutive negative reports should be obtained. Local Boards of Health should insist upon this important part of the rules of the State Board of Health.

According to Table 11-B, 231 out of 758, or 30.4 per cent, were released from quarantine by the end of the second week after the beginning of the disease; 481, or 62 per cent, were released from quarantine by the end of the third week; 660, or 87 per cent, were released from quarantine by the end of the fourth week; only 61, or 8 per cent, were kept in quarantine until the end of the fifth week; and 37, or 4.8 per cent, were kept in quarantine after the fifth week. The large number of cases released from quarantine within two weeks after the beginning of the disease may be accounted for by the number of specimens taken from individuals exposed to the disease, but released from quarantine as soon as a negative report was received from the laboratory; in part also by the fact that in a number of cases diphtheria bacilli had entirely disappeared from the nose and throat before the end of the second week after the beginning of the disease. All in all, we believe that the rule of the Board that no culture for release from quarantine be taken prior to fourteen days from the date

of initial symptoms is a most important one from the standpoint of the public health.

The figures of these tabels are of great significance when we consider that according to the former "time limit" rule all cases of diphtheria must remain in quarantine for five weeks, whereas the use of the laboratory findings has compelled only 8 per cent of the patients to remain in quarantine for that length of time.

RETIREMENT OR MEMBERS OF THE BOARD OF HEALTH.

At the meeting of the State Board of Health and the State Board of Medical Examiners, held January 9-10, 1907, the following resolutions were presented and adopted:

TESTIMONIAL TO DR. R. E. CONNIFF.

WHEREAS, At this session of the Board of Health the term of service of our esteemed colleague, Dr. R. E. Conniff, expires by legal limitation. During a period of fourteen years he has rendered valuable service to our commonwealth as a Health Officer. These services were rendered during a period when laws were being enacted and rules formulated for the conservation of the public health.

The object to be considered was always, in his view, the welfare of the people. His splendid intellectual equipment and mature judgment qualified him to lead in the enactment of rules and regulations far-reaching in their bearing upon the welfare of the State.

To him there has been no higher call than that of duty and he has served his State faithfully—ofttimes at material loss and personal sacrifice. His associations with his colleagues have invariably been pleasant. His sincerity and genial good nature have enabled him to pave the way over threatened difficulties. His courtesy has been uniform and unvarying. We, his colleagues, gladly bear testimony at this time, the conclusion of his term of service, to his ability as a Health Officer and his worth as a sanitarist. We can only add at this parting the merited encomium, than which there is no higher: "Well done, good and faithful servant."

TESTIMONIAL TO DR. J. F. KENNEDY.

WHEREAS, Dr. J. F. Kennedy has for twenty-two years served the State as Secretary of its State Board of Health and State Board of Medical Examiners, and,

WHEREAS, He is about to sever his official connection with the said Board, and,

WHEREAS, He has, during these years, served the Board and State most efficiently and faithfully; be it

Resolved, That we herewith make official and public recognition of the faithful manner in which he has always performed his duty; of the important part which he has taken in formulating the public health and medical practice laws of the State; of the efficiency with which he has performed the executive duties of his office and of the high esteem in which we, individually, and as representatives of the people of the State, hold him as a man, as a sanitarian and as an executive official; and be it further

Resolved, That we express our hearty thanks to Dr. Kennedy for the uniform courtesy and favors which he has ever extended to us as individuals, and the assistance which he has ever given us in our official work as guardians of the public health of the State; and that we express to him our most sincere hope that he may live many years, not only in the pleasure of his family life and the friendship of a large circle of friends, but also in supreme satisfaction of many years of work faithfully done and efficiently performed—a work of untold value to the citizens of this commonwealth, in that he has done much to conserve the individual and public health and happiness; and be it further

Resolved, That a copy of these resolutions be sent to Dr. Kennedy, be spread upon the records of our transactions and published in the Iowa Health Bulletin and the Iowa Medical Journal.

TESTIMONIAL TO DR. F. W. POWERS.

The following testimonial to Dr. F. W. Powers upon his retirement from membership on the State Board of Health and State Board of Medical Examiners was presented at the regular meeting of the Boards held January 22, and unanimously adopted by a rising vote:

With this meeting of the Board the term of our conferee, Dr. F. W. Powers, expires. During his term of service we gladly bear testimony to the fact that Dr. Powers has been a potential force and a positive factor in determining the policy of health and sanitary affairs in the State. To his fine ability as a sanitary officer he has added a persistent and ceaseless activity in enacting and enforcing salutary health laws in the State. He has been consistent and courageous in his efforts and ofttimes has met strenuous opposition in his work as a health officer. Such opposition apparently inspired added zest to his work, which he met unflinchingly and unswervingly.

Among his conferees, both in the medical profession and on the Board of Health, Dr. Powers is esteemed a faithful and efficient officer. The health laws of this State bear the impress of his safe judgment and their enforcement has been materially aided by the exercise of his counsel and good judgment while a member of this Board. His genial nature and good fellowship have contributed much to the pleasure of the meetings of the Board, and we, his colleagues, at this hour of separation, gladly unite individually and collectively our testimony to the general esteem in which he is held, and evidence the warm personal friendship with which we each regard him. While we shall no longer have the pleasure of meeting with him in the capacity of health officer, we beg to assure him that we shall not fail to entertain for him a hearty good will, and trust that the friendship formed by our associations shall not diminish with the cessation of his labors as a member of this Board.

We beg to assure Dr. Powers that our interests shall follow him into the activities of his private career, and we shall anticipate with pleasure the renewal of personal acquaintance, and the hearty greetings which added so much of satisfaction to our conventions here.

DEPARTMENT OF VITAL STATISTICS.

In the matter of accurate vital statistics Iowa is woefully deficient. The reports of deaths returned to this office probably represent 95 per cent of the actual number. The returns of marriages and divorces, where given, are correct, as shown by the certificates of the clerks of the district courts, but as some of these neglected to report to this office, the data for the whole State is incomplete.

The births, collected by the assessors and reported to the clerks of the district courts, and by them to this office, are evidently very incomplete and practically worthless for statistical purposes. In many instances the number of deaths outnumber the number of births, and in 17 counties not a birth was reported. These conditions are due to the unsatisfactory method of collecting this data through the medium of the assessors. In the course of a year numbers of people move from one town, township or county to another, or the assessor engrossed in listing the taxable property forgets to inquire for births. In either event the births are overlooked.

It is evident that all of the assessors in the seventeen counties from which no reports were received entirely neglected the important duty assigned them. But this is not surprising, for the law pertaining to the returns of births has been changed so often that misunderstanding and confusion is a natural result and in a measure excusable.

To determine the best system for obtaining complete returns of births has always been a perplexing problem, but it would be difficult to conceive a more unreliable and useless method than that now in vogue in Iowa.

Accurate vital statistics are a necessary adjunct to the proper administration of public affairs in county, state and nation. In this State statistics of marriages and divorces are complete, and those of deaths reasonably so, with a fair prospect for complete accuracy in the future. But owing to the manifestly incomplete returns of births, the combined value of collateral statistics is much diminished. As the birth rate necessarily forms the basis of vital statistics, it would seem in keeping with American intelligence to provide a reliable foundation upon which to erect collateral statistics.

The various laws relating to birth statistics show that the Iowa legislature has appreciated the importance of such data, but unfortunately the responsibility for collecting reports has been placed upon persons not in position to secure accurate or complete returns. The assessor, clerk of the district court and the attending physician have been tried and the results obtained are equal failures. It is therefore apparent that a con-

tinuance of the present imperfect system or a return to either of the former would be a useless expenditure of time, energy and money.

In European countries the head of the family is required to appear before the proper local official and furnish the particulars necessary for registration. The reports are then forwarded to the central office and there compiled. Since this system has proved satisfactory in foreign countries, there is no good reason why it should not in Iowa. The State requires that mortgages, title deeds and like instruments shall be recorded in the office of the county recorder and a small fee is provided for this service. A similar requirement concerning births, with sufficient penalties for failure to make the record within a specified time, presents the most favorable prospect for obtaining accurate records and statistics.

The department of vital statistics now receives an annual appropriation of $2,000. With an additional appropriation of $3,000 to cover extra clerical assistance and printing, and the enactment of a law embodying the foregoing suggestions, it would be possible for Iowa to establish and maintain a system of statistics equal in accuracy and value to that of any foreign country.

The following is a classified summary of expenditures of this department for the biennial period commencing July 1, 1906, and ending June 30, 1908:

Salaries and clerk hire, July 1, 1906-June 30, 1907	$1,213.50	
Salaries and clerk hire, July 1, 1907-June 30, 1908	1,340.25	
Total		$2,553.75
Printing and binding, July 1, 1906-June 30, 1907	$ 762.92	
Printing and binding, July 1, 1907-June 30, 1908	340.67	
Total		$1,103.59
Books and miscellaneous, July 1, 1906-June 30, 1907	$ 116.80	
Books and miscellaneous, July 1, 1907-June 30, 1908	61.92	
Total		$ 178.72
Postage, July 1, 1906-June 30, 1907	$ 405.00	
Postage, July 1, 1907-June 30, 1908	255.71	
Total		$ 660.71
Expressage, July 1, 1906-June 30, 1907		
Expressage, July 1, 1907-June 30, 1908	$ 1.45	
Total		$ 1.45
		$4,498.22
Appropriation, Thirty-first General Assembly	$2,500.00	
Appropriation, Thirty-second General Assembly	2,000.00	
Total	$4,500.00	
Total expended July 1, 1906-June 30, 1908	4,498.22	
Balance unexpended	$ 1.78	

TABLE No. 1.

BIRTHS, MARRIAGES, DIVORCES AND DEATHS—JULY 1, 1906, TO JUNE 30, 1907.

Counties	Marriages	Divorces	Deaths	Births*
Adair	108	12	151	153
Adams	109	10	103	240
Allamakee	184	1	171	297
Appanoose	253	31	335	167
Audubon	100	4	113	117
Benton	306	28	237	208
Black Hawk	490	58	330	360
Boone	243	24	208	244
Bremer	190	9	188	145
Buchanan	157	13	230	195
Buena Vista	102	11	133	178
Butler	124	14	152	157
Calhoun	136	12	121	166
Carroll	179	6	158	122
Cass	155	15	187	172
Cedar	120	8	195	148
Cerro Gordo	235	23	218	345
Cherokee	131	13	152	87
Chickasaw	130	.....	79	243
Clarke	124	9	122	94
Clay	108	6	115	148
Clayton	216	14	303	226
Clinton	444	44	431	509
Crawford	173	14	198	391
Dallas	181	25	139	163
Davis	132	8	110	119
Decatur	153	16	165	281
Delaware	161	10	148	167
Des Moines	491	47	398	243
Dickinson	80	6	64	90
Dubuque	545	25	651	290
Emmet	74	9	79	97
Fayette	232	23	264	277
Floyd	132	8	155	143
Franklin	115	8	97	149
Fremont	98	.....	120	187
Greene	140	12	140	156
Grundy	111	5	96	166
Guthrie	151	14	211	157
Hamilton	156	8	182	141
Hancock	80	3	87	106
Hardin	164	11	222	272
Harrison	205	29	133	235
Henry	134	14	203	113
Howard	102	5	124	124
Humboldt	83	5	90	118
Ida	95	5	84	120
Iowa	147	4	165	205
Jackson	171	27	169	154
Jasper	232	28	253	252
Jefferson	143	14	130	149
Johnson	215	18	237	429
Jones	121	19	228	319
Keokuk	197	14	208	394

*For last half 1906.

TABLE No. 1—CONTINUED

Counties	Marriages	Divources	Deaths	Births*
Kossuth	181	7	179	267
Lee	457	55	503	284
Linn	656	108	621	326
Louisa	82	12	89	112
Lucas	118	4	131	106
Lyon	98	9	61	126
Madison	168	11	185	124
Mahaska	307	57	359	448
Marion	232	15	243	238
Marshall	360	33	389	208
Mills	111	17	128	202
Mitchell	119	9	123	108
Monona	210	18	139	132
Monroe	240	43	315	276
Montgomery	189	19	160	133
Muscatine	328	50	358	234
O'Brien	112	14	144	119
Osceola	59	6	53	106
Page	224	22	290	183
Palo Alto	89	6	128	180
Plymouth	203	8	179	238
Pocahontas	123	5	83	134
Polk	1,336	384	1,397	1,591
Pottawattamie	1,091	64	614	484
Poweshiek	164	15	217	200
Ringgold	98	18	98	119
Sac	131	9	145	190
Scott	746	61	757	403
Shelby	140	8	111	187
Sioux	179	6	177	311
Story	174	11	242	362
Tama	178	25	208	196
Taylor	153	14	159	300
Union	167	24	183	99
Van Buren	129	8	108	164
Wapello	428	49	436	
Warren	169	4	212	141
Washington	154	7	198	161
Wayne	123	5	176	145
Webster	282	11	282	233
Winnebago	92	3	126	200
Winneshiek	153	14	189	192
Woodbury	700	127	715	468
Worth	69	5	97	86
Wright	142	10	122	137
Grand total	21,064	2,280	11,778	21,648

TABLE No. 2.

BIRTHS, MARRIAGES, DIVORCES AND DEATHS—JULY 1, 1907, TO JUNE 30, 1908.

Counties	Marriages	Divorces	Deaths	Births for 1907
Adair	113	11	161	308
Adams	124	8	94	232
Allamakee			174	
Appanoose	288	43	339	498
Audubon	110	9	102	284
Benton			235	
Black Hawk	410	50	400	654
Boone	231	28	310	638
Bremer	149	11	159	319
Buchanan	160	12	227	321
Buena Vista	135	4	137	214
Butler		13	146	272
Calhoun	118	12	150	
Carroll	209	10	160	385
Cass	156	7	182	286
Cedar	121	9	163	323
Cerro Gordo	224	19	171	428
Cherokee	137		150	266
Chickasaw	109		86	275
Clarke	94	11	127	213
Clay			110	
Clayton	186	18	240	41
Clinton	444	53	498	503
Crawford	164	14	186	402
Dallas			150	
Davis	125	8	128	294
Decatur	159	12	166	284
Delaware	140		190	328
Des Moines	360	55	441	443
Dickinson	68		56	129
Dubuque	548	4	622	
Emmet	101	3	78	192
Fayette	187	27	202	541
Floyd	134	20	137	270
Franklin	129	8	115	276
Fremont			142	
Greene	121	6	114	283
Grundy	112	4	105	206
Guthrie	125	15	164	257
Hamilton	157	17	157	306
Hancock	100	3	83	212
Hardin	156	13	223	338
Harrison	169	22	154	422
Henry	161	19	226	281
Howard	92	7	126	252
Humboldt	79	7	102	216
Ida			96	
Iowa	127	7	173	340
Jackson	173	13	216	384
Jasper	226	20	263	437
Jefferson	155	7	177	240
Johnson	205	30	280	441
Jones	147	19	220	280
Keokuk	168	9	216	
Kossuth			167	
Lee	450	53	528	411

TABLE No. 2—CONTINUED

Counties	Marriages	Divorces	Deaths	Births for 1907
Linn	656	92	678	611
Louisa	88	15	110	203
Lucas	136	15	144	208
Lyon	114	10	73	264
Madison	122	8	161	265
Mahaska	297	27	309	374
Marion	173	18	250	407
Marshall	323	23	446	408
Mills	133	15	173	246
Mitchell	110	9	119	322
Monona	----	18	133	----
Monroe	211	30	230	583
Montgomery	144	18	179	284
Muscatine	283	46	350	280
O'Brien	123	6	116	290
Osceola	71	1	57	195
Page	----	----	321	----
Palo Alto	107	7	93	323
Plymouth	151	11	165	381
Pocahontas	138	8	110	288
Polk	1,351	----	1,232	----
Pottawattamie	938	80	828	656
Poweshiek	134	11	219	249
Ringgold	118	11	117	222
Sac	----	----	156	----
Scott	644	90	772	861
Shelby	148	7	126	344
Sioux	201	11	147	564
Story	----	----	234	----
Tama	199	12	238	368
Taylor	151	10	158	226
Union	----	22	190	----
Van Buren	----	----	104	----
Wapello	483	64	525	408
Warren	134	13	217	240
Washington	139	14	223	272
Wayne	----	----	149	----
Webster	278	----	280	561
Winnebago	89	----	107	258
Winneshiek	148	9	209	377
Woodbury	602	118	799	995
Worth	85	----	95	180
Wright	139	12	135	303
Grand total	----	----	22,323	----

TABLE No. 3.

RECORD OF DEATHS.

Counties	1906						1907						
	July	August	September	October	November	December	January	February	March	April	May	June	Total
Adair	4	13	13	12	5	11	20	17	18	18	8	12	151
Adams	10	7	7	7	5	7	5	14	11	20	5	5	103
Allamakee	11	9	15	14	9	15	23	18	13	11	22	11	171
Appanoose	20	26	31	31	28	28	34	37	31	30	19	17	335
Audubon	10	10	11	9	3	10	16	7	12	5	13	7	113
Benton	16	15	12	19	23	24	28	22	19	17	23	19	237
Black Hawk	28	21	41	32	34	30	39	33	33	25	27	21	360
Boone	6	21	32	23	22	17	28	20	28	19	24	11	269
Bremer	13	15	11	14	15	13	17	17	19	18	21	16	188
Buchanan	17	21	14	28	26	25	15	28	29	30	35	22	290
Buena Vista	4	12	8	8	12	10	15	9	18	13	15	9	133
Butler	12	7	14	14	23	16	15	15	11	8	11	6	152
Calhoun	7	5	6	12	8	9	10	17	9	16	12	10	121
Carroll	6	11	13	7	18	18	17	12	20	10	14	12	158
Cass	12	13	9	16	21	12	24	16	20	16	13	15	187
Cedar	5	12	15	16	21	12	23	22	20	16	17	16	195
Cerro Gordo	6	16	20	18	10	29	21	20	23	15	19	21	218
Cherokee	11	13	13	9	16	15	13	10	11	16	14	12	152
Chickasaw	7	4	8	7	11	8	12	4	4	3	4	7	79
Clarke	5	9	11	8	9	9	14	15	19	8	9	6	122
Clay	2	9	5	4	7	8	8	13	14	23	12	10	115
Clayton	23	18	15	24	24	25	29	30	36	29	36	14	303
Clinton	31	39	40	37	29	48	35	32	49	24	36	34	434
Crawford	2	15	13	17	24	14	24	16	36	11	12	14	198
Dallas	10	11	13	10	15	10	11	10	14	9	15	8	136
Davis	6	7	18	6	6	10	11	19	10	6	9	2	110
Decatur	7	9	17	14	10	22	14	18	14	7	24	9	165
Delaware	13	12	12	6	12	21	15	9	10	9	16	13	148
Des Moines	26	33	33	31	30	41	26	33	58	24	33	30	398
Dickinson	5	1	6	4	9	6	3	2	7	3	7	6	64
Dubuque	41	56	65	53	38	42	57	61	54	57	64	63	651
Emmet	4	8	4	8	3	5	6	11	15	11	4	5	79
Fayette	19	23	29	17	21	27	29	24	18	21	21	15	294
Floyd	12	17	10	13	7	15	27	8	16	12	10	8	155
Franklin	3	13	7	9	10	11	11	10	5	6	6	6	97
Fremont	12	6	9	12	7	13	11	10	13	8	10	9	130
Greene	7	12	9	16	16	14	11	12	14	12	10	7	140
Grundy	7	6	8	9	1	9	13	9	12	11	4	7	96
Guthrie	9	18	16	22	13	15	22	27	20	17	24	8	211
Hamilton	11	11	17	12	15	11	19	18	22	13	16	17	182
Hancock	2	3	5	8	8	5	1	7	14	12	4	8	87
Hardin	13	19	18	17	10	19	23	32	21	12	12	20	222
Harrison	4	16	13	10	16	11	20	21	20	13	10	9	163
Henry	16	11	22	13	16	11	23	16	19	19	16	21	203
Howard	8	12	10	11	7	12	10	15	12	7	9	11	124
Humboldt	----	4	9	8	6	7	13	12	7	9	7	8	90
Ida	5	6	7	7	6	7	9	12	5	5	8	7	84
Iowa	8	16	9	8	7	15	20	20	16	18	18	10	165
Jackson	11	12	9	8	8	19	12	21	22	22	12	13	169
Jasper	17	13	17	17	18	20	24	43	27	16	23	18	253
Jefferson	6	10	10	10	5	15	16	13	12	10	14	9	130
Johnson	14	22	22	19	22	30	33	37	32	21	14	16	287
Jones	10	17	21	17	16	23	19	26	19	15	31	14	228
Keokuk	8	14	20	19	29	22	23	21	10	14	14	14	208

TABLE No. 3—CONTINUED

Counties	1906 July	August	September	October	November	December	1907 January	February	March	April	May	June	Total
Kossuth	5	10	12	16	9	19	23	22	20	18	14	11	179
Lee	34	46	40	40	48	47	40	46	58	46	45	26	506
Linn	45	43	56	56	40	42	66	58	58	60	49	48	621
Louisa	5	1	6	8	8	5	10	10	12	7	12	5	89
Lucas	8	11	5	11	11	16	18	11	19	8	9	4	131
Lyon	1	2	4	2	3	11	6	12	8	5	2	7	61
Madison	13	12	15	15	11	7	19	23	18	21	19	12	185
Mahaska	21	28	37	23	33	27	32	34	40	29	36	25	359
Marion	21	12	25	18	20	25	27	22	24	24	7	18	243
Marshall	25	19	23	37	35	32	22	40	41	39	44	32	389
Mills	6	5	12	12	9	3	8	17	17	13	13	13	128
Mitchell	5	13	8	14	16	5	14	13	13	6	7	9	123
Monona	7	6	7	9	10	11	22	15	12	5	16	9	129
Monroe	18	21	31	33	24	22	34	29	31	24	26	22	315
Montgomery	7	19	15	16	9	13	14	15	14	16	8	14	190
Muscatine	24	29	36	35	32	32	39	33	32	21	30	24	358
O'Brien	8	16	11	8	10	14	9	18	23	8	13	6	144
Osceola	5	6	2	2	4	4	3	9	4	6	4	4	53
Page	13	27	22	24	28	36	22	23	33	25	21	16	290
Palo Alto	1	10	5	10	10	14	8	5	17	17	20	11	128
Plymouth	7	13	11	7	14	16	27	20	18	22	13	11	179
Pocahontas	4	3	6	5	8	5	7	10	9	7	9	9	96
Polk	113	81	96	94	88	116	128	138	125	116	126	86	1,307
Pottawattamie	43	41	35	45	56	69	56	67	65	46	44	49	614
Poweshiek	12	11	14	26	11	27	22	21	22	20	13	11	217
Ringgold	4	11	7	9	7	10	8	14	9	11	10	2	98
Sac	6	9	17	13	11	16	19	5	9	11	12	14	145
Scott	56	51	52	44	65	71	76	68	85	67	74	47	757
Shelby	6	4	5	12	11	9	13	9	12	10	12	8	111
Sioux	9	15	27	10	17	8	24	14	13	13	17	10	177
Story	19	16	25	18	9	19	24	23	31	22	19	26	242
Tama	15	11	15	13	10	17	20	28	23	18	11	13	206
Taylor	9	14	15	14	16	14	9	13	15	19	12	9	159
Union	14	9	16	15	12	16	16	24	17	13	18	13	183
Van Buren	8	6	7	9	5	10	10	11	13	12	14	3	108
Wapello	22	33	33	38	42	33	46	46	47	28	41	32	441
Warren	12	12	20	16	12	19	23	26	24	13	13	19	212
Washington	14	17	19	9	10	16	15	22	24	19	18	15	198
Wayne	9	8	7	17	9	13	22	21	21	25	14	10	176
Webster	19	37	7	19	15	23	31	26	36	31	24	14	283
Winnebago	8	7	16	10	11	10	8	17	9	10	6	14	126
Winneshiek	8	10	12	14	17	14	32	27	16	15	17	10	189
Woodbury	55	87	64	87	59	55	68	69	56	57	77	47	715
Worth	4	7	11	13	8	6	8	5	16	5	7	7	97
Wright	4	6	13	9	11	7	15	11	13	13	16	4	122
Grand total													21,778

TABLE No. 4.

RECORD OF DEATHS.

Counties	1907 July	August	September	October	November	December	1908 January	February	March	April	May	June	Total
Adair	9	9	27	7	13	23	16	18	12	10	13	8	164
Adams	6	7	10	9	9	7	10	9	7	9	4	10	94
Allamakee	7	10	9	16	19	9	31	26	10	12	13	12	174
Appanoose	25	32	22	17	30	27	25	27	30	25	23	16	299
Audubon	4	6	8	7	7	13	13	11	13	6	8	6	102
Benton	24	10	24	27	18	26	21	29	16	13	16	11	235
Black Hawk	12	22	33	25	32	40	32	53	33	45	34	33	400
Boone	20	25	29	19	21	34	40	21	38	26	29	8	310
Bremer	21	13	15	14	14	12	8	7	15	14	11	15	159
Buchanan	24	34	23	20	26	31	22	39	25	21	35	27	337
Buena Vista	5	10	11	5	12	15	18	19	10	17	9	6	137
Butler	5	6	9	13	14	10	17	17	16	12	17	10	146
Calhoun	10	6	11	4	7	10	8	14	13	13	14	10	130
Carroll	6	16	19	9	17	10	20	7	18	16	13	9	160
Cass	16	15	14	7	20	10	16	24	13	17	20	10	182
Cedar	12	10	14	11	11	16	12	19	17	19	11	11	163
Cerro Gordo	12	13	12	15	17	23	21	15	15	15	11	14	171
Cherokee	7	6	14	9	12	18	23	21	10	9	10	5	150
Chickasaw	5	3	7	6	7	5	10	9	10	9	4	11	86
Clarke	3	8	17	12	12	10	11	11	14	15	5	9	127
Clay	7	5	11	10	7	13	11	8	9	8	9	12	110
Clayton	13	18	17	18	21	26	29	17	28	28	9	18	240
Clinton	31	38	48	31	40	36	58	54	36	48	45	30	498
Crawford	20	7	14	16	12	16	27	19	20	12	11	18	186
Dallas	7	5	13	12	13	9	18	25	14	13	13	9	150
Davis	10	20	12	6	9	4	16	15	12	9	6	9	128
Decatur	12	12	13	17	10	17	16	20	20	8	11	10	166
Delaware	11	14	15	12	21	17	23	12	16	21	13	15	190
Des Moines	37	48	20	23	43	37	42	46	37	39	28	46	441
Dickinson	4	6	6	1	2	3	4	6	7	5	7	4	56
Dubuque	42	51	55	46	41	40	78	56	64	58	47	49	622
Emmet	7	8	13	5	6	1	11	3	9	7	4	4	78
Fayette	11	11	12	20	21	23	31	30	25	30	23	25	262
Floyd	10	11	14	12	9	5	15	7	19	11	14	10	137
Franklin	8	9	11	10	8	6	12	13	11	13	9	5	115
Fremont	13	12	8	14	3	12	22	8	20	10	10	8	142
Greene	8	8	6	11	5	13	5	12	16	11	6	13	114
Grundy	9	7	8	6	5	9	10	16	12	8	9	6	105
Guthrie	9	13	15	16	14	20	19	16	13	14	10	8	164
Hamilton	14	16	16	14	8	16	12	17	14	15	8	7	157
Hancock	7	8	7	7	11	9	13	2	3	4	7	4	83
Hardin	17	19	15	24	16	24	26	21	19	13	19	7	233
Harrison	10	9	11	9	15	11	15	15	17	21	9	12	154
Henry	9	15	17	16	11	21	28	29	18	27	19	16	226
Howard	6	6	7	10	10	10	18	10	14	14	8	11	126
Humboldt	1	8	3	8	6	6	18	18	4	7	6	9	102
Ida	9	7	11	4	3	7	12	7	12	10	4	10	96
Iowa	12	14	10	14	15	16	16	15	20	16	18	12	178
Jackson	13	15	22	15	12	25	24	23	27	12	11	17	216
Jasper	22	25	34	22	18	13	25	19	22	23	22	18	263
Jefferson	10	22	10	13	16	16	22	15	12	10	16	5	177
Johnson	26	22	18	26	14	24	31	38	25	21	27	17	289
Jones	8	14	19	18	19	18	20	19	29	12	18	26	220
Keokuk	16	13	24	12	11	19	23	27	22	21	18	10	216

TABLE No. 4—CONTINUED

Counties	1907 July	August	September	October	November	Decembe	1908 January	February	March	April	May	June	Total
Kossuth	6	18	8	11	12	17	18	16	13	16	11	21	167
Lee	42	47	46	40	37	46	57	53	50	40	36	34	528
Linn	46	58	53	42	47	59	65	67	62	71	59	49	678
Louisa	6	7	13	6	4	11	16	15	11	12	5	4	110
Lucas	7	13	8	4	7	10	19	16	14	12	16	18	144
Lyon	7	8	9	6	3	6	10	3	2	4	9	6	73
Madison	9	11	13	12	14	10	19	16	21	18	8	10	161
Mahaska	31	28	37	18	20	26	37	25	27	19	19	22	309
Marion	21	29	12	12	19	25	33	30	27	23	17	11	259
Marshall	28	26	31	30	32	46	48	52	46	37	42	28	446
Mills	15	15	16	14	15	19	18	15	16	16	9	5	173
Mitchell	6	9	9	11	13	9	11	13	8	13	6	11	119
Monona	11	9	5	9	12	16	18	15	14	10	10	4	133
Monroe	22	23	17	18	17	26	19	22	31	10	12	13	230
Montgomery	12	17	11	12	11	14	20	23	24	11	13	11	179
Muscatine	21	33	30	28	32	39	30	38	17	29	33	20	350
O'Brien	11	11	11	10	6	8	5	14	10	9	15	6	116
Osceola	7	5	3	5	3	3	5	6	2	4	7	7	57
Page	19	24	26	22	30	15	31	46	35	25	24	24	321
Palo Alto	5	7	8	4	4	8	15	7	4	8	11	12	93
Plymouth	13	10	13	13	9	12	23	13	25	9	16	9	165
Pocahontas	11	7	11	10	10	4	18	12	5	7	6	9	110
Polk	88	127	105	99	92	81	102	112	118	99	106	95	1,232
Pottawattamie	39	56	51	59	47	67	70	40	54	41	60	44	628
Poweshiek	17	21	20	16	10	15	18	28	31	17	14	12	219
Ringgold	7	12	9	10	9	8	6	10	15	14	9	8	117
Sac	10	15	18	8	14	13	18	15	12	11	11	11	156
Scott	44	72	64	73	58	77	77	75	77	55	53	47	772
Shelby	4	9	10	15	7	10	12	12	13	10	4	5	126
Sioux	12	8	11	7	17	12	14	21	14	15	7	9	147
Story	18	12	24	14	18	19	26	25	23	23	18	14	234
Tama	14	16	12	17	18	24	24	21	24	23	18	27	238
Taylor	15	13	19	13	11	10	18	12	12	12	7	16	158
Union	12	16	17	16	18	12	16	17	16	13	13	14	180
Van Buren	12	9	5	8	5	5	12	10	9	13	6	10	104
Wapello	23	57	46	45	38	32	51	49	55	54	37	32	525
Warren	16	21	19	9	15	21	35	11	21	18	14	17	217
Washington	16	17	9	12	18	17	16	28	25	17	26	22	223
Wayne	13	12	9	10	16	12	16	15	14	11	12	9	149
Webster	20	25	17	15	16	21	37	37	33	24	28	16	289
Winnebago	5	9	12	6	8	17	10	5	9	9	7	10	107
Winneshiek	17	15	18	16	6	21	31	31	26	14	9	5	209
Woodbury	54	68	58	58	42	66	82	58	85	79	85	64	799
Worth	6	9	10	3	4	8	13	3	16	12	4	7	95
Wright	7	13	9	13	9	11	14	14	14	14	12	5	135
Grand total	----	----	----	----	----	----	----	----	----	----	----	----	22,323

CAUSES OF DEATH—JULY 1, 1906, TO JUNE 30, 1907.

Disease	July	August	September	October	November	December	January	February	March	April	May	June	Grand total
Total deaths (stillbirths included)	1,301	1,554	1,745	1,708	1,622	1,973	2,130	2,173	2,185	1,92[illegible]	1,832	1,63[illegible]	21,778
Preventable diseases	217	227	261	326	387	465	648	761	701	45[illegible]	476	31[illegible]	5,240
Stillbirths	69	83	75	79	48	103	84	71	64	71	67	6[illegible]	677
*2 years and under	----	----	----	----	----	----	417	380	346	204	290	22[illegible]	1,956
†From 1 to 10 years	----	----	----	----	----	----	----	----	----	----	----	----	----
†From 10 to 21 years	----	----	----	----	----	----	----	----	----	----	----	----	----
65 years and over	430	491	481	601	553	642	776	841	889	639	667	512	7,520
†Foreign born	----	----	----	----	----	----	----	----	----	----	----	----	----
†Native born	----	----	----	----	----	----	----	----	----	----	----	----	----
Accidents from petroleum products	----	----	----	----	----	----	----	----	----	----	----	----	----
Appendicitis	13	19	17	14	11	10	15	17	18	12	10	17	173
Cancer	100	102	90	87	78	69	112	70	98	79	90	87	1,063
Diphtheria	8	6	13	47	29	35	26	20	14	14	16	7	235
Influenza	----	2	1	5	4	10	46	87	93	18	18	6	290
Measles	1	----	1	3	1	3	7	6	17	14	27	15	95
Meningitis	29	40	29	27	28	33	46	47	46	32	34	26	417
Pneumonia	32	35	40	81	154	200	336	391	343	187	139	90	2,091
Puerperal Septicemia	4	4	3	2	4	5	4	6	3	3	8	4	50
Scarlet Fever	3	1	2	1	7	6	9	12	9	13	14	11	88
Small Pox	----		----				----	2	----	1	----	----	3
Suicide	10	7	13	12	12	13	11	16	16	12	23	11	156
Tuberculosis (pulmonary)	96	89	86	101	98	120	129	147	125	135	108	113	1,347
Tuberculosis (other forms)	13	20	30	22	15	20	17	17	26	18	24	20	242
Typhoid Fever	23	24	46	36	38	28	22	16	18	12	13	15	291
Violence	95	107	94	78	55	70	70	65	62	65	74	61	896
Whooping Cough	8	6	10	2	9	5	6	6	7	5	15	12	91

*No record first six months.
†No record for this year.

CAUSES OF DEATH—JULY 1, 1907, TO JUNE 30, 1908.

Disease	July	August	September	October	November	December	January	February	March	April	May	June	Grand total
Total deaths (stillbirths included)	1,522	1,794	1,837	1,636	1,538	1,990	2,408	2,250	2,206	1,898	1,694	1,532	22,323
Preventable Diseases	227	268	281	295	339	473	865	782	626	507	366	278	5,307
Stillbirths	62	68	53	75	60	73	73	66	91	74	69	62	826
Under 1 year	209	297	322	223	192	237	297	293	93	304	238	173	2,878
From 1 to 10 years	127	194	103	132	116	133	165	166	188	157	117	114	1,712
From 10 to 21 years	76	104	100	76	97	94	113	108	111	100	106	93	1,178
65 years and over	477	580	538	534	607	713	971	846	811	657	600	541	7,875
Foreign born	317	395	387	379	407	438	640	517	506	371	369	354	5,080
Native born	1,087	1,353	1,275	1,201	1,195	1,410	1,721	1,683	1,671	1,466	1,322	1,176	16,563
Accidents from petroleum products	3	-----	5	-----	3	-----	-----	1	2	-----	1	1	16
Appendicitis	16	17	22	18	12	14	19	13	15	20	18	13	197
Cancer	109	93	100	97	103	92	104	79	102	92	121	104	1,196
Diphtheria	3	14	7	17	24	26	31	17	19	10	11	9	188
Influenza	4	-----	4	5	4	28	121	149	56	27	9	2	409
Measles	4	1	-----	1	2	1	5	8	6	6	5	5	44
Meningitis	24	35	38	35	29	24	50	48	58	46	24	25	436
Pneumonia	41	45	56	78	129	244	450	381	297	220	123	67	2,131
Puerperal Septicemia	5	4	3	5	3	6	6	3	5	6	4	10	60
Scarlet Fever	2	5	6	7	7	4	9	9	16	14	5	5	89
Small Pox	-----	-----	-----	-----	1	-----	-----	2	1	5	2	-----	11
Suicide	17	19	9	14	12	27	19	12	26	15	19	38	227
Tuberculosis (pulmonary)	101	98	89	88	92	97	125	115	111	107	107	103	1,233
Tuberculosis (other forms)	22	29	34	20	18	20	32	26	28	30	44	25	328
Typhoid Fever	13	26	34	35	25	19	28	13	15	16	15	8	247
Violence	94	100	107	72	78	80	71	42	61	61	58	98	922
Whooping Cough	8	11	10	4	5	4	8	11	14	20	17	19	131

The following list of *indefinite terms* frequently used, with explanatory notes showing why such should *be avoided* in stating causes of death, is published for the information of physicians, health officers, coroners and undertakers, all of whom under the laws of Iowa are concerned in the matter of executing death certificates.

Many of the terms used by physicians to denote the cause of death are indefinite, unsatisfactory and practically worthless for legal or statistical purposes.

Statistics, to be comparable, must be uniform, and to be valuable for scientific purposes must be accurate. Their chief value is in the distribution of deaths by causes, but the cause of death must be properly stated before it can be properly classified. The entire value of vital statistics depends upon the clearness and certainty with which the physicians supply the information. In the certificates of death received at this office there is much too large a proportion of "unknown" or indefinite items for which the physicians alone are directly responsible and which they can and should take pains to avoid.

It is not to be expected that an entirely definite and accurate statement of the cause of death can be made in every case. There are cases in which the exact cause cannot be ascertained, and others in which an accurate diagnosis is impossible, but they are comparatively few, and a careful observance of the suggestions made in this pamphlet will greatly reduce the number of certificates of deaths that must necessarily be classed as unknown or ill-defined.

Before signing a certificate of death the physician should endeavor to state in clear and distinct terms (not technical) the disease or injury actually causing the death of the deceased, always avoid giving a symptom or train of symptoms as the cause of death and above all avoid such useless terms as "old age," "childbirth," "accident," "poison," "heart disease," "heart failure," "convulsions," "exhaustion," "fever, "stomach and various other troubles," etc. The use of such terms simply denotes that the physician using them is either too careless to diagnose his cases or woefully ignorant in the science of his profession.

List of Indefinite Terms Frequently Used and Which Should be Avoided in Stating the Cause of Death.

The explanatory notes will show wherein such terms are lacking the information necessary for a proper classification.

Indefinite terms used in reporting deaths.	Further information required for proper classification.
ABSCESS	What caused the abscess? What organ or part of the body was affected? Was it tuberculosis or result of injury. If of lung, was it not pulmonary phthisis?
ACCIDENT	What was the nature of the accident?

STATING CAUSE OF DEATH—CONTINUED

Indefinite terms used in reporting deaths	Further information required for proper classification
ACUTE GASTRITIS	State cause. Was it due to some irritant poison?
ACUTE HYDROCEPHALUS	Was it due to tuberculosis meningitis?
ADVANCED AGE	What disease caused death? See "Old Age."
ALBUMINURIA	Name the acute or chronic disease causing the albuminuria. Was it due to scarlet fever or Bright's disease?
AMPUTATION	What was the disease or injury requiring the amputation to be performed? State fully, and if due to injury from violence, state nature of the accident.
ANASARCA	Name disease causing anasarca. See "Dropsy."
ANEMIA	State cause of the anemia, if known. A death should not be reported thus when the cause of the anemia was pulmonary tuberculosis or other wasting disease.
ANESTHESIA	Name the anesthetic and state whether it was administered for a surgical operation, in which case give the disease or injury for which the operation was undertaken.
ANGINA	Was it due to scarlet fever or diphtheria? This is a suspicious return and one to be carefully scrutinized by registrars.
ASCITES	Name disease causing ascites. See "Dropsy."
ASPHYXIA	How? Was it accidental? If so, state fully the nature of the accident. If by gas or poisonous vapors, give particulars. Was it a case of "overlying" (child)? If in a mine, it should be so stated. Physiologic asphyxiation (mode of death) by failure to eliminate CO_2 should not be given as a cause alone. What disease caused this condition?
ASTHENIA	A practically worthless statement. See "Debility." What was the cause?
ATROPHY	What caused the atrophy? Was it tuberculosis wasting (phthisis)? Was it syphilis? What organ or parts atrophied?
AUTOINFECTION	What caused the autoinfection? This term should not be used when cholera infantum or other diarrhoeal disease is meant.
BAD COLD	Is it bronchitis, pneumonia, or pulmonary consumption?
BED SORES	What was the disease causing death and during which the patient contracted bed sores? Was it rheumatism, paralysis, etc.?
BILIOUS ATTACK	Very indefinite. Name the disease causing death.
BILIOUS FEVER	Was it malarial, typhoid, or other form of fever? State definitely.
BLOOD POISONING	Do you mean septicemia, syphilis, or any other definite disease? If septicemia, what was the cause? Was it puerperal?
BOTTLE FEEDING	This return is valuable but only in connection with the disease causing death. Was the disease resulting from improper feeding diarrhoeal in character?

STATING CAUSE OF DEATH—CONTINUED

Indefinite terms used in reporting deaths	Further information required for proper classification
BOWEL DISEASE	What disease of the bowels? If cholera infantum or diarrhoeal disease of infants, state definitely.
BOWEL TROUBLE	What was the "trouble"? Name a definite disease. Was it diarrhea, dysentery, enteritis? Was it cancer or colic or strangulated hernia? All these are "troubles," besides some others.
BRAIN DISEASE	Was it a tumor of the brain? Was it meningitis? Name disease causing death.
BRAIN DISORDER	What was the disease causing death? Was it paralysis, apoplexy, etc.? Was it caused by tuberculosis or syphilis? Be definite.
BRAIN FEVER	This term is thoroughly discredited. Was it meningitis? Name disease causing death.
BREAKING DOWN	A worthless return. What disease caused the breaking down? See "Debility."
BRIGHT'S DISEASE	State whether acute or chronic. Acute nephritis following scarlet fever or other infectious disease should be reported under the primary cause.
BRONCHITIS	Was it acute or chronic? If it extended to pneumonia, the death should be reported from bronchopneumonia. See also "Chronic bronchitis."
CACHEXIA	What disease caused the cachexia? Was it cancer, syphilis, tuberculosis? State cause definitely.
CANCER	What organ or part of the body did the cancer affect? Always state this.
CARBUNCLE	Was it anthrax or malignant pustule? Was it caused by diabetes?
CARCINOMA	What organ or part of the body did the carcinoma affect?
CARDIAC ASTHMA	Name the form of heart disease causing death.
CARDIAC ASTHENIA CARDIAC DEBILITY CARDIAC FAILURE CARDIAC WEAKNESS	These returns are usually generally equivalent to "heart failure," a return which should never be made nor accepted. See "Heart failure."
CARIES	State location and cause. Was it tuberculosis?
CASUALTY	Give nature of accident.
CATARRH	An unsatisfactory statement. Give location and preferably make a proper statement of disease causing death.
CATARRH OF BOWELS	Was this diarrhoea or enteritis?
CATARRH OF LUNGS	Was this acute or chronic bronchitis, bronchopneumonia, or pulmonary tuberculosis?
CATARRH OF STOMACH	Very indefinite and frequently secondary to other diseases. Name disease causing death.
CELLULITIS	Give location and cause. Was it erysipelas? Was it puerperal or traumatic?

STATING CAUSE OF DEATH—CONTINUED

Indefinite terms used in reporting deaths	Further information required for proper classification
CEREBRAL COMA	"Coma" is necessarily cerebral as resulting from interference with the functions of the brain, but the cause of it may vary widely. Was it from cerebral hemorrhage, Bright's disease, etc.? Was it due to violence? If so, give nature of accident.
CEREBRAL EXHAUSTION	A more definite statement is desirable in place of this return. Was it cerebral softening, paretic dementia, etc.?
CHILDBIRTH	Name immediate cause of death, as puerperal hemorrhage, puerperal convulsions, etc.
CHOKING	Give cause. If in course of disease, name the disease causing death.
CHRONIC BRONCHITIS	This statement frequently disguises pulmonary tuberculosis. Was the death caused by consumption?
CHRONIC PNEUMONIA	Was this not pulmonary tuberculosis?
CHRONIC SENILITY	"Senility" is never a satisfactory return. See "Old age."
CIRRHOSIS	Cirrhosis of what organ? Of the brain, spinal cord, liver or kidneys?
COLD	Cold weather (temperature) or a "cold on the lungs?" If freezing is meant, say so. If a disease, use a more definite term. See "Bad cold."
COLIC	Name disease causing colic.
COLLAPSE	Collapse from what? Disease or injury? If from surgical operation, state the reason for the operation. "Collapse" alone is a most worthless statement.
COMA	What was the cause of the coma? This is a mere symptom of little value for compilation unless explained. See "Cerebral coma."
COMPLICATED DISABILITY	First name the disease causing death, and then the complications, if desired.
COMPLICATIONS	What "complications" of what primary disease Name the disease causing death.
CONCEALED HEMORRHAGE	What was the cause of the concealed hemorrhage? Did it occur during pregnancy or after childbirth? Was it from rupture of aneurism? Was it cerebral hemorrhage? If caused by violence, what was the nature of the accident or injury?
CONCUSSION OF BRAIN	What caused it? State the nature of the accident.
CONGENITAL CAUSES	What were the congenital causes? Was death due to syphilis or tuberculosis?
CONGESTION	Of what organ? Did the congestion amount to inflammation? If so, it should be definitely stated. Was it passive or hypostatic congestion? If so, name the disease from which it resulted.
CONGESTION OF BRAIN	Was this due to hemorrhage (apoplexy)? Was it some form of meningitis? State definitely.

STATING CAUSE OF DEATH—CONTINUED

Indefinite terms used in reporting deaths	Further information required for proper classification
CONGESTION OF LUNGS	Was it acute bronchitis, bronchopneumonia, or lobar pneumonia? If so, state definitely. Was it passive or hypostatic congestion? If so, name disease causing the condition?
CONGESTIVE CHILL	Was this a symptom of malarial fever, pneumonia, or other acute disease? State definitely the disease causing death?
CONGESTIVE FEVER	Was it malarial or other fever? Give name.
CONTINUED FEVER	Was it typhoid fever? State definitely.
CONVULSIONS	What caused the convulsions? Were they epileptic, puerperal, caused by diarrhoea or enteritis (infants)? Name the disease in which the convulsions occurred. "Convulsions" are mere symptoms and should not be given as equivalent to a proper statement of cause of death.
CRAMPS	See "Convulsions" above. Inquire especially whether due to diarrhoeal, disease (infants).
CRUSHED	What was the nature of the accident? Was it in a mine, by falling earth in excavation by railroad accident, etc.?
CYANOSIS	If due to malformation of heart in infants, so state it. If due to organic disease, state definitely.
DEBILITATED	Name the diesase or other cause of the debilitated condition. See "Debility."
DEBILITATION OF HEART	See "Heart failure." This is a worthless synonym for an indefinite return that should never be accepted.
DEBILITY	What caused the debility? Name the acute or chronic disease. Debility might follow typhoid fever, diphtheria, tuberculosis, Bright's disease, and a host of other causes. The return is worthless and should never be made.
DECREPITUDE	Entirely indefinite. What was the cause of the condition? See "Debility."
DEFECTIVE CIRCULATION	In infants inquire whether this was due to malformation of heart (cyanosis). What caused the defective circulation? Was it due to organic heart disease? This return may be equivalent to the worthless "heart failure."
DEFECTIVE VITALITY	Indefinite. See "Debility."
DELERIUM	Give cause of delerium.
DEMENTIA	If any acute disease caused death it should be named, as also the cause of the dementia, if known.
DENTITION	What was the disease causing death of the teething child? "Dentition" is not a proper cause of death, and, like "infantile" and "old age," does little except to mark the approximate age of decedents.
DERANGED NERVES	Worthless. Name the disease causing death.
DESPONDENCY	Was this death from suicide? If so, state means employed.

STATING CAUSE OF DEATH—CONTINUED

Indefinite terms used in reporting deaths	Further information required for proper classification
DIARRHOEA	Diarrhoea accurring as a mere symptom of other diseases, as tuberculosis, cancer, etc., should not be reported as the cause of death.
DIATHESIS	Name actual disease causing death.
DIED SUDDENLY	What caused the death? If no cause can be ascertained, this return is preferable to a mere guess. Did the death occur during an acute disease? Was it apoplexy or organic heart disease? Such cases may require investigation by the health officer or coroner.
DISEASE OF BRAIN, BOWELS, HEART, LIVER, LUNGS, STOMACH, UTERUS OR ORGANS OR PARTS OF BODY.	Name the disease causing death. Never make a return of the mere location of the disease without specifying its nature.
DROPSY	Name the disease in which the "dropsy" occurred. This is a mere symptom and should never be accepted when possible to secure a definite statement of cause. In children inquire whether scarlet fever preceded. Was it due to organic heart, liver, or kidney disease?
DROWNING	Always state whether accidental or suicidal, if known.
DYSPEPSIA	Not to be accepted as a proper statement of cause of death when more definite information can be obtained. Was there organic disease of the stomach or other organs? If so, name the disease causing death.
ECLAMPSIA	Give cause of convulsions. Were they puerperal?
EDEMA OF LUNGS	Give cause. See "Congestion of lungs."
EFFECTS OF AGE	Name the disease causing death. See "Old age."
ELECTROCUTED	Was this legal execution or accidental death by electricity?
EMACIATION	What caused the emaciation? Was it pulmonary phthisis? Was it after some acute disease, as typhoid fever? Name the disease causing death.
ENCEPHALITIS	This term is deservedly passing out of use. Name definite disease. See "Brain fever."
ENDOMETRITIS	Give cause. Was it puerperal?
EPITHELIMA	What part of the body was affected?
ERUPTION	Name disease causing eruption.
ERUPTIVE FEVER	Name the fever precisely. Health officers should investigate such a return in order to discover presence of some communicable disease.
EXHAUSTION	What caused the "exhaustion"? This is a most worth'ess term, but one frequently returned from public institutions. If after a surgical operation, name the disease or injury for which the operation was undertaken.

STATING CAUSE OF DEATH—CONTINUED

Indefinite terms used in reporting deaths	Further information required for proper classification
FAILURE OF VITAL POWERS	A worthless statement, not better than "debility," which see. What disease caused the failure of vital powers?
FEEBLENESS	What disease caused death? See "Debility."
FEMALE TROUBLE	What was the disease causing death. Was it a uterine or ovarian tumor or cancer? Was it result of childbirth? Such an indefinite and worthless statement as this should never be accepted without question.
FEVER	What was the fever? Was it enteric (typhoid) fever? Was it scarlet fever? Was the fever merely symptomatic of some acute disease, as tuberculosis, pneumonia? Was it puerperal fever? It is important that full information be given in such a case.
FILLING UP OF LUNGS	Was this due to bronchitis? Pneumonia? Pulmonary consumption? Name the disease causing death.
FITS	Were these epileptic "fits?" See "Convulsions."
FRACTURE	What was the nature of the accident causing the fracture?
GANGRENE	Did this follow an injury? If so, state nature of accident that caused it. Give cause for condition, if known.
GASTRIC CATARRH	See "Catarrh of stomach."
GASTRIC FEVER	A worthless return. Was it acute gastritis or some definite form of fever, as typhoid, malaria, etc.?
*GENERAL ANASARCA	See "Dropsy."
*GENERAL ASTHENIA	See "Asthenia."
*GENERAL BREAKING DOWN	See "Breaking down."
*GENERAL DEBILITY	See "Debility."
*GENERAL DECLINE	What caused the decline? Was it pulmonary phthisis? State disease.
*GENERAL DROPSY	See "Dropsy."
*GENERAL FAILURE	Name the disease that caused death. What organ failed especially? If heart, see "Heart failure."
*GENERAL INERTIA	See "Debility." Inquire as to infection from uncinaria.
*GENERAL PARALYSIS	If extended paralysis resulted from cerebral hemorrhage, the cause should be given and the expression "general paralysis" should be avoided. "General paralysis' should be written only for "general paralysis of the insane," or paretic dementia, and the statement of the fact of insanity should always be included.
*GENERAL PROSTRATION	What was the cause?
*GENERAL WEAKNESS	What disease led to this condition?

*As a rule the adjective "general" attached to an indefinite term throws no additional light upon the case. The accuracy of all such expressions is questionable.

STATING CAUSE OF DEATH—Continued

Indefinite terms used in reporting deaths	Further information required for proper classification
GRADUAL DECAY	What disease caused the gradual decay? Was it pulmonary tuberculosis?
GUNSHOT WOUND	Accidental suicidal, or homicidal?
HANGING	Suicidal, or legal execution?
HEADACHE	A mere symptom without definite value for statistical purposes. What disease caused death?
HEAD TROUBLE	Was this a disease of the brain or of the face or scalp? What was the disease causing death?
HEART CLOT	State if caused by embolism. Did it occur in course of infectious disease? Was there organic disease of the heart?
HEART DISEASE	Better stated as "organic heart disease," and the exact form of the disease, with its origin, if known, would be still more desirable. Do not report "heart disease" in every case of sudden death unless it actualy existed.
HEART FAILURE	This return with all its worthless synonyms, as "cardiac asthenia," "cardiac debility," "cardiac paralysis," etc., should never be accepted as the sole cause of death. What disease caused the "heart failure?" The heart always "fails" before death from any cause. Be particularly careful that deaths from diphtheria, tuberculosis, etc., are not so reported. If organic heart disease is meant it should be so stated.
HEART TROUBLE	Was it organic heart disease?
HEMATEMESIS	Name the cause. Was it ulcer or cancer of stomach? Was the blood derived from the lungs and was it a case of pulmonary phthisis?
HEMOPTYSIS	See "Hemorrhage of lungs."
HEMORRHAGE	From what organ or part of the body? Was it puerperal, or from accident or injury? If the latter, state nature of injury and whether accidental, suicidal, or homicidal. If from lungs, was it not due to pulmonary tuberculosis? Was it cerebral or from rupture of aneurism?
HEMORRHAGE OF BOWELS	Did this occur in course of typhoid fever? Then the disease causing the hemorrhage of bowels should be given as the cause of death.
HEMORRHAGE OF LUNGS	Was this not due to pulmonary tuberculosis? If so, the primary cause should be reported without fail.
HEREDITARY INFLUENCE	What is meant—tuberculosis? Syphilis? State definite disease causing death.
HYDROCEPHALUS	Was it congenital or hydrocephalus? If acute hydrocephalus, state whether caused by tuberculosis meningitis.
HYPOSTATIC CONGESTION	Name the disease causing the passive or hypostatic congestion.
ICTERUS	See "Jaundice."
IMBECILITY	Was it congenital, or after disease of brain? If the latter, state cause of condition.

STATING CAUSE OF DEATH—Continued

Indefinite terms used in reporting deaths	Further information required for proper classification
IMPERFECT NUTRITION	State name of disease causing imperfect nutrition. Did it follow some disease? If so, give name of disease.
INANITION	This is a particularly pernicious term and is responsible for a multitude of worthless certificates. It sounds as if it meant something definite, but, in the majority of cases, it does not. What disease caused the inanition? Was it syphilis, tuberculosis, cholera infantum? If inability to take food, state cause.
INDISPOSITION	Worthless. What disease caused death?
INERTIA	What disease caused death? Uterine inertia? Uncinariasis? See "Debility."
INFANCY	"Infancy" is not a disease or cause of death. Infants are peculiarly liable to certain affections, which should be definitely named. What disease caused death?
INFANTILE ASTHENIA	See "Asthenia" and "Infancy." The term "infantile" adds no precision to an indefinite statement.
INFANTILE ATROPHY	See "atrophy" and "Infancy."
INFANTILE DEBILITY	See "Debility" and "Infancy."
INFANTILE MARASMUS	See "Marasmus" and "Infancy."
INFIRMITY INFIRMITY OF AGE	What disease caused the "infirmity?" See "Old age."
INFLAMMATION	Inflammation of what organ or part of the body? State cause, if known.
INJURY	What was the nature of the injury, and was it accidental, or homicidal?
INSANITY	Give form of insanity and immediate cause of death.
INTERNAL HEMORRHAGE	Hemorrhage of what organ? Rupture or aneurism? Puerperal hemorrhage? If due to external violence, state nature of accident.
INTERNAL INJURIES	State nature of accident causing internal injuries.
INTESTINAL HEMORRHAGE	Did this follow typhoid fever? If due to injuries, state fully nature of accident.
INTESTINAL PERFORATION	Was this a result of typhoid fever? Was it due to hernia or other intestinal obstructions? Was it the result of violence? State fully the cause of this condition.
INWARD CONVULSIONS	Name disease causing convulsions. See "Convulsions."
JAUNDICE	When jaundice or icterus is reported for decedents over three months of age, name disease causing this condition.
KIDNEY COMPLAINT	Name the form of kidney disease as definitely as possible. "Kidney complaint" is very indefinite.
KIDNEY DISEASE	Name the disease.
KIDNEY TROUBLE	Name the disease.

STATING CAUSE OF DEATH—CONTINUED

Indefinite terms used in reporting deaths	Further information required for proper classification
KILLED	Accidental, suicidal, or homicidal? State means of death. This calls for investigation by a coroner.
LACK OF ENERGY	Name disease causing death.
LACK OF RESPIRATION	Name the disease in which the "lack of respiration" occurred. Was it diphtheria? Was it asphyxia or suffocation? Was it atelectasis (infant)?
LACK OF VITALITY	What disease caused death? See "Debility."
LAPARATOMY	What was the disease or nature of injury requiring operation?
LARYNGITIS	Was it not diphtheritic?
LIVER COMPLAINT	Was there a definite disease of the liver? If so, state it precisely.
LIVER DISEASE	Name the disease.
LOSS OF BLOOD	What caused the "loss of blood?" See "hemorrhage."
LUNG DISEASE	Was it acute or chronic bronchitis, bronchopneumonia, lobar pneumonia, or pulmonary tuberculosis? Name the definite disease causing death.
LUNG TROUBLE	What was the name of the disease? Was it pulmonary tuberculosis? Was it pneumonia?
MALARIA	Was death caused by malarial fever? Do not use the term "malaria" loosely, but limit it to form of disease of definite malarial origin.
MALASSIMILATION	What disease caused the malassimilation?
MALIGNANT DISEASE	Name the disease. Was it scarlet fever, diphtheria, cancer, or other disease to which the very indefinite adjective "malignant" may be applied?
MALIGNANT FEVER	Name the fever.
MALIGNANT SORE THROAT	Was not this diphtheria?
MALNUTRITION	What disease caused the malnutrition?
MARASMUS	What disease caused the "marasmus?" Was it due to tuberculosis, syphilis, or cholera infantum? State fully as this return in itself is practically worthless for compilation.
MENINGITIS	Was it epidemic cerebro-spinal meningitis? If so, write exactly in this form, being particular not to omit the word "epidemic." Did it follow scarlet fever, pneumonia, or some acute infection? If so, name the primary disease. Was it traumatic? If so, state the nature of the violence which caused the meningitis. Was it tuberculous meiningitis?
MENTAL DEBILITY	Give cause of "mental debility," and immediate cause of death.
METRITIS	Give cause. Was it puerperal?
METROPERITONITIS	Give cause. Was it puerperal?
MILK INFECTION	State whether diarrhoea or enteritis was caused by the milk infection.

STATING CAUSE OF DEATH—CONTINUED

Indefinite terms used in reporting deaths	Further information required for proper classification
MORTIFICATION	State cause. See "Gangrene."
NARCOTISM	Name narcotic employed, and whether accidental, suicidal, or homicidal.
NATURAL CAUSES	Name the disease causing death. The statement "natural causes" is entirely worthless, although frequently reported by coroners.
NECROSIS	Give location and cause. Was it tuberculous?
NEPHRITIS	Was it acute or chronic? If acute, occurring in the course of some disease, name the disease causing death.
NERVOUS EXHAUSTION	Name a definite disease causing death, if possible.
NERVOUS FEVER	Give name of fever attended with nervous or cerebral symptoms. Was it typhoid fever?
NERVOUS FIT	See "Convulsions."
NERVOUS SHOCK	What caused the nervous shock? Was it due to an accident or injury? If, after surgical operation, name disease of injury requiring operation.
NEWBORN	What disease caused death of newborn child? See "Infancy."
NO VITALITY	What disease caused death? What caused the lack of vitality?
OBSTRUCTION	Obstruction of what? Name organ affected.
OLD AGE	This is not a satisfactory return. The influence of age is shown by the statement of age in years, months, and days. To this the statement of "old age" as a cause of deaths adds nothing of value. Name the disease to which the old person succumbed.
OPERATION	Name the disease or injury requiring the operation. See "Surgical operation."
OVERWORK	Name disease causing death.
PARALYSIS	Give cause of paralysis, if known, or state definite form, as paralysis agitans, infantile paralysis, etc. Did the paralysis follow cerebral hemorrhage? Did it follow some acute disease? Give the primary cause.
PARALYSIS OF HEART	This is usually a mere synonym of "Heart failure" and should never be used nor accepted. See "Heart failure."
PELVIC ABSCESS	What was the cause. Was it puerperal?
PELVIC PERITONITIS	What was the cause. Was it puerperal?
PERFORATION OF BOWELS	See "Intestinal perforation."
PERIMETRITIS	What was the cause? Was it puerperal?
PERITONITIS	What was the cause of the peritonitis? "Idiopathic peritonitis" should be rarely returned. Was it puerperal or traumatic? In the latter case, state mode of injury.
PERNICIOUS ANEMIA	If any definite cause can be assigned for the anemia, it should be reported. Anemia due to tuberculosis, syphilis, etc., should be returned under the primary disease.

STATING CAUSE OF DEATH—CONTINUED

Indefinite terms used in reporting deaths	Further information required for proper classification
PHLEBITIS	What was the cause. Was it puerperal?
PNEUMONIA	Specify definitely whether bronchopneumonia or lobar pneumonia. If sequel to influenza, state that fact.
POISONING	Name poison, and whether accidental, suicidal, or homicidal. Autointoxication should not be returned in this form, but the disease causing the condition should be named.
PREGNANCY	State cause of death more specifically. Was it due to abortion or miscarriage, nephritis, etc.?
PROGRESSIVE ASTHENIA	What was the disease causing the condition? See "Asthenia."
PROSTRATION	What disease caused the prostration? See "Debility."
PULMONARY HEMORRHAGE	Was it not due to pulmonary tuberculosis?
PYEMIA	What caused the pyemia? Was it puerperal or traumatic? If traumatic, state nature of accident causing injury.
RASH	What was the disease attended by rash? This is a suspicious return, and may indicate scarlet fever, measles, etc.
RHEUMATISM	Always state whether acute or chronic. If chronic rheumatism, note any organic disease of heart or other organs resulting therefrom.
RUBEOLA	Was this measles or German measles, (rotheln)?
RUPTURE	Rupture of what? If hernia is meant, it would be better so written, as "rupture" alone may be misinterpreted.
SARCOMA	Of what organ or part of the body?
SCARLET RASH	Was this scarlet fever?
SCLEROSIS	Sclerosis of what organ? If cancer (scirrhus) is meant, state that fact definitely.
SCROFULA	A term now fortunately going out of use. State definitely the form of tuberculosis.
SENECTUS	See "Old age."
SENILE ANASARCA	See "Old Age" and "Dropsy." Neither term is satisfactory. Give disease causing death.
SENILE ASTHENIA	See "Old Age" and "Asthenia." Give disease causing death.
SENILE ATROPHY	See "Old Age" and "Atrophy." State disease causing death.
SENILE DECAY	See "Old Age." State disease causing death.
SENILE DECLINE	See "Old Age." Name the disease, if any, that caused the decline.
SENILE DEGENERATION	See "Old Age." Degeneration of what organ? State disease causing death.
SENILE DEMENTIA	See "Old Age."
SENILE DISEASE	What was the disease? See "Old Age."
SENILE EXHAUSTION	See "Old Age" and "Exhaustion."' Name disease causing death.

STATING CAUSE OF DEATH—CONTINUED

Indefinite terms used in reporting deaths	Further information required for proper classification
SENILE MARASMUS	See "Old Age" and "Marasmus." Name disease causing death.
SENILITY	See "Old Age." Name disease causing death.
SEPSIS SEPTICEMIA SEPTIC INFECTION SEPTIC POISONING	What caused the "Septicemia?" Was it puerperal, traumatic, or did it occur in the course of some disease? Specify fully.
SHOCK	What caused the shock. If from injury, state nature of accident. If from surgical operation, state disease or injury requiring the operation.
SHOT	How? Accidental, suicidal or homicidal?
SIMPLE ATROPHY	See "Atrophy."
SLOUGHING	Explain fully, stating disease or injury.
SORE THROAT	Was it not diphtheria? Such a return in a fatal case is extremely suspicious, and a definite statement should be insisted upon by registrars.
SPECIFIC DISEASE	Name the disease.
SPECIFIC INFECTION	Name the disease.
SPINAL TROUBLE	Was this a disease of the spinal cord or the spine, and in either case, what was the disease. Was it Pott's disease of the spine?
STILLBORN	Never report a child as stillborn unless dead at birth. If the child survived any time whatever, the cause of death should be stated.
STOMACH TROUBLE	Was it cancer, round ulcer, or other definite disease of the stomach? State fully, as this, alone, is very indefinite and unsatisfactory.
STOPPAGE	Stoppage of what? Explain fully and name disease causing death.
STRANGULATION	Was this strangulation from disease (diphtheria), choking or hanging? If from disease, state fully. If from hanging, state whether suicide or legal execution.
STRICTURE	Stricture of what? Was it of intestines, esophagus, uretha?
STROKE	Was this a "stroke of apoplexy" due to cerebral hemorrhage?
STUPOR	What was the cause of the stupor, disease or injury? State fully. See also "Coma."
SUDDEN	What disease caused the sudden death? If from violence, state means and whether accidental.
SUFFOCATION	State very precisely the cause of the suffocation, as this term, returned alone, is very indefinite. See "Asphyxia."
SUICIDE	State means of death employed.
SURGICAL OPERATION SURGICAL SHOCK	Always state the disease or injury requiring operation. Unless the operation was improper or unskilfully performed, it should not be given as the primary cause of death.

STATING CAUSE OF DEATH—CONTINUED

Indefinite terms used in reporting deaths	Further information required for proper Classification
SYNCOPE	What caused the syncope? Was death due to organic heart disease? Give disease causing death.
TEETHING	Name the disease affecting the teething child. See "Dentition."
TONSOLITIS	Was death not due to diphtheria? This is a suspicious return.
TOXEMIA	Was this acute or chronic poisoning due to some external agent? If so, state fully, giving name of poison, whether accidental, etc. Was it autointoxication, due to poisons generated in the body by disease? If so, state the name of the disease causing the condition which resulted in death. Avoid use of easily misunderstood terms of this character.
TUBERCULOSIS	State organ affected. Do not fail to state as pulmonary tuberculosis if lungs were affected.
TUMOR	Was it a cancer? Whether a cancer or tumor, do not fail to specify organ or part of body affected.
TYPHOID CONDITION	Avoid this term as it is likely to be mistaken for typhoid fever.
TYPHOID PNEUMONIA	Was the primary disease typhoid fever or pneumonia?
TYPHO-MALARIAL FEVER	Was it typhoid fever? Was it malarial fever? A mixture of these diseases rarely occurs, the great majority of cases so-called "typho-malarial fever" being nothing more nor less than typhoid fever.
TYPHUS	Was this not typhoid fever?
ULCER	State location and cause.
UREMIA UREMIC POISONING	State cause of uremia. If due to an acute disease, the latter should be named as the cause of death. If in Bright's or other organic disease, state fully. Was it puerperal?
VIOLENCE	State form of violence and whether accidental, suicidal or homicidal.
VITAL DEGENERATION	Worthless. State disease causing death.
WANT OF VITALITY	See "Lack of vitality."
WASTING	What was the disease causing "wasting." See Atrophy."
WEAK HEART	If organic heart disease, so state it. Give the disease causing death. This return may be equivalent to "Heart failure," which see.
WEAKNESS	Name disease causing weakness. See "Debility."
WOUNDS	What was the cause of the injury, and was it accidental, suicidal or homicidal?

THE GENEVA CROSS.

National Headquarters, Room 341, War Department, Washington, D. C.

November 11, 1907.

Editor Iowa Health Bulletin,
Des Moines, Iowa.

Dear Sir:—As a member of the Executive Committee of the American National Red Cross, I have been requested to forward to you the enclosed resolutions with the hope that you may find it expedient to kindly print them in your publication and lend what assistance you can in discharging the international duty assumed by this country in agreement with all the great powers, of protecting the Red Cross name and insignia from any use save that agreed upon by the Treaty of Geneva.

In cases where the name and insignia are used as trade-marks the suggestion would be of value that their use should be gradually eliminated within the next three or four years, in conformity with the provisions of the Treaty that prohibition of the use of the emblem and name should be enforced not later than five years after the Treaty went into effect.

Very truly yours,

R. M. O'REILLY,

Surgeon General, United States Army, and Member of the Executive Committee, the American National Red Cross.

(Resolutions adopted by the Executive Committee of the American National Red Cross, October 18, 1907.)

WHEREAS, By international agreement in the Treaty of Geneva, 1864, and the revised Treaty of Geneva, 1906, "the emblem of the Red Cross on a white ground and the words Red Cross or Geneva Cross" were adopted to designate the personnel protected by this convention, and,

WHEREAS, The Treaty further provides (Article 23) that "the emblem of the Red Cross on a white ground and the words Red Cross or Geneva Cross can only be used, whether in time of peace or war, to protect or designate sanitary formations and establishments, the personnel and material protected by this convention," and,

WHEREAS, The American National Red Cross comes under the regulations of this Treaty, according to Article 10, "volunteer aid societies, duly recognized and authorized by their respective governments," such recognition and authority having been conferred upon the American National Red Cross in the charter granted by Congress January 5, 1905, Sec. 2, "The corporation hereby created is designated as the organization which is authorized to act in matters of relief under said Treaty," and, furthermore,

WHEREAS, In the revised Treaty of Geneva, 1906, in Article 27, it is provided that "the signatory powers whose legislation should not now be adequate, engage to take or recommend to their legislatures such measures as may be necessary to prevent the use by private persons or by societies other than those upon which this convention confers the right thereto of the emblem or name of the Red Cross or Geneva Cross,"

Be It Resolved, That the executive committee of the American National Red Cross requests that all hospitals, health departments and like institutions kindly desist from the use of the Red Cross created for the special purpose mentioned above, and suggests that for it should be substituted some other insignia, such as a green St. Andrew's Cross on a white ground, to be named the "Hospital Cross," and used to designate all hospitals (save such as are under the medical departments of the army and navy and the authorized volunteer aid society of the government), all health departments and like institutions, and, further,

Be It Resolved, That the executive committee of the American National Red Cross likewise requests that all individuals or business firms and corporations who employ the Geneva Red Cross for business purposes kindly desist from such use, gradually withdrawing its employment and substituting some other distinguishing mark.

CONCERNING THE APPOINTMENT OF HEALTH OFFICERS, THEIR DUTIES, ETC.

The following questions and answers have been prepared for the guidance of Local Boards of Health. If any Local Board, or official, has neglected to comply with the statutory provisions, or has acted in any manner contrary thereto, the necessary steps should be promptly taken to remedy the defect.

1. Who has the authority to appoint the Health Officer? Does the law provide for his appointment by the Mayor, or should he be elected by the Local Board of Health?

Ans. Section 2568 of the Code provides as follows: "The town or city or township clerk shall be clerk of the Local Board of Health, *which Board shall appoint a competent physician as its Health Officer, who shall hold office during its pleasure.*" This provision is definite and admits of but one construction, viz: that the Local Board of Health shall appoint the Health Officer.

2. In Section 8, Chapter 26, Acts of the 32d G. A., the Mayor is authorized to appoint a "health physician." Does that relate to the Health Officer of the Local Board of Health?

Ans. No; Section 8 of Chapter 26, Acts of the 32d G. A. (Sec. 652, Supplement to the Code), pertains to city and town government (City Councils). It repealed Section 652 of the Code, but does not affect Section 2568. The "Health Physician" is a new officer created by the 32d G. A., but his duties are not prescribed or implied. Neither the Mayor nor the City Council have authority to appoint the Health Officer. Such appointment must be made by the Local Board of Health when in session as such.

3. If a physician is a member of the City Council, and consequently of the Local Board of Health, is he eligible to appointment as Health Officer of said Board?

Ans. No; the courts have held that one person cannot legally hold both of these offices, as the duties conflict. The same rule would also apply to the Mayor of a town and to the Township Clerk, if the party elected to either of these positions is otherwise qualified for appointment as Health Officer.

4. Can a physician who is not a citizen of the United States, but otherwise qualified, be appointed Health Officer?

Ans. No; he must be a citizen, and a resident of Iowa. He need not be a resident within the jurisdiction of the Local Board of which he is Health Officer.

5. Is it legal for a physician to act as Health Officer to two or more Local Boards?

Ans. Yes; but he must be appointed by each Board when in session and take the oath of office in each instance.

6. Is a person not a physician eligible to appointment as Health Officer?

Ans. No; the statute provides for the appointment of a "competent physician." In making its selection the Board is not confined to any special school of medicine. The appointee may be either a regular, homeopathic or eclectic. He *must* be the legal holder of a certificate regularly issued by the State Board of Medical Examiners of this State, *authorizing him to practice medicine* in the State of Iowa, and said certificate must be recorded in the office of the County Recorder wherein he resides. The person selected for this important office should be the *most competent physician available*, regardless of politics or personal or social influence.

7. Is an Osteopath eligible to appointment as Health Officer?

Ans. Not as an Osteopath. The term physician as used in the statutes applies only to practitioners of medicine. If an Osteopath holds also a physician's certificate, he would be eligible as a physician, but not otherwise.

8. How should the Health Officer be paid for his services?

Ans. The Local Board must determine his compensation. He should receive a fixed annual salary or specified fees. In cities and towns his compensation must be paid from the general fund of the municipality. In townships the amount determined must be certified to the County Auditor for payment in *full* by the board of supervisors, who will advance the same, and at the next assessment tax the full amount thereof against the property of the township from which certified.

9. What are the duties of the Health Officer? Is he required to treat cases of infectious disease?

Ans. His duties are laid down in Rule 28, Chapter 1, of the Revised Rules and Regulations of the State Board of Health. Rule 10 also provides that "all disinfection provided for in this chapter (Chapter 1) shall be done under the personal supervision of the Health Officer." This should be taken into account when fixing his compensation. The Local Board may, if necessary, provide by resolution for additional duties, provided such do not conflict with the statutes or the regulations of the State Board of Health. He is not required to treat cases of infectious disease,

and if called upon to do this by the Local Board of Health or its authorized official, he is entitled to the same reasonable fees for such service as provided for in the case of other physicians.

10. Have the Board of County Supervisors authority to contract with a physician to treat cases of infectious disease?

Ans. No; if the patient under quarantine demands medical attendance, the Local Board of Health must select the physician for each individual case and determine the compensation to be paid before said service is rendered.

11. Has the Health Officer authority to order release of quarantine?

Ans. No; the statute (Section 2568) provides as follows: "The quarantine authorized by this section in case of infectious or contagious diseases may be declared or terminated by the Mayor of any city or town, or the Township Clerk outside of such city or town, in cases required by regulations of the State Board of Health." In the event that the Mayor or Township Clerk fail or neglect to perform, this duty devolves upon the Local Board of Health, for the same section (2568) further provides that "It (the Local Board) *shall* * * * proclaim and establish quarantine against all infectious or contagious diseases dangerous to the public, and maintain and remove the same, as may be required by regulations of the State Board."

12. Has a Local Health Officer authority to examine the patients of another physician in order to determine the character of the sickness?

Ans. Not upon his own motion. If there be sufficient reason to suspect that a case of infectious disease is being wilfully secreted by the attending physician, or head of the family, or that a correct diagnosis has not been made, the Mayor or the Local Board of Health should instruct the Health Officer to visit the patient in company with the attending physician and report his findings in writing. During this investigation, the Health Officer should refrain from unnecessarily disturbing the patient, and scrupulously regard the professional courtesies due the attending physician. If upon request the Health Officer is refused access to the patient, proceedings must be taken in accordance with the provisions of Section 2569 of the Code.

13. In matters pertaining to the public health not covered by regulations of the State Board of Health, is the Mayor or Local Board obliged to follow the advice of the Health Officer?

Ans. They are not obliged to do so, but as he is the medical advisor of the Board, and presumed to be competent, his advice should be sought and followed as a general rule of procedure. If he is unable to give the desired advice, or contentions arise, the matter should be referred to the State Board of Health for final settlement.

14. Do the terms "City Physician" and "Health Officer" allude to the same official?

Ans. No; they are entirely distinct and the terms should not be confused. The City Physician, where there is one, is provided for by ordinance adopted by the City Council, and elected by that body. The Health Officer is provided for by statute (Section 2568), and appointed by the Local Board of Health.

15. Is a Local Board of Health obliged to appoint a Health Officer?

Ans. It is; the statute (Section 2568) says, "It (the Local Board) SHALL appoint a competent physician as its Health Officer." The Local Board can not be properly organized until this provision has been complied with. If the Health Officer should resign, the vacancy must be filled as soon as possible.

CONFERENCE OF STATE AND LOCAL BOARDS OF HEALTH.

The first annual conference of State and Local Boards of Health convened at 2 p. m. November 12th at the Y. M. C. A. Auditorium, Des Moines. Dr. Sams, President of the State Board of Health, presided, and, after explaining the objects of the conference, introduced Assistant Attorney-General Charles W. Lyons, who delivered the following address of welcome:

Mr. President, Ladies and Gentlemen:—

In beginning I desire to convey to you the regrets of Attorney-General Byers that important duties have made it impossible for him to be with you today and deliver the address of welcome as announced in your program. I know he would have enjoyed being with you, and I am sure it would have been a pleasure to you to have listened to him. As his assistant, and in his stead, I have been requested to supply his place on the program.

If I am not misinformed, it is usually the duty of the assistant in your profession to administer the anesthetic, but as assistant in this particular case I find myself called upon to perform the major operation.

This meeting, as I understand it, was arranged for by the State Board of Health, and to it have been invited all the Local Boards of Health throughout the state, as well as the Iowa Association of Health Officers, and it is my duty and pleasure on behalf of the State Board of Health to welcome you to this conference.

I feel a special interest and pride in performing this duty today, for I realize that I am welcoming the first gathering of this kind ever held in the State of Iowa; and I take further pleasure and interest, for I realize I am addressing a gathering of men charged with a most important duty.

Nothing is more indicative of the progress of civilization than is the manner in which the state or community is endeavoring to care for the health of its citizens. A community or state may be said to be progressive in proportion to the extent that it enacts and provides for the enforcement of laws regulating matters pertaining to the public health.

What is more important to the individual than health, or to the community than healthy individuals?

A man cannot be all that his Creator intended that he should be without a perfect and harmonious play of all the functions of his body, and the actual joys of life can only come to those who are blessed with good health; yet, an individual may be ever so particular in the care of his person, but if by virtue of his surroundings in the community in which

he lives, he is compelled to habitually breathe an atmosphere loaded with malaria he will almost certainly at some time be prostrate with some kind of fever.

The science which you Health Officers represent has analyzed the effluvia of the cess pool and the pile of putrescent matter so frequently lying near our dwelling, and made it possible for us as a community to take proper measures to protect ourselves from the evil effects which would ordinarily result therefrom.

The preservation of the public health has been a subject of public action for centuries, and special organs for protection of public health—Boards of Health—were created several decades before the middle of the nineteenth century; but the recent development of medical and sanitary science has so altered the scope of public activity that the present system as it exists in the most advanced cities is distinctly and emphatically new.

This meeting has been called for the special purpose of discussing the question of public health, and, as the population of the country is rapidly centering in towns and cities, the question is one growing in importance and one demanding a definite and speedy solution. In this question is involved the consideration of measures for the laying out of the town or city, for the proper disposal of its refuse, for the supply of pure water, and the occasional enforcement of quarantine regulations. In addition thereto, one of the most important questions of public health is the cleaning of streets and matters connected therewith.

The desired conditions and results can only be brought about by a rigid enforcement of sanitary laws and regulations, and I desire to say at this time that I know that the State Board of Health is ever ready, willing and anxious to co-operate with Local Boards of Health and Health Officers, and assist in every possible way to a better understanding as to what is required, as well as a better understanding as to how the requirements may be more effectually carried out.

The recent legislation in this state upon the question of the adulteration of food and drugs is but a crystallization into the form of law of the rapidly growing sentiment and demand that those who furnish us with food must furnish that which is pure and wholesome.

If the result of this meeting shall be to so impress upon you the importance of the position which you have been called to fill, and a realization of the great responsibilities resting upon you, and at the same time so fill you with inspiration and enthusiasm that as you return to your several communities it will be with a determination to better and more effectually enforce the regulations concerning matters of public health,—then it will have accomplished all that its promoters could have hoped.

Again, I bid you a most hearty welcome to this conference, believing that it will prove both pleasant and profitable to all concerned.

Dr. E. Warren Doolittle, in behalf of the Iowa Association of Health Officers, and the Local Boards of Health, responded as follows:

Mr. President, Ladies and Gentlemen:—

Sandwiched between men of national and international reputation, it is quite likely my proportions may be modified; but be that as it may—I was chosen, and I am here to represent this advance guard of sanitary workers, and in their behalf I wish to thank you for your very cordial welcome to this conference and to your city.

I said your city; I should have said our city, for I believe that the Capital City of Iowa belongs to every loyal citizen within her borders, and that every man, woman and child, next to our own home towns—"God bless them"—should have a pardonable pride in the material prosperity of Des Moines. It is our city and part of an equipment for our state advancement, and I wish to say to you that this conference stands for progress and the uplifting of mankind.

We believe that preventive medicine means more for the upbuilding of a physically and morally healthy people than all else connected with our professional labors. Believing thus, we feel assured that you will bear with our infirmities and lend us every possible aid. We will do nothing to retard progress; on the contrary we hope to accomplish much for which you can commend us.

Through the liberality of our legislators we have a well equipped laboratory for bacteriological research, and the State Board of Health, through its most efficient Secretary, sends us each month a message of good cheer in the form of a Bulletin—a journal far in advance of its kind—clean, bright, educational and uplifting, whose teaching through the Local Boards reaches the people; whatever educates and prospers the citizens of Iowa, prospers this city. May the city of Des Moines and the State of Iowa continue in an abundant prosperity, and may they both "Do Things."

In introducing the next speaker, President Sams alluded to the marked advancement in matters pertaining to sanitation, and dwelt upon the importance of conferences such as this whereby useful and practical information relating to the protection and improvement of the public health could be discussed and disseminated. "As progression is the motto of the age and should be pre-eminently the watchword of sanitarians, it is most fitting that one of its chief exponents should open this, the first conference of Iowa State and Local Boards of Health." He therefore had the pleasure of introducing Governor Cummins.

Mr. President, Ladies and Gentlemen:

I feel that I am introduced to you under the terms of the program which I have just seen, under false pretense. I really thought it had been given to me to extend the welcome which you have been so eloquently accorded by my young friend, the Assistant Attorney-General. I never would have had the temerity to have undertaken anything so formal or dignified as an address, for I don't like to talk unless I know

delight in entering unknown fields and exploring them without any guide or knowledge of them; I am as ignorant of the work that your positions devolve upon you as I would be if I lived in another state. I don't know much about doctors except in a friendly way. I have never had to call upon doctors very much in my life time. I have often said when people have expressed some surprise that I could endure the fatigue I have undergone occasionally, that the great thing is to have a good stomach.

I am entirely impartial with regard to the profession of medicine. I have friends everywhere. It has happened me more than once that I have visited in the morning an Allopath; taken counsel in the afternoon something about the subject. There are some people who frequently of a Homeopath, and in the evening have been rubbed by an Osteopath, and I have had great good of all of them. I congratulate you upon your gathering. I have in my hand the rules recently adopted, as I understand it, by the State Board of Health. I have given them some slight examination, and I congratulate the Board of Health and its members upon the completeness and thoroughness of their work; but above all things I felicitate you upon your co-operation. I cannot tell you how to do your work, but I do know how helpful it is for men with a common object, with a unity of purpose, to come together in consolidation and conference. Co-operation is the striking characteristic of our age, and of our civilization. It is the one thing above all others that makes the men and women of this century better men and better women than those of a former century. We have learned at length that no man is strong enough to stand alone. We have learned that no man, however comprehensive, is broad enough to absorb all the knowledge of his immediate occupation or profession, and therefore we are to a degree never before known in the history of man, drawing together for mutual sympathy and for mutual help. The world co-operates with the republic; the republic co-operates with the states; the states co-operate with their special communities, and together they create and maintain a system which makes the present time the golden age in all the annals of mankind; and it is especially with reference to this that I desire to speak.

The state, and I am now speaking of the segregated administration known as the state, desires the close and earnest assistance of the Boards of Health and all Health Officers in its various localities. It is idle—it is worse than idle, for the state to maintain a Board of Health unless this work can be supplemented and strengthened by the Local Boards of Health throughout the commonwealth. We have drifted into a complicated and intricate civilization. As the Attorney-General has so well said, the tendency of men and women to crowd themselves into the towns and cities has developed problems relating to the public health entirely unknown to our ancestors. There would be comparatively little need of this great organization if we all lived in the country, but living as we do to a large extent in the towns and cities, it has become essential that we shall preserve as nearly as we can the purity of atmosphere, the purity of the water, and the immunity from contagion in the cities that the old life gave us in the country, and this, as I esteem it, is the great work upon which we have entered. I am glad to know that in this respect, as in every other, Iowa has taken a prominent and honorable and an advanced position. I have always believed since I came to be a man, because all my mature years have been spent in Iowa, that here was the fairest opportunity for intelligent, God-fearing and patriotic men and women to solve the problems of government that was presented in the whole world. We have a degree of intelligence rarely seen in a community of 2,200,000 people. I do not believe that we can find upon the earth a similar number of people so sincerely devoted to uprightness, so sincerely attached to good government, so obedient and law-abiding—men and women whose hearts beat so kindly and constantly for the welfare of their fellow men and women as those gathered between the Mississippi and Missouri rivers in the territory we call Iowa. The many depressing and discouraging influences witnessed elsewhere are absent here. There is no motive and can be no motive among the people of our state save to uplift the community. As yet we are not afflicted with that disease we mark elsewhere, and which when developed, as we occasionally see it, is the greatest enemy of society—lust for power and riches. As yet it does not greatly move the hearts of our constituency, and therefore your Boards, as well as other Boards and Commissions to which are given the administration of the laws of our state, have, as it seems to me, a peculiar opportunity to work out these problems, and to answer these questions relating to the public health and the public safety; and I am glad to know from my association with your central body, the State Board of Health, that the work is going forward with renewed vigor and that the men to whom this power is given understand its importance and that gradually all the people are coming to know that the Boards of Health are not mere burdens upon society, but that they are leaders in the pathway toward health and life and happiness, and I have no doubt that at this meeting or conference you will have an exchange of views that will still further dignify not only the Local Boards of Health, but the State Board of Health, and will add additional strength to the work that you have so well done. I hope that each one of you will leave the meeting with some new thought, and some new purpose with which you will illuminate your work in the days to come.

The subjects on the program were then taken up in the regular order. The representatives of the Local Boards entered into the spirit of the work and availed themselves of every opportunity to obtain all the information possible upon the subjects presented. The school of instruction upon the Revised Rules and Regulations was conducted by Dr. Elker, Dr. Linn, Dr. Moerke and the Secretary, and although all the time available was devoted to this branch of the work, another day would barely have sufficed to answer the questions and give the information desired.

While the attendance was good, many Boards were not represented, but the earnest attention of those present and the results obtained since the conference adjourned, is evidence that the efforts of the State Board are appreciated, and that the Local Boards are beginning to realize their responsibilities.

PRESIDENT'S ANNUAL ADDRESS.

BY CASSIUS T. LESAN, MOUNT AYR, IOWA.

Mr. Chairman, Ladies and Gentlemen:

I wish to thank the members of this Society for the honor they have conferred upon me by electing me as your presiding officer. The annual conference of the Iowa State Board of Health with the Health Officers of the state will be another step toward bringing the members of the State Board and the Health Officers into closer relations, one with another.

The State Board has no doubt made great preparations for our instruction and we are to receive and carry home the knowledge that they have accumulated for us. The subjects to be discussed in the papers to be read are all live subjects and those who are to deliver them are expert teachers of the subjects to be discussed.

I sincerely hope that ways and means can be provided for the continuation of this work, until in the future we will not only have each year conferences of this kind, but that annual post graduate courses lasting from ten days to two weeks will be held at the State Laboratory, where practical demonstrations and lectures are given and those completing the courses will be granted certificates for special work.

The Iowa State Board of Health is to be congratulated upon the individuality of its members. It has always been a board of members and not a one man board. The tendency in some states to centralize the power in one man is a condition to be discouraged and I hope such a condition will not receive encouragement in the State of Iowa. Each Health District should be represented by a member from that district, he knowing more of the needs and conditions than any one living in a distant part of the state, or at least, should know better.

The Secretary of the Board should not be burdened with health affairs pertaining to particular health districts, on account of his time being entirely occupied by the affairs of the office.

The reconstruction of the Rules and Regulations of the State Board of Health just published will no doubt be productive of great good and has meant, to the members of the Board, as well as the Secretary, a large amount of difficult work.

Our State Bacteriological Laboratory, through the earnest efforts of Dr. Henry Albert and his worthy assistants, has not only been the means of positive diagnosis, but has been a wonderful success from an educational standpoint. At its beginning only scientific men and the medical profession appreciated the value of a State laboratory, but its advantages are now well known to all Local Boards, as well as the public at large. I predict it will require little effort to secure needed appropriations for its support and advancement. Dr. Albert is deserving of the congratulation

of the medical profession for the magnificent manner in which he is conducting the affairs of that institution.

The educational campaign now being carried on throughout the State by the Anti-Tuberculosis League should receive the endorsement of the Society. Many of the members of this Society are members of the Anti-Tuberculosis League, having been influential and prominent in its organization. In his work as State lecturer for the Anti-Tuberculosis League Rev. Kepford is not only interesting and educating the public as to the cause and prevention of tuberculosis, but also teaching them as to general sanitation. This will be effective in the prevention of other diseases. I know that these lectures impress the public. Rev. Kepford was in Mount Ayr Sunday before last. Early Monday morning I was called to see a sick child, and the first thing the mother said to me was: "I heard that preacher last night and he advised us to open all our windows. I did and now my little boy has the croup."

Inspection of public schools has been a subject discussed by this Society from its beginning. The reasons for establishing such a system are well known and appreciated by every member of this Society. The question by which the public may be made to realize the need of such inspection is the issue today.

The action taken lately by the Polk County Medical Society in offering its services in the inspection of the Des Moines public schools will arouse public investigation and will not only contribute to the general good health of the pupils of the city of Des Moines, but will also stimulate other Societies to offer their services in a similar manner. As soon as the public appreciates the value of school inspection there will be found in all the schools in Iowa either a skilled physician or trained nurses devoting their time to this life saving occupation.

Lectures given before normal institutes upon the subject, "Symptoms of Infectious Diseases," as well as those of the diseases of eye, ear, nose and throat, so harmful and so often not recognized until too late, would be the means of educating the teachers in the need and the methods of early recognition of those diseases and would also enable them to notify the parents of the beginning conditions in their children and the advisability and consulting a physician. Such a campaign among the teachers of this State would be effective.

The ignorance and prejudice against the teaching of the danger and extent of venereal disease to the individual and to society as well as the modes of contagion, direct and indirect, must be educated out of the way before we can expect to accomplish anything in the prevention of this class of disease.

The majority of boys and girls of this land receive their first and only instruction in the physiology of the sexual organs from the older children with whom they come in contact, either in our public schools or upon the street.

You are all familiar with the ravages of these social diseases. The many motherless homes, the untold number of innocent women who are infected after marriage, many of them required to resort to surgical interference, to say nothing of the lives lost on account of improper diagnosis and treatment. Proper education along this line should begin early

in the home and be continued in the public schools. Sexual physiology should be taught just the same as the effect of alcohol, which is required by law. The subject could be taught with others equally urgent, such as the infection of typhoid fever, tuberculosis, diphtheria, etc.

Medical inspection of prostitutes should be replaced with the quarantine card and every house of prostitution in which there exists a case of venereal disease should be placed in strict quarantine. Just the moment public sentiment is in favor of abolishing the red light districts of our cities, this will be an easy method of doing so.

The free distribution of antitoxin similar to methods adopted by the State of Illinois, is one which should receive the endorsement of this Society. You are no doubt all familiar with the plan that stations should be provided throughout the State where antitoxin is furnished to Local Boards at special rates for the indigent upon the receipt of a certificate from any practicing physician. This method will insure pure antitoxin at reasonable rates.

Past experience has been sufficient to convince me that the best method to bring about needed legislation is by first educating the general public. In that way reform as well as scientific legislation will become an easy matter. Members of the legislature will favor the passage of such measures as the general public demand. I believe that if societies of this kind would agree upon a plan and carry out an educational campaign in accordance therewith, trying only one reform at a time, it would bring about more needed legislation in the same length of time than to continue to place before the legislature ideal bills, providing reforms that we cannot expect to be laws for many years, or at least until the general public demands it. The average member of the legislature represents the same degree of education and refinement as the community he represents and he will generally vote for the things demanded by the majority of his constituents. In my opinion we can reach the members of the legislature by appealing to the people they represent and as soon as they see the need demands will be made by them and legislation will be obtained.

We as scientific men no doubt have seen the need of many reforms, but have failed to recognize the well known fact that such things cannot be made laws and enforced as such until the heart of the public opinion beats in sympathy and harmony with them. Abraham Lincoln realized, at the time he witnessed the whipping of the slave girl in New Orleans, the need of emancipating the slaves as much as he did when he issued the proclamation, but he waited until public opinion prevailed to a sufficient extent before he gave slavery the blow and his own name immortality. Too much agitation, too many bills before the legislature, will do harm. An educational campaign from the platform and pulpit, through the press and in the public schools, is the best method to bring about agitation of this vital subject, sanitation.

THE BACTERIOLOGICAL LABORATORY IN PUBLIC HEALTH WORK.

Abstract from an address given by Dr. Henry Albert before the conference of the State and Local Boards of Health, held in Des Moines, November 12-13, 1907.

The speaker made a general survey of the work of the laboratory since its organization, referring to the number and different kinds of examinations made during the past three years. He referred to the fact that during the first year 3,580 examinations were made in the laboratory; during the second, 5,199 examinations and the last year, which represents the third year, 8,453 examinations. He then referred to some of the features of the work which were either new or needed special emphasis.

Tuberculosis. It has now become quite thoroughly understood that although the finding of tubercle bacilli means a positive diagnosis of tuberculosis, yet the absence of tubercle bacilli from the sputum or of various discharges does not necessarily mean the absence of the disease. This refers more especially to various secretions or excretions such as milk, urine, bowel discharges, etc. Specimens of such are frequently submitted for examination and only occasionally are tubercle bacilli discoverable. In instances of this kind it is as a rule far more satisfactory to have the tuberculin test applied to determine the existence of the disease. This applies especially to cattle which are suspected of being consumptive. The opthalmo tuberculin test recently discovered will probably become more popular than the old tuberculin reaction.

Typhoid Fever. The Widal or agglutination test has now become the standard laboratory method of diagnosing typhoid fever. Quite recently the isolation of typhoid bacilli from the blood has been employed with considerable success. The most satisfactory way of isolating such bacteria is to disinfect the skin of the finger or ear, collect 15 to 30 drops of blood and cultivate them in media consisting of sterile bile. After obtaining a growth the bacteria are subjected to the agglutination test for confirmation. By this method it has been possible to diagnose typhoid fever in from 75 to 90 per cent of all cases as early as the 4th and 6th day. We have not yet considered it sufficiently practical to adopt it on a State-wide basis, but are giving the method a trial; meantime we shall continue with the agglutination test. He also referred to the importance of "bacilli carriers" in typhoid fever. These may represent people who have never had an attack of the disease, but who may still be the carriers of the germs because of some localized infection. Usually, however, they represent patients who have recovered from typhoid fever, presenting no evidence whatever of the disease process, but who carry with them the specific germ of the disease process. It is principally with the urine that such bacteria are excreted. The germs have been found in the urine

of convalescent typhoid patients for months and in some cases for a number of years after the patient has entirely recovered. He referred to epidemics which had occurred in Germany, in New York city and in our own state that were traceable to "typhoid bacillus carriers."

Diphtheria. The Board of Health Bacteriological Laboratory has probably served the people of the State better in connection with examinations for diphtheria than in other diseases—by aiding in establishing an early and definite diagnosis, as well as by assisting in the release from quarantine. Not only have many cases of the disease been prevented, but many patients have been released from quarantine at a much earlier period than would have been the case if we depended upon the time limit alone. There may be diphtheria bacilli carriers. Among these may be patients who have recovered from the disease, but who still carry the germs in their nose and throat, but more often there are persons who have been in contact with diphtheria patients to whom has been transferred from the air or clothing or some other way the specific germs, but who have had sufficient resistance so as not to contract the disease. Such may be represented by school children who continue with their school work, but during all that time may be the source of diphtheria among their schoolmates. During the course of epidemics of diphtheria it is always advisable to examine the throats of the school children, especially those among whom the disease exists, and in all cases of sore throat to make a culture for bacteriological examination. By this means the laboratory has assisted in clearing up a number of epidemics in different parts of the State.

Hydrophobia. The laboratory has for some time made use of the direct microscopical method of examining the brains of affected animals for hydrophobia. This consists of making smears of certain parts of the brain and examining the stained preparation for the so-called wegri bodies. It is not at all certain that these bodies are the causative agents of the disease, but they have been found so constantly in hydrophobia and absent from other disease processes so universally that their presence is of great diagnostic significance. The laboratory continues also to make animal inoculations in all cases to be absolutely sure of the diagnosis.

The speaker also referred to some of the new apparatus of the laboratory, to the fact that the tuberculosis outfit has been changed somewhat so that hereafter a stronger bottle and a mailing case will be employed instead of a wooden case as used formerly. He emphasied the importance of sending the specimens in the regular outfit and referred to the importance of corresponding with the Director before sending miscellaneous specimens, in order to be sure that the specimens are being collected in the proper manner.

The following is the program of the conference held under the auspices of the Iowa State Board of Health in conjunction with the Iowa Association of Health Officers:

Des Moines, Iowa, November 12-13, 1907. Headquarters, Wellington Hotel.

TUESDAY, NOVEMBER 12TH.

The Health Officers' Association called to order at 9:30 a. m., Dr. Cassius T. Lesan of Mount Ayr presiding.

Order of business.
Reading of minutes of previous meeting.
Report of officers.
Report of committees.
President's address.
General business.
Election of officers.

AFTERNOON.

The General Conference of Health Officers, Mayors, Township Clerks and members of the State Board of Health called to order at 2 p. m. Dr. J. H. Sams of Clarion, President of the State Board of Health, presiding.

Address of Welcome—Attorney-General H. W. Byers.
Response—Dr. E. Warren Doolittle, Vice-President I. A. H. O.
Address—Governor Albert B. Cummins.
"The State Bacteriological Laboratory and Its Relation to the Public Health"—Dr. Henry Albert, Director of State Laboratory, Iowa City.
"Sewerage and Sewage Disposal"—Col. Charles Francis, Engineer State Board of Health.
General discussion.

WEDNESDAY, NOVEMBER 13TH—MORNING SESSION—9:00 A. M.

"School of Instruction on the New Rules and Regulations"—by the members of the State Board of Health.

10:30 a. m. "Water Analysis and Purification"—Prof. Chas. N. Kinney, Chemist of the State Board of Health.

AFTERNOON SESSION, 2:00 P. M.

"Local Meat and Dairy Inspection"—Dr. L. Enos Day, Bureau of Animal Industry, Washington, D. C.
Replies to questions.
School of instruction continued.

DUTIES AND POWERS OF LOCAL BOARDS OF HEALTH.

BY LOUIS A. THOMAS, SECRETARY STATE BOARD OF HEALTH.

The duties imposed and the powers conferred upon Local Boards of Health are set forth in Chapter 16, Title 12, of the Code. Section 2568 provides that the Mayor and Council of each city or town, and the Trustees of any township shall constitute a Local Board of Health within the limits of such cities, towns or townships of which they are officers, and the city, town or township clerk shall be the clerk of the Local Board. Thus it will be seen that the membership and territorial jurisdiction of

each Board is definitely laid down by the statute. In incorporated cities or towns the Board is composed of the whole Council, and not simply a committee appointed by that body. Where a city or town, under its incorporation, includes a part or the whole of one or more townships, the Local Board of the city or town has superior jurisdiction over that of the township, and this rule also applies to cemeteries, waterworks and other utilities situated outside the limits of the municipality, when the same are owned or controlled by the city or town.

Cities operating under "Special Charter" may organize their Local Board of Health under Section 1025, Chapter 14, Title 5, of the Code, but in all other respects they must conform to the regulations and requirements of the State Board of Health.

Immediately upon organization all Local Boards of Health must select and appoint a competent physician as its Health Officer, who shall hold office during its pleasure. The term "competent" in this connection expresses the qualifications required of such appointee, the evident intention of the statute being that the person selected for this responsible position should be in every respect the most competent physician available. To meet the requirements of this Section the person chosen as Health Officer must be a legally registered physician in the State of Iowa. The statute makes no distinction as to the particular school of practice, all being recognized on an equality, but the term "physician" applies only to such persons as are legally entitled to practice medicine under the laws of Iowa, or in other words, only those to whom the State Board of Medical Examiners has issued its certificate authorizing them to practice medicine in this State. In addition to these legal requirements the person selected as Health Officer should possess adequate sanitary knowledge and practical experience, and be a man of executive ability, coupled with moral courage and keen judgment.

Rule 28, Chapter 1, of the Revised Code of Rules and Regulations of the State Board of Health prescribes certain important duties for the Health Officer, but the Local Board may, by regulation, prescribe additional duties and empower him with executive authority.

The Health Officer is not a member of the Board, and consequently has no vote in its proceedings; neither can a member of the Board, otherwise qualified, be elected Health Officer. A City Physician cannot legally perform the duties of Health Officer unless duly elected to such office by the Local Board when in session; these offices are distinct and separate, but there seems to be no legal obstacle to the same person holding both positions.

The compensation of the Health Officer and all other persons employed by the Local Board of Health must be determined and fixed by that body when in session, and referred to the City Council for payment.

The Board may select any one of their number Chairman, but unless such selection be made, the Mayor would become the presiding officer, in any event this courtesy should be extended to him, for aside from the fact that he is the official head of the municipality, he is the Quarantine Officer, and the only member of the Board invested with individual authority to declare or terminate a quarantine. No committee or individual member of a Local Board has any authority whatever unless specifically conferred by statute or by the Board when in session.

To be valid and binding upon the people of a community, every act in the organization of a Local Board and in the discharge of its official duties, must be done in strict conformity with the statutes. Many well intended measures adopted by various Boards have failed to receive the sanction of the courts, owing to the fact that the Board had omitted in some particular to follow the procedure defined by the statute. It is, therefore, expedient that all acts performed, including those of organization, be in exact accord with the wording and intent of the statute. While many instances could be cited, the following example may illustrate the importance of this procedure. The State Board of Health has by regulation prescribed the size and text for the official quarantine sign, and the courts have held that "a sign of less dimensions than that prescribed, or one omitting any part of the said text, could not be held to constitute a legal quarantine; and that such defect, if proved to exist, could be pleaded as sufficient grounds for acquittal of the violator in the event of prosecution."

It is always unwise for a public body to adopt methods or assume responsibilities not conferred by law, or to avoid the somewhat irksome formality of "red tape;" this is especially true in matters pertaining to Local Boards of Health, as they are liable at any moment to be plunged into endless litigation, thus delaying efforts to advance the interests of the community, and in addition encourage contention or chronic disregard of necessary regulations. Delays are often costly and may result in serious consequences to health and life, therefore it is best to follow the proper procedure, thus avoiding possible obstacles.

While the Board of Health and the City Council are composed of the same membership, they are distinct and separate bodies. All business pertaining to the Board of Health should be transacted when in session as such, and its actions recorded in a separate book. It should make accurate, complete and permanent record of all its proceedings and its adjudications should appear therein in clear and distinct language.

Local Boards are required by law to adopt, obey, promulgate and enforce the rules and regulations of the State Board. These apply chiefly to quarantine and the control of infectious diseases, but Local Boards may, if necessary, adopt additional regulations suitable to their own locality, provided that such regulations are reasonable and do not conflict with the law or the regulations of the State Board of Health.

In the matter of nuisances every Local Board must adopt and publish such standing rules and regulations as are necessary, and specially adapted for the protection and preservation of the public health within its own jurisdiction. In the inspection of buildings, care and removal of persons infected with an infectious disease, and rabid animals, the Local Board is vested with complete and independent authority, and its jurisdiction extends to and includes all boats and vessels within its ports and harbors. It may, by resolution, specifically instruct certain of its officers to enforce its own regulations and those of the State Board. Thus a resolution making the Health Officer the Executive of the Board, and

instructing him to enforce its rules and regulations, would give him the necessary authority. The Mayor should also detail certain police as Sanitary Officers to execute the orders of the Health Officer, as it is always more satisfactory to have special men familiar with the routine work.

All orders for quarantine or for abatement of nuisances must be made in writing and in duplicate, one copy being left with the party served and the other filed in the office of the Local Board. Notice of quarantine should be served upon the occupant, but notice for abatement of a nuisance must be served upon the owner of the property; otherwise the cost of removal or abatement, in the event of neglect, could not be collected or taxed against the property. Service in all cases should be made by police officer.

If the owner or occupant of any suspected premises refuse to admit the Inspector of the Local Board, application should be made to the nearest magistrate of the county, stating under oath the facts as far as known, thereupon said magistrate shall issue his warrant authorizing any peace officer, accompanied by the Health Officer and two members of the Local Board, to enter the premises between the hours of sunrise and sunset, and remove or abate whatever nuisance be found.

The term "nuisance" as used in sanitary regulations is not always clearly understood by those whose duties require that they be fully informed as to what does and what does not, constitute a nuisance under the law relating to the duties of Local Boards of Health.

The term in general includes those agencies and conditions that annoy or incommode—those that are or that may become offensive or noxious —and those that are directly dangerous to health and life.

Section 5078 of the Code of Iowa defines what are nuisances under the general law, as follows: 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 and dangerous to the 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 corrupting or rendering unwholesome or impure the water of any river, stream or pond—are nuisances."

Nuisances are classified—public and private. They are termed public whenever they annoy or endanger the well being of the citizens in general; and private when they affect only the property rights of an individual.

Every person has the legal right to the enjoyment of health and life; therefore any condition or agency jeopardizing either may be construed a nuisance within the purview of the Local Board.

Boards of Health have no jurisdiction over private nuisances or over those having no deletary influence upon health or life; these are matters for adjudication by civil action, to be brought by the party injured. Neither has a Local Board authority to order a business permanently closed, that power being vested in the courts; but the Local Board may, by standing rule or special regulation, require that any and all business

be conducted in a sanitary and inoffensive manner, and in accordance with specified requirements.

It is imperatively the duty of a Local Board to provide for all persons within its jurisdiction, sick or infected with an infectious disease, regardless of said person's residence, place of settlement, or social status. Under the laws of Iowa it is a criminal offense for any person, officer or member of a Board of Health, to remove or order removed from its legal jurisdiction any person sick or infected with an infectious or contagious disease, except in accordance with the provisions of Chapter 99, Laws of the Thirtieth General Assembly.

The custom of "passing on" infected tramps from one community to another has been a common practice in some localities. The recklessness of this custom cannot be too severely criticised. It is pernicious and a menace to public health, for it not only endangers the life of the victim, but in addition exposes innumerable innocent persons to infection and often unjustly burdens other communities with expense and responsibility.

Quarantine is established by a written order of the Mayor, and the placing in the most conspicuous place on the premises a card of not less than 18 inches square, on which shall be printed in large letters the word "Quarantine," the name of the disease, and the words, "No person shall be permitted to enter or leave these premises except as provided by law, while it is quarantined, under the penalty provided by law." (See pages 10 and 11, Revised Code of Rules and Regulations.)

A separate card must be used for each building, and it is advisable to place one at each entrance. The State Board of Health has now adopted "yellow" as the official quarantine color, this being the color reserved for such purpose throughout the civilized world.

The duration of quarantine for the various infectious diseases is prescribed by regulations of the State Board of Health, and Local Boards must in every instance maintain the quarantine for the full period thus designated. The Mayor and Township Clerk are required to report all cases of infectious disease reported to them to the Secretary of the State Board of Health, and later to report as to the termination of the disease, the number of cases on the premises and the fact of disinfection and release of quarantine. (See Chapter 1 of the Revised Code of Rules and Regulations.)

The question as to who should defray the expense of quarantine has been definitely settled by the legislature. Chapter 111 of the Acts of the Thirty-first General Assembly provides "that all expenses incurred in establishing, maintaining, or raising a quarantine, including that of disinfection and also the expenses incurred by the Local Board of Health in providing needful assistance, nurses, medical attendance and supplies, shall be certified to and paid by the County in which the expenses are incurred, and that the Board of Supervisors of that County shall, at the time it levies the general taxes, levy upon the property of the city or town from which such expenses were certified, a sufficient tax to reimburse the County to the extent of one-third the amount paid by it. The Local Board of Health shall audit all such bills and allow thereon such amount as is reasonable, but the Board of Supervisors may revise the amounts so

allowed." It will be seen from the foregoing that no part of the expenses incurred as the result of quarantine can in future be charged to or collected from an individual, no matter what be his condition or circumstances; in other words, the Local Board of Health must in all cases provide for all persons placed under quarantine. The Local Board should select the nurses and medical attendants for this purpose, but if the parties quarantine decline to accept the services of those thus selected, they must themselves pay the charges of those they employ upon their own motion. (See Section 2570, Page 84, of Appendix.)

No person, other than the attending physician, is allowed to enter or leave a quarantine unless in possession of a written permit signed by the Mayor and countersigned by the Health Officer.

The question of disinfection has always been a bone of contention between the Board and those affected, often resulting in the process being imperfectly carried out, or, perhaps, neglected altogether. Unless disinfection be properly and thoroughly done it is worthless, and so far as any real benefit to the general public is concerned, the pretense might as well be omitted entirely. The State Board has, by regulation, prescribed the method of disinfection to be used by all Local Boards. Before any quarantine is released the requirements of this regulation must be strictly complied with. All disinfection must be done under the personal supervision of the Health Officer. The material used should be purchased by the Local Board of Health at wholesale.

The premises upon or within which any business is conducted is at all times subject to quarantine restrictions for the purpose of disinfection; this likewise applies to Common Carriers and to United States mails, but the period of detention should not be longer than the actual time necessary to thorough disinfection. (See Rule 14, Chapter 1.)

A Local Board of Health has no authority to impose penalties for violation of its rules or regulations; such punishment is provided for in Section 2573 of the Code; in addition to this the City Council may, by ordinance, provide penalties for violation of any of the rules or regulations of the State or Local Boards of Health, and this should be done in all cases in order to expedite punishment of violators and to emphasize the importance of prompt and strict compliance with sanitary regulations. If this provision be made the violator of a Board of Health regulation would commit two offenses by one act, the first against the Statutes of Iowa, and the other against the Ordinances of the Municipality, and in addition thereto render himself liable for civil damages arising out of his neglect or failure. (See copy of ordinance or page 80 of the Revised Code of Rules and Regulations.)

The statute providing for the organization of Local Boards of Health, and prescribing their duties, is mandatory, therefore neglect or failure to follow the prescribed dictum might render the members liable for malfeasance in office, and perhaps to civil damages alleged as the result of their neglect.

Prosecutions for the commission or maintenance of a nuisance, or for violation of any rule or regulation of the State or Local Boards of Health, including Quarantine, should be instituted under the Criminal Code, the proceedings being commenced by information in the name of the State.

The County Attorney is the legal adviser of all Boards of Health in the county. It is his duty to give advice and council whenever requested by them, and when information is filed to prosecute persons violating the regulations of the State or Local Boards of Health.

Without exception the Local Board of Health is the most important department of the municipality, though it is not generally recognized as such by the average City Council. We are indebted to Benjamin Franklin for the maxim, "Public health is public wealth," and as year succeeds year since the utterance of that maxim its truth becomes more and more manifest. Modern improvements and environments, with continually increasing population, bring in their train responsibilities proportionate to their advantages. Increased commercial and social intercourse have developed need for rapid transit. Mechanical skill and popular demand for the luxuries of life, create numerous elements favorable to the distribution of infectious diseases. Thus diseases active in a given locality may be transported to the remotest portions of the country, within the period of incubation. The multitudinous avenues thus open to transmission of infectious material, the apparently insignificant and unsuspected conductors, and the remote distance of the infected host, provide most advantageous features for wide distribution, practically unlimit the field of sanitary work, and continually create new and serious responsibilities for the Local Boards of Health.

The Local Health Department should at all times be equipped with necessary supplies and prepared to meet every emergency. Prevention of disease means economy, so preventive measures should be looked upon in the light of insurance. Local Boards should appreciate the importance of adequate appropriations, and also the fact that money judiciously expended for this purpose is an investment that will return continual profits far beyond computation.

The Health Officer upon whom you must necessarily rely for technical information, and upon whom the major share of your responsibility must devolve, should receive compensation proportionate to his duties; his services, if properly rendered, are the most valuable of all city officials; he should therefore be recompensed accordingly. He is required to attend the Annual Sanitary Conference of State and Local Boards, and should keep in touch with current sanitary topics, and the duties pertaining to his office.

In Memoriam

Josiah Forrest Kennedy, A. M. M. D.

Born January 31, 1834
Died September 26, 1908

Dr. Josiah Forrest Kennedy died at his home in Los Angeles, California. He was born near Landesburg, Pa., where his early life was spent. He was educated at Williamsburg Academy and Dickinson College and graduated from the Medical Department of the University of New York City in 1858. The same year he settled at Tipton, Iowa, where he commenced the practice of medicine. In 1861 he was made an assistant surgeon in the army, being stationed at Georgetown, D. C., and for two weeks was in charge of the wounded from Antietam. His commission was signed by Lincoln and Cameron. He resigned from the army October, 1862, and returned to Tipton, Iowa.

In 1869 he was elected professor of obstetrics in the Medical Department of the Iowa State University. In 1884 he was elected Secretary of the Iowa State Board of Health, and served with great fidelity and efficiency for the period of 22 years. In February, 1907, he moved to Los Angeles, California.

For many years he was an active member of both the Polk County and the Iowa State Medical Associations and had held various important offices in National Medical and Benevolent Societies.

His courteous manner and conscientious devotion to duty endeared him to his many associates and colleagues, as well as to his professional patrons by whom he was greatly beloved for his tender and successful professional ministrations.

Interment was made at Los Angeles, California.

DISINFECTANTS AND DISINFECTION.

Read before a joint meeting of the Iowa State Board of Health and the Iowa Association of Local Health Officers at Waterloo, Iowa, July 11, 1906.

BY HENRY ALBERT, M. S., M. D., DIRECTOR IOWA STATE BOARD OF HEALTH BACTERIOLOGICAL LABORATORY, IOWA CITY, IOWA.

The subject of disinfection is so broad and covers such a wide range of considerations that it is impossible to discuss it properly in the brief time allowed for this paper. Important as are such subjects as the disinfection of the patient's body, instruments, dressings, discharges of various kinds, etc., I have deemed it more important to view and consider the subject from the broader standpoint, namely, the disinfection of premises following contagious diseases.

For the disinfection of premises following contagious diseases a great many substances might be used. It may safely be said, I believe, that nine out of every ten of the advertised disinfectants are of very little value. Some of them are of some value as antiseptics and deodorants. Many of these advertisements are accompanied by good testimonials. There are three agencies that we should always keep in mind in general disinfection: 1, A gaseous disinfectant; 2, heat; 3, a liquid disinfecting solution.

GASEOUS DISINFECTION.

There are three methods of aerial disinfection: (1) By the use of formaldehyd gas; (2) by sulphur fumes; (3) by hydrocyanic acid gas. For the various contagious diseases the first of these methods is by far the best. Sulphur and hydrocyanic acid are better than formaldehyd only when we have to deal with animal life such as cockroaches, bedbugs, fleas, mosquitoes, etc. I have repeatedly exposed guinea pigs, rats, bugs, etc., to the action of formaldehyd during fumigation, without any apparent harmful effects.

FORMALDEHYD.

For disinfection following contagious diseases, formaldehyd is far better than sulphur. Not only is it far more efficient, but has no or scarcely any deleterious influence on anything in the room. Sulphur will partially bleach many of the colors of wall paper and fabrics, dulls gilt and varnished wood and tarnishes metal. Formaldehyd gas has none of these deleterious influences except, when very strong, it sometimes tarnishes steel and iron. Formaldehyd is an irritating gas formed by oxidizing vapors of methyl alcohol by passing them over platinum sponge or coke heated to redness ($CH_3OH+O=CH_2O—H_2O$). A saturated aqueous solution

of this gas contains 40 per cent of formaldehyd. Such solutions are sold under the trade names of "formalin," "formal," "formol," etc. When the temperature of the gas is lowered to 68 F. or if attempts be made to condense or concentrate the 40 per cent aqueous solution, some of the formaldehyd is polymerized into paraformaldehyd, a white solid substance of a soapy consistency. When this is dried (as by sulphuric acid) a white powder is formed known as paraform or triozymethylene. These solid polymers when gently heated are reconverted into the gaseous formaldehyd.

The fact that the gas is converted into the solid sustance at a temperature of 68 F. is of the highest importance; it means that the temperature of a room to be disinfected should be above that point if the best results are to be obtained; on the whole a temperature of 60 F. has proved satisfactory; never ought the temperature be below 52 F. Formaldehyd will readily combine with organic compounds, making it a good deodorant. It is neutralized by ammonia, making the latter substance of value in getting rid of the formaldehyd fumes after disinfection has been completed.

How is the formaldehyd to be used? Carefully and thoroughly performed experimental work has demonstrated that several conditions are necessary in order to have the disinfectant action most efficient. Why is it that the results of various experimenters have been so different? Why does one man obtain better results with one method and another man with another method? These are questions of vital importance. In order to determine the cause of these discrepancies and also to find out, if possible, the best and most efficient method of generating formaldehyd gas, I have during the past two years performed a large number of experiments, some under circumstances in which I had control of all of the conditions present and could change or modify them at will, and others with conditions as they are ordinarily met with in practice. I shall not today burden you with many figures, but desire simply to state that I obtained varying results by using various methods of generating formaldehyd gas. I found it to be an almost invariable rule that the manufacturers and supply houses fail to recommend a sufficient amount of the substance. If disinfection is to be done at all it should be done thoroughly; otherwise it cannot be of much value. As performed by some the only good it does, I believe, is a psychologic one; it calms the mind, and the reason why reinfection is not more common from such work is probably either the law of chance or the old principle, "The lame and lazy are always provided for."

Conditions for Using Formaldehyd.—The conditions which should be borne in mind in formaldehyd fumigation are as follows:

1. The amount of the substance used. If all conditions are favorable a small amount of gas is sufficient, but in the absence of all favorable conditions a liberal allowance should be made for inefficiency of method. Under ordinary conditions when penetration of mattresses, etc., is required no less than 16 oz. of 40 per cent formalin, all of the gas of which is available, should be used for every 1,000 cu. ft. of room space; if only surface disinfection is necessary, only one-half of that amount is necessary.

2. The gas should be evaporated as rapidly and in as concentrated a

form as possible. This depends on the system used and the thoroughness with which all holes and places of leakage have been closed up.

3. The temperature of the room should at least be 70 F., if possible; the higher the better, although, of course, some disinfection will take place at a lower temperature. We cannot rely on the disinfection if the temperature is below 52 F.

4. The atmosphere should contain considerable moisture, best if saturated, although 75 per cent is very satisfactory. If the air is too dry more moisture may be obtained by boiling water in the room or by simply pouring steaming water back and forth from one vessel into another.

5. The length of time of action. This will vary with the conditions already mentioned although it is safe to say that the time of exposure in most instances should be from 12 to 24 hours. Very frequently no more than four hours are necessary.

6. Leakage of gas from the room. If care is not taken to close up all cracks and holes in the room carefully a larger amount of formalin must necessarily be used. The State Board of Maine pays no attention to small openings in the rooms, but to compensate, recommends that 32 oz. of the formalin be used for every 1,000 cu. ft. of room space

Methods of Using Formaldehyd.—Having these conditions in mind, let us briefly review the different methods of using formaldehyd gas. They are as follows:

1. Formalin, evaporated by heat in the room to be fumigated.
2. Formalin, evaporated in one of the several forms of apparatus—the gas passing through a key-hole in the door.
3. Formalin, as a spray produced by passing air or steam through it.
4. Formalin, sprayed about the room.
5. Formalin used to saturate sheets which are hung up in a room and the solution slowly evaporated.
6. Formaldehyd produced by passing the vapor of methyl alcohol over a heated platinum sponge.
7. Formaldehyd generated by heating one of its solid forms.
8. Formalin evaporated by the adding of a chemical agent such as potassium permanganate.
9. Foramlin mixed with equal parts of water and boiled off.

No. 1.—The generation of formaldehyd gas by evaporating formalin in the room to be disinfected by the use of a lamp, has the great disadvantage of not being able to control the amount evaporated, and the constant danger of fire.

No. 2.—The evaporation of the gas in special forms of apparatus, the gas passing through a key-hole or some other opening, has the special disadvantage that it requires almost invariably a rather complicated form of apparatus which is very liable to get out of order.

No. 3.—The method of spraying a solution of formalin by passing air or steam through it, is better than method No. 2, only in that more moisture is present, but has the disadvantage in that it requires a longer time to evaporate.

No. 4.—The spraying of a solution of formalin about the room is distinctly disadvantageous in that the gas is slowly evaporated. This disadvantage may be compensated for by taking twice the usual amount of formalin (which would mean about two pints for every 1,000 cubic feet), and leaving the rooms exposed to the fumes at least twenty-four hours. The best results are obtained when the formalin is mixed with equal parts of water before it is sprayed. This is the method used in the city of Philadelphia and very satisfactory results are obtained. Every exposed surface in the room must be thoroughly sprayed. The procedure is rather disagreeable to the operator, on account of his being obliged to remain in the presence of the fumes for so long a time.

No. 5.—The remarks made in regard to method No. 4 also apply to the method of evaporating formaldehyd slowly from sheets which have been saturated with a solution of formalin and hung in the room. This method is used in Chicago.

No. 6.—Fumigation by the immediate production of formaldehyd gas by passing the vapor of methyl alcohol over a heated platinum sponge, is as a rule, very unsatisfactory.

No. 7.—The evaporation of the gas from one of the solid forms has several disadvantages: (a), not enough moisture is present; (b), it requires fire in the room in most instances; (c), it is rather expensive, for instance, it requires from 150 to 200 of the Schering pastilles to disinfect properly a room with 1,000 cubic feet of space; (d), the amount generated can not always be controlled. It has the advantage that the formaldehyd exists in a convenient form and as such does not very readily disintegrate.

No. 8.—The method of evaporating formaldehyd vapor by adding to the 40 per cent solution some chemical agent, such as potassium permanganate, is a comparatively new one, and I believe it to be one of the best, if not the best. The formaldehyd solution is poured into a rather deep vessel in which potassium permanganate has previously been placed. The potassium permanganate, by oxidizing a portion of the formaldehyd, changing it to formic acid, produces enough heat to evaporate the remainder. The first experiments with this method from which we have any reliable data regarding results, were performed by the State Board of Health of Maine in 1904. They obtained perfect disinfection by using 2 pints of formalin and 13 ounces of potassium permanganate for every 1,000 cubic feet of space. They did not take the usual precautions of sealing cracks and other small openings about the house, and they permitted the gas to act for but four hours.

AUTHOR'S EXPERIMENTS.

My first experiments were performed with the view of confirming the results obtained in Maine. Later I modified the method somewhat, with the object principally of lessening the quantity of material used. I have found that if the vessel from which the evaporation is to be made is first slightly heated the evaporation is more rapid and more complete, and the deposit of polymerized formaldehyd on the sides of the vessel is prevented. The radiation of heat may also be prevented by wrapping asbestos paper over the bottom and sides of vessel or by placing it in a wooden bucket. A convenient vessel for this purpose is a tin or galvanized iron pail which consists of two portions, a lower, which is about 10 inches in diameter and about 10 inches high, and an upper portion, consisting of a band of tin or galvanized iron attached to the lower portion, but which extends outward so as to form an angle of about 25 degrees with the vertical. This portion is about 10 inches high and the upper diameter about 16 inches.

Potassium permanganate in the form of very fine crystals or in a powdered condition, is placed in the pail preferably previously heated. There should be 8½ oz. of the potassium permanganate for every 1,000 cu. ft. of room space to be disinfected. (Maine State Board of Health recommended the use of 13 oz.) Then the solution of 40 per cent formaldehyd (formalin) is added—20 oz. for every 1,000 cu. ft. of room space to be disinfected. (Maine State Board of Health recommended 32 oz. of formalin.) Effervescence begins immediately. This method is, we believe, the one best adapted for general fumigation. The formaldehyd is liberated very rapidly, which makes the method very efficient and, when rightly performed, reliable. A small amount of moist residue which has the odor

of formaldehyd is always left in the bottom of the vessel. The vessel to be used may be such as the one described or any deep pail or vessel will serve the purpose about as well. It is the best if the vessel is first heated, in that it produces a more rapid and complete evaporation of the formalin an prevents some of the gas from collecting on the side of the vessel in a polymerized form. The potassium permanganate should be in small pieces, preferably in a ground condition, because the action will then take place much more rapidly. Twenty oz. of formalin are used for every 1,000 cu. ft., since there is a loss of about one-fifth of the amount during the process of evaporation. This means that about 16 oz. of formalin become available in its gaseous state. If a low vessel is used pieces of paper should be placed on the floor to prevent the floor from becoming soiled by some of the fluid being accidentally thrown out during the effervescing process. The method is simple, easy to perform, without any danger of fire and does efficient work. I, therefore, most heartily recommend it.

LIQUID DISINFECTION.

Most physicians do not rely entirely on gaseous disinfection, but advise the washing of the floors, walls and furniture with some liquid disinfectant. There is some reasonable ground for this feeling of uncertainty. The principal reason, I believe, is the fact that most of our manufacturing houses recommend too little of the fumigating agent and they are always able to present figures demonstrating the efficiency of their method and often the inefficiency of other methods. Formaldehyd is formaldehyd, no matter what way it is generated, and, to insure efficient action, there are two points that we must always bear in mind: 1, That enough of the agent is used; 2, that the formaldehyd be permitted to work under favorable conditions.

If we are sure that these conditions are fulfilled then I see no need of following a gaseous disinfectant with a liquid one; if we are not sure, then I believe it should always be used. Of course it may be argued that, inasmuch as the use of the liquid disinfectant following the use of formaldehyd gas does no harm except taking away a little of the shine from varnished furniture, it is better that it should always be used, because it associates the idea of washing with disinfection, which notion is a good one to keep constantly before the people. However much of dirt and bacteria may be removed by washing alone, the terms washing and disinfection are not synonymous and it is better to have disinfectants stand on their own merit.

There are, however, positive indications for the use of liquid disinfectants. Suppose, for instance, a child who today shows signs of being affected with measles attended school or church yesterday and, not feeling well, remained in her seat all afternoon. In such instances I do not think that general fumigation is absolutely necessary and that washing the floors and furniture in the neighborhood of the child's seat is sufficient. I believe, however, it to be a good thing to fumigate school houses and churches several times a year on general principles if there are any contagious diseases among the children of the community.

What are the best liquid disinfectants? The market today is flooded with disinfectant agents, nine-tenths of which do not, I believe, merit the term. Except for special purposes, I see no need of using anything aside from carbolic acid or some of the coal-tar proprietary preparations, mercuric bichlorid or biniodid. Carbolic acid may be said to be the king of disinfecting agents. It is stable, it is certain, it has penetrating properties. For washing it should be used in a 5 per cent solution. The various proprietary coal-tar compounds, are, as a rule, also very good disinfectants and have an advantage over carbolic acid in that they are cheaper and, second, they do not have such irritating and caustic properties. Their use can be recommended.

Bichlorid of mercury is a most efficient disinfectant when properly used. If freshly prepared with water that does not contain much organic matter it may be recommended as the best agent for washing floors, woodwork, etc. It should be used in a 1-1000 solution—if much organic matter is present, in double that strength. Formalin is not to be recommended as a liquid disinfectant. A 5 per cent solution of it has less than one-tenth the value of a 5 per cent solution of carbolic acid. The various preparations on the market that go by the names of "chlorids" and other fanciful terms have but little disinfectant value.

OUTLINE OF METHOD.

After having already presented the various phases of the subject, it may seem superfluous to go any further into the detail of method of disinfection, but in this, as in most other things, success depends as much on the details as on the generalities. I will indicate briefly how, under ordinary conditions, I would disinfect a room.

1. The person who disinfects should put on a cap and gown and face, at least mouth and nose, covered with a piece of gauze, which are later left in the room to be disinfected with the other objects.

2. All holes and cracks should be sealed by pasting over them pieces of paper or filling them with cotton or cloth.

3. Precautions under certain circumstances:

   a. If the wall paper of the room is badly torn in several places, it should be removed.

   b. If, by accident, a rug or carpet should have remained in the room, it should be thrown over the back of a chair.

   c. If the room has no door which it is desirable to open, one window should be left unlocked, to be thrown open when the fumigation is complete.

   d. No vessels containing water should be left in the room.

4. The patients' clothing and the bed clothing should be thrown over the ends of the bed, backs of chairs or over a wire or rope stretched across the room.

5. Valuable books should be opened and placed on end, so that the leaves may be separated as much as possible.

6. Determine the temperature of the room and see that it is above 60.

7. See that the room contains enough moisture in a vaporized state.

8. Potassium permanganate is placed in a vessel which has been slightly heated beforehand; to this the formalin is added; 8½ oz. of the potassium permanganate and 20 oz. of the formalin (40 per cent formaldehyd) to every 1,000 cu. ft. of room space to be disinfected if penetration of mattresses, etc., is required; if only surface disinfection is necessary no more than one-half of these volumes is necessary. If the formalin is generated by a method which liberates all of the gas only 16 oz. are necessary. These volumes are much greater than those given by the manufacturer of most disinfectants. No doubt, also, the volumes given are somewhat greater than absolutely necessary in all instances. Nevertheless, I think that in using disinfectants we ought to use the same principles used by financiers in estimating profits or expenses. They calculate closely just what they will be and then allow a good margin against themselves for unforeseen circumstances. On account of the variability of strength of many preparations of 40 per cent formaldehyd, we should be sure that we secure our solution from a reliable house.

9. Let the gas act for 6 to 12 hours and open doors or windows. The placing or evaporation of a little ammonia in the room will neutralize the formaldehyd and thus hasten the disappearance of the odor of that substance.

10. All bedding, patient's clothing, etc., that is not harmed by boiling should next be boiled for one-half hour.

11. Wherever possible, the mattress, rugs, etc., should be steamed; I believe that every large city should have a steam disinfector for this purpose. Where this is not possible, these articles should be taken outdoors and thoroughly aired and beaten. The person beating them should have a piece of gauze tied over his head and preferably should also wear a suit which may be sterilized by boiling.

12. Papers, rags, cheap books and other articles of little value should be burned.

13. In case it is not possible to obtain all of the favorable conditions for formaldehyd disinfection, or if there is any suspicion that there are still organisms that need to be killed, all of the woodwork and, if necessary, the walls should be washed with a liquid disinfectant, such as bichlorid of mercury, 1-1000; carbolic acid, 5 per cent, or one of the various proprietary coal-tar preparations properly diluted.

INSECTS; THE ROLE THEY PLAY IN THE TRANSMISSION OF DISEASE.

BY HENRY ALBERT, M. S., M. D.

That insects have had something to do with the spread of disease has long ago been suspected; the actual demonstration of such was, however, not made until recent years, and the importance of the role which they play in the spread of pathogenic microorganisms has yet to be appreciated. For many years Italians have believed that mosquitoes had something to do with malaria, but it was not until 1898 that the relation between the two was absolutely determined. For decades we have chronicled the

enormous death rate due to malaria and yellow fever. The lowering and, in many places, the complete abolition of that death rate, during the past five years, has been one of the most astonishing accomplishments of scientific medicine.

Let us consider separately and in order the different phases of our subject:

I. The diseases transmitted by insects.

II. The insects responsible for such transmission.

III. How such transmission may occur.

IV. Agents eliminating the insect factor in the transmission of disease.

I. *Diseases Transmitted by Insects.*—There are a number of diseases such as malaria, yellow fever, Texas cattle fever, and possibly also sleeping fever, "spotted fever," relapsing fever, and elephantiasis that are conveyed only through the medium of insects. Others are at times transmitted in this way.

a. Malaria.—Although the infective agent of malaria was discovered by Laveran in 1880, and this disease had long been classed with the communicable diseases, and although it was long ago suspected that the mosquito had something to do with malaria, yet it was not until 1898 that the manner of transmitting the disease was solved. Through the painstaking researches of Ross, Manson, Grassi and others, we now know that the hæmatozoon malariæ requires two hosts for its development; man as the intermediate host for the development of the larval form, and the mosquito, of the genus anopheles, as the definitive host for the development of the adult form. The mosquito forms the only means, so far as we know at present, of transmitting the disease from one individual to another.

b. Yellow Fever.—Scarcely less wonderful are the discoveries in connection with yellow fever. Dr. C. J. Finlay, of Havana, in 1881 first advanced the idea that mosquitoes were concerned in the transmission of this disease. In 1900 a committee consisting of Dr. Reed, Dr. Carroll, Dr. Agramonte and Dr. Lazear, which had been appointed to investigate the relation existing between the mosquito and yellow fever, reported that the mosquito of the genus *Stegomyia* served as a host for the parasite of yellow fever and that it was very probable that the disease was propagated only through the bite of this insect. A committee consisting of Parker, Beyer and Pothier have recently stated that they found a protozoon parasite in the stegomyia, and to have worked out a part of its life history. For this organism they propose the name *Myxococcidium stegomyia* (Marine Hospital Service, Yellow Fever Institute, Bulletin No. 13, March, 1903). It has, as yet, been by no means proved that the bodies found by the last named committee are the real ætiological agents of yellow fever.

c. Elephantiasis, due to filaria sanguinis hominis.—The mosquito serves as intermediate host, and transmits the embryo parasite to man through its bite. The parasites probably develop into the adult form in the skin or just beneath it, which probably enter the lymphatics and give birth to broods of embryos that are disseminated in the lymph stream and then enter blood vessels. They occur in the peripheral blood in greatest

number when the patient is asleep. When the patient is active they retire to the deeper structures, presumably the lymphatics. By occluding the lymphatics they produce a lymphatic œdema which causes an enlargement, principally of the lower extremities, resulting in the condition known as elephantiasis.

d. Trypanosomiasis.—This condition is due to the presence of an animal parasite, trypanosoma, which has an elongated body and a large flagellate caudal extremity. The organisms are found principally in the blood of animals affected: There are a number of these parasites, which produce different diseases in different animals (in some cases apparently without effect) and are transmitted from animal to animal, in a few cases at least, by different insects. One of the most important of these diseases in the human being is:

e. Sleeping Fever, a very fatal disease which is almost entirely limited to the colored population of Africa. During the past year it has been determined with a great deal of certainty that the specific cause of the disease is a trypanosoma (Castellai, *Brit. Med. Journal*, June 20, 1903), and that it is transmitted by some insect, probably the tsetse fly which also conveys the trypanosoma producing the disease nagana which proves so fatal to many of the domestic horses in Africa. Our common rat is frequently found affected by trypanosoma transmitted by the rat flea. It does not prove fatal, but affords a good opportunity for the laboratory study of this parasite.

f. Relapsing Fever.—Ticktin has examined bedbugs which had filled themselves with blood of men and monkeys suffering from relapsing fever, and found that the blood of these insects contained the specific spirilla for a period varying from eighteen to seventy-seven hours after they had gorged themselves. Some soon became immotile, others remained motile for a long time. Blood, from eight bedbugs which had fed upon an infected monkey, was injected into another monkey which in sixty-four hours developed the disease. The recent researches of Karlinski have caused him to believe that bedbugs play an important part in the transmission of relapsing fever. (Karlinski, *Centralblatt fur Bacteriologie*, Bd. XXX, Orig., 1902.)

g. Texas Fever of Cattle.—Theobald Smith has shown that this disease is caused by a very small hematozoon (*Pyrosoma bigeminum*) and is carried from animal to animal through the bite of a tick (*Boophilus bovis*). The adult tick, after gorging itself with the blood of an infected animal, falls to the ground, and in a few days lays her eggs and dies. After several weeks the eggs hatch out, the embryo ticks escape and at the first opportunity attach themselves to cattle, and through their bite infect healthy animals.

h. Typhoid Fever.—During the past few years our attention has frequently been called to the fact that flies play rather an important part in conveying the germs of typhoid fever. Such seems to have been a great factor in the production of the large number of cases of typhoid in the American camps during the Spanish-American war. Flies were very numerous and had free access both to the discharges of typhoid patients and the food of the soldiers.

Smith reported a small epidemic of typhoid at the New Haven county jail, which he attributed to the influence of flies. Twenty-one of the inmates were taken sick. There were several cases of typhoid in the houses near the jail and there was open communication between the jail kitchen and the adjoining yards.

Dr. Alice Hamilton, who made a very careful study of the recent typhoid epidemic in Chicago, believes that flies were concerned in the production of many of the cases (*Jour. of the American Med. Association*, February 28, 1903). Ficker has isolated typhoid bacilli from the bodies of flies caught in a house where eight cases of typhoid occurred (*Arch. f. Hyg., Munchen u. Leipzig*, Bd. XLVI, S. 274). Experimentally, Ficker has shown that typhoid bacilli will live in the bodies of flies for some time, and that flies fed with typhoid bacilli are able to convey the micro-organisms to objects with which they come in contact, for as long as twenty-three days after feeding. This emphasizes the great importance of thoroughly disinfecting all discharges from typhoid patients, and of excluding all flies and other insects from dwelling places, especially from the rooms of typhoid fever patients and from the dining rooms of others.

i. Tuberculosis.—The frequency of occurrence of this disease, its almost universal distribution, the manner in which infected material is distributed because of the careless disposition of many consumptives, the great number and disgusting habits of flies, all suggest that the role which insects play in the transmission of this disease may not be at all unimportant. Spillmann, Haushalter and Hoffman have found living and virulent tubercle bacilli in the bodies of flies caught in the rooms of consumptives and also in their fæcal specks scraped from the wall or articles of furniture. The greatest care should be taken with tuberculous sputum. It should be collected in spittoons which contain a disinfecting solution and are always kept well covered.

j. Plague.—It seems very certain that this disease is frequently transmitted by fleas, either,

Fleas that commonly infest the human being, conveying the disease from one individual to another, or,

The rat flea, which leaves the dead rat, an animal very susceptible to plague, as soon as the body becomes cold. These fleas will sometimes bite the human being and so may transmit the disease. Transmission by flies probably also occurs. Nuttall has shown (1897) that flies die of the disease, and Yersin has found the bacilli of this disease in flies infesting his laboratory.

k. Cholera (Asiatic).—There have been a number of epidemics of this disease, the spread of which cannot be satisfactorily explained except through the agency of flies. Biggs explained the development of a small epidemic of this disease in New York in 1892 on these grounds (*Amer. Jour. of the Med. Sci.*, January, 1893). Macrae performed an interesting experiment by exposing sterilized milk in two apartments of a jail, one of which contained cholera patients and the other did not, but both contained many flies. The milk in the apartment which contained the cholera patients soon became infected with cholera micro-organisms, the other did not.

l. Yaws.—The real cause and manner of transmission of this disease is not known. There is, however, good evidence to show that simple sores have been infected with the virus of the disease by certain flies called "yaws flies" which are common in the "yaws" district.

m. Leprosy.—This disease is in some cases probably transmitted by mosquitoes and flies. It is interesting to note that the plague of mosquitoes and an epidemic of leprosy appeared at the same time in the Hawaiian Islands in 1840, at which time mosquitoes were imported, probably from China. Alvarez claims to have discovered bacilli of leprosy in mosquitoes gorged with the blood of lepers. Others have failed to verify his findings.

n. Anthrax.—It is very probable that anthrax is frequently carried from animal to animal and occasionally from animal to man through the bites of flies.

o. Worms.—Tape worms, especially *Taenia cucumerina*, a tape worm occasionally found in man, but most commonly in the dog, undergoes a part of its development (larval) in the bodies of fleas and dog lice. The swallowing of such insects has caused tape worm infection. Grassi has demonstrated that ordinary flies may ingest the ova of various worms parasitic to man such as the ordinary round worm, pin worm, and tape worm, and later deposit them with their fæces. This is, of course, a possible source of infection.

p. Impetigo Contagiosa.—Although it has not yet been well demonstrated clinically that impetigo may be transmitted from the affected to the unaffected by insects, yet there is abundant experimental evidence that this is possible, especially through the medium of lice. Dewevre has been able to transfer the disease in this way in about 50 per cent of children experimented upon.

q. Purulent Conjunctivitis, such as *Egyptian ophthalmia and "Florida sore eyes."*—Flies are attracted by the discharges and in some cases are known to have carried the infection from the affected to the unaffected. There are certain flies (Hippelates flies) which are especially prone to dart into the eyes, nose, etc. These are probably most responsible for carrying the infection.

r. Ordinary Infection.—Paltauf reported a case of fly bite producing erysipelas, meningitis, and death in two days. Joseph gives three cases of septicæmia due to fly bites.

Wounds may be infected by insects, first, directly, by getting in contact with wound; second, indirectly, by carrying infected material to instruments or dressings or to the skin which later through an abrasion may produce an infection.

There are many other diseases or disease conditions that are no doubt occasionally, or frequently, transmitted by insects. Reference to some of these will be made when considering the next subject.

II. *Insects Principally Concerned in the Transmission of Disease.—a. Mosquitoes.*—The female of this insect usually lays her eggs on the surface of water and young ones develop only where there is an abundance of moisture. The larvæ remain near the surface and breathe through a respiratory tube near the anal extremity. If this contact with the atmosphere is denied they will soon drown. There are different varieties

of mosquitoes concerned in the transmission of different diseases, as follows:

Malaria—Anopheles, several varieties, *Anopheles maculipennis, Anopheles punctipennis*, etc.

Yellow fever—*Stegomyia fasciata.*

Filariasis—a culex (*Culex pipiens* and *Culex ciliaris,*) and possibly also an anopheles.

Our common mosquito is also a culex (*Culex pungens*). The recent researches on dengue, by Graham, practically show that this disease is caused by a hæmatozoon which is conveyed by a mosquito. In all of these cases infection is carried by the bite of the mosquito. It is probable that this insect also has something to do with the spread of other disease conditions.

b. Flies.—A number of different flies are concerned in the transmission of different diseases. Probably of greatest importance is our common house fly (*Musca domestica*), which enjoys feasting upon the discharges of animals as much as upon the food of human beings and is very prone to carry infectious material from the one to the other, either mechanically, the infectious material clinging to parts of its body, or by ingestion, and later depositing it with its fæces. Or, if the organisms kill the flies, the decomposition of the latter will permit the liberation of the infective material. It is very probable that *Bacillus typhosus* and the tubercle bacillus are frequently spread by flies in one of these three ways. Dr. Alice Hamilton, who made a rather detailed study of the recent mild epidemic of typhoid in Chicago, states that in one instance the discharges from a typhoid patient were put into a privy vault and that a number of flies, caught within the vault, on the fence in the yard, and in the sick room and kitchen of the patient, were examined, and from two of them typhoid bacilli were isolated (*Jour. of the Am. Med. Assn.*, February 28, 1903). Spillman and Haushalter have found virulent tubercle bacilli in the bodies of flies. Madox and Simmond after feeding flies with the spirilla of Asiatic cholera have been able to obtain cultures of this organism from them. Yersin found the bacilli of bubonic plague in flies infesting his laboratory, and Nuttall has shown that flies will die of this disease.

The ordinary fly can travel at the rate of 5.35 metres per second, which would mean ten miles if kept up for one hour. Its powers of producing evil are great and it is not at all improbable that many of our cases of typhoid, both sporadic and epidemic, are due to the agency of flies.

Other flies concerned in the transmission of disease are: The tsetse fly conveying trypanosoma, producing nagana in horses, and sleeping fever in man.

The "yaws fly" connected with the disease, known as "yaws."

The Hippelates fly disseminates a purulent conjunctivitis—"Florida sore eye."

c. Fleas.—There are different varieties of these suctorial, wingless insects, which choose different animals as hosts. The one which most commonly affects man is the *Pulex irritans;* the dog and cat flea (*Pulex serraticeps*) may also affect the human being, etc. Fleas are probably the agents frequently conveying trypanosoma infection from rats to rats

and plague infection from rats to rats or man and from man to man or rats.

d. Ticks.—These insects seem to be capable of conveying a number of diseases:

Texas cattle fever (already described) caused by a small protozoon (*Pyrosoma bigeminum*) which is conveyed by ticks (*Boophilus bovis*).

The carapto disease affecting human beings in Africa seems certainly to be produced by the bite of a tick (*Argas maubata*, Manson, *Brit. Med. Jour.*, September 11, 1903). The infective agent is probably the Filaria perstans.

Another "tick fever" of man occurs in Asia, due to the tick *Argas persicus*.

A third probable "tick fever" in man is the so-called "spotted fever," a quite fatal although not very common disease which is practically limited to the Bitter Root Valley of the Rocky Mountains. Wilson and Chowning, who discovered the casuative agent of the disease, have given to it the name *Pyroplasma hominis*. There is considerable evidence to show that the disease is transmitted to man by a tick, *Dermacentar reticulatus* (*Journal of Infectious Diseases*, Vol. 1, No. 1, January 2, 1904, p. 31, and *U. S. Public Health Service Bulletin*, No. 14, July, 1903). There are still other diseases of horses, sheep and cattle probably transmitted by ticks.

e. Bedbugs (*Cimex lectularius*).—Nuttall, in 1898, performed a number of experiments permitting bedbugs to bite animals that had died or were dying of anthrax, mouse septicæmia, etc., and then permitted these bugs to bite healthy animals. Results were all negative. During the last few years it has been determined that bedbugs play a very important part in the transmission of relapsing fever. (Karlinski, *Centralblatt f. Bact.* Bd. XXXI, Orig., 1902).

f. Lice.—Experimentally, Dewevre has conveyed impetigo contagiosa from the affected to the unaffected in a number of cases.

Other insects, such as ants, cockroaches, spiders, etc., also no doubt play some part in spreading infectious diseases.

III. *Insects are capable of spreading disease in a number of different ways:*

a. Pathogenic micro-organisms may collect upon the limbs or bodies of insects, and by them be carried to fresh wounds, where they produce direct infection, or to articles of food, thus indirectly infecting the individual consuming such food. The contamination of food is of frequent occurrence, as already stated, and no doubt plays an important part in the transmission of typhoid fever.

b. Insects may ingest disease producing micro-organisms with their food and later deposit them with their fæces. Spillman and Haushalter have found living and virulent tubercle bacilli in the fæces of flies that had been fed upon tuberculous sputum.

c. Insects may ingest the germs of disease with their food, be killed by them, and the dead animals may cause infection by,

Falling or dying on articles of food, contaminating the latter.

By decomposition of the body of the dead insect, the liberation of the micro-organisms, and their dissemination through the dust. This is especially true of bubonic plague, which causes the death of infected flies.

d. Insects may ingest pathogenic germs by biting diseased animals and then transmit them to healthy animals by similar bites. Many examples of this method of infection can be given such as the transmission of anthrax by flies, bubonic plague by fleas, and trypanosomiasis, which in some cases is transmitted by flies, in others by fleas. Certain diseases, such as malaria and yellow fever, are transmitted only in this way. In such cases, the organisms always have a double life history and undergo one part of it in the body of the insect.

e. Insects may ingest pathogenic micro-organisms and transmit them to their offspring, who in turn may inoculate healthy animals. As an example of this method of transmission we have the Texas fever of cattle.

IV. *Agents Eliminating* the *Insect Factor* (a few of the more important insects) *in the Spread of Disease:*

a. Destruction of bedbugs, etc.

1. Screen windows to prevent the entrance of bedbugs at night.

2. All crevices obliterated, by papering or painting walls, and using furniture as simple as possible.

3. Infected places may be washed with some disinfecting solution, such as mercuric chlorid.

4. Use of pyrethrum, a good palliative.

5. General fumigation, as concerns the destruction of insects. Formaldehyd often fails to kill them. This is a point of considerable importance. Formaldehyd, although superior to sulphur dioxide in the destruction of bacteria, is inferior to the latter when insects are considered. Better than either for the destruction of animal life—large animals as well as insects—is the use of hydrocyanic acid. It has a slight tendency to destroy the color of fabrics and will slightly tarnish polished brass and nickel. The precautions of general fumigation, such as the closing of all crevices, etc., should be observed. For fumigation, Howard advises the addition of one ounce of potassium cyanide (98 per cent) to a solution containing one ounce of commercial sulphuric acid diluted, with two ounces of water to every 1,000 cubic feet of room space. After twenty-four hours, the room should be thoroughly aired (preferably about twenty-four hours) before it is again occupied.

Although affording a very efficient means for the destruction of animal life, such as bedbugs, cockroaches, clothes moths, ants, flies, etc., as well as rats and mice, the use of hydrocyanic acid is both expensive and dangerous and it should be used only when the greatest precautions are taken.

b. Flies.—Although we may greatly lessen the number of flies by rendering the breeding places (usually manure) inacessible to flies, or when accessible, by the occasional addition of chlorinated lime to destroy the larvæ as recommended by Howard, yet the extermination of these pests will not be accomplished for some time at least. We may do something, however, to free ourselves from the dangers that lurk about these creatures. In the first place we may deny their access to special sources of infection by such means as the thorough disinfection of the bowel and bladder discharges of typhoid fever patients. In the second place we can prevent them from gaining entrance into our dwelling places and from contaminating our food, by the use of screens and fly nets. And,

lastly, their number may be decreased by the use of sticking paper, poison, etc., or by entirely eradicating them from a room by fumigation.

c. Destruction of Mosquitoes.—It is rather hard to destroy large numbers of the adult forms except by fumigation, but since the larval forms are more accessible, it is to them that the axe is placed. This may be done by:

1. Removal of their breeding places by draining swamps and other small bodies of standing water, and by preventing the accumulation of water in cans, pails, barrels, etc.

2. Lakes, watering troughs, etc., may be stocked with different varieties of fish, which will swallow the larvæ before they develop into adult forms.

3. The surface of water which cannot be drained may be covered by a film of coal oil, petroleum, or kerosene, about one ounce to every fifteen square feet. This kills the adult female when she attempts to deposit her eggs, it prevents the development of eggs and kills the larval forms, since it is impossible for them to breathe. This oil does not injure the fish below.

If it is impossible to destroy all the mosquitoes we may further protect ourselves by:

4. Screening doors and windows, and thus preventing the entrance of mosquitoes into houses, especially those containing patients with malaria, yellow fever or filariasis.

5. Pyrethrum (Persian powder) may be blown about the room or burned. This has no effect on the human being, but stupefies the insects so that they may be collected and destroyed.

6. To keep mosquitoes from the body a number of substances, such as the essential oil of lavender, pennyroyal, peppermint, eucalyptus, camphor, etc., have been advised, but they are all volatile and exert their good influence for but a short time. Howard mentions the use of the following formula: Castor oil, one ounce; alcohol, one ounce, and oil of lavender, one drachm. The use of an ointment of petrolatum which has been impregnated with peppermint and eucalyptus is also useful and convenient. As an application for mosquito bites, Howard mentions the use of alcohol, ammonia, or glycerin, singly or combined.

This brief review of the subject under consideration gives us at least a glimpse of the important role played by insects in the transmission of disease. That chapter in preventive medicine which will refer to the zeal and energy with which the clinical observations and laboratory experiments in such diseases as malaria and yellow fever were conducted; which will relate the sacrifice of a Lazear's life, a consequence of devotion to science; and which will tell us of the enormous saving in human life and suffering that has resulted from researches along these lines during the last five years, will be one of the brightest that an historian will have occasion to record.

PLEA FOR NATIONAL HEALTH.

Paper read by Wm. Louden before the Jefferson County Farmers' Institute, February 29, 1908, Fairfield, Iowa.

Mr. President, I wish to digress a moment to call attention to the great health movement which has been recently organized. It is headed by Prof. Irving Fisher of Yale, and has a committee of one hundred of the foremost men and women of the country. Among them are Dr. Lyman Abbott of New York, Bishop Ireland of St. Paul, Andrew Carnegie, Jane Addams, head of the Hull House, Chicago; Luther Burbank, the famous manipulator and originator of different species of plant life; Horace Fletcher, the great authority on mastication; Prof. Chittenden of Yale, the noted food expert; Dr. Kellogg of Battle Creek, and many more equally as noted and trustworthy.

It is called the National Health League, and I am fully convinced it is the most important movement that was ever inaugurated in this country. I fully appreciate and understand the great movements that have been undertaken to promote material development, to preserve our natural resources and to maintain and increase our national wealth. I warmly approve of them all, and am willing to do what I can to help them along. Notwithstanding this, I will have to say that all these things combined do not begin to compare in importance with this great movement for the preservation and promotion of the national health. It has the unreserved support of President Roosevelt, who says that he regards "our national health as physically our greatest asset," and it should have the active support of every citizen.

The greatest wastes sustained by the American people are on account of sickness and disease—the loss of health and vigor, and yet there is nothing to which they devote so little intelligent thought or care. The national government spends millions annually in disseminating information in regard to all kinds of matters connected with farming, fruit raising, the care of live stock and similar subjects, which is all very well, but how much does it spend in teaching the people how to avoid sickness and disease, and how to have robust health and strength? Practically nothing. Is not the life and health of a human being worth more than the health of the hog for which the government expends thousands upon thousands of dollars?

Is there need for an awakening on this subject? Listen to the facts. During the next twelve months one and a half millions of people will die in the United States, at least one-half of whom could be saved if we only knew how. Over four millions of people will be constantly sick, bringing sorrow and trouble and expense to over five million homes, directly affecting the welfare and happiness of probably twenty-five million people and indirectly affecting the interests of all. Eight million of our present population will be prematurely cut off by tuberculosis

and yet tuberculosis is a preventable disease. During the next ten years six million infants under two years old will end their little spans of life while mothers sit disconsolately by and watch and weep in utter helplessness. And yet one-half or more of these little ones could be saved by a proper dissemination of hygenic knowledge.

If it were not for the influx of foreign immigration the population of the United States would decrease. Where are the descendants of the sturdy old revolutionary stock? There are precious few. Look at the families which have no children, and the others where there are only one or two. Is the American race dying out? It would seem so, not from choice, but of necessity, because its vitality has become deteriorated to such an extent as to threaten its perpetuity.

The last century, and especially the last fifty years, has been notoriously one of exploitation. Exploitation, not only of our soil, our timber and other natural resources, but of the energy and vitality of ourselves as well. We have been so eagerly chasing the almighty dollar that we have utterly failed to observe the rules of life which all races of mankind have found necessary to prevent extinction. We have placed our lives and our health almost entirely in the hands of a special class, forgetting that the only way to have life and health is by correct living.

The chemist has attempted to take the place of the laws of nature and while he has had a measure of success here and there, on the whole he has miserably failed. The multiplicity and complexity of diseases and the steadily declining vitality of the race proves his undeniable failure. When the future historian comes to write about the present decadence of the American people he will place on his epitaph the words, "Poisoned to Death." They have been poisoned by unwholesome food, by impure air, by alcoholic stimulants, by the deadly nicotine, by poisonous drugs and vile patent medicines, by scientific serums, by antitoxins, by hypodermics, by vaccine virus, and we know not what.

Human nature cannot stand such treatment for any extended period of time. She has been uttering protest after protest and the time is not far distant when these protests must be respected. Mental conditions must also be changed to comply with the requirements of nature. This national organization is the advance guard of a mighty movement which I have faith to believe will redeem the race from the dangers which threaten its extinction. The following is from one of the bulletins issued by the society and was written by its secretary, Professor Norton of Yale:

"The Department of Agriculture spends seven million dollars on plant health and animal health every year, but, with the exception of the splendid work done by Doctors Wiley, Atwater and Benedict, Congress does not directly appropriate one cent for promoting the physical well-being of babies. Thousands have been expended in stamping out cholera among swine, but not one dollar was ever voted for eradicating pneumonia among human beings. Hundreds of thousands are consumed in saving the lives of elm trees from the attacks of beetles; in warning farmers against blights affecting potato plants; in importing Sicilian bugs to fertilize fig blossoms in California; in ostracizing various species of weeds from the ranks of useful plants, and in exterminating parasitic growths

that prey on fruit trees. In fact, the Department of Agriculture has expended during the last ten years over forty-six millions of dollars. But not a wheel of the official machinery at Washington was ever set in motion for the alleviation or cure of diseases of the heart or kidneys, which will carry off over six millions of our entire population. Eight millions will perish of pneumonia, and the entire event is accepted by the American people with a resignation equal to the Hindoo, who, in the midst of indescribable filth, calmly awaits the day of the cholera."

My apology for this digression is the supreme importance of this matter, although it would really come under the head of domestic science, which has to do largely with questions of health. You will hear more of this movement anon, and the people of our fair county and city should arouse themselves to its importance and be ready to lend a helping hand in one of the greatest reforms of the century.

TYPHOID FEVER.

The State Board of Health is anxious to secure the co-operation of all physicians throughout the State in an effort to prevent the appearance and spread of this disease in the State during the summer and fall months, and believes that much can be accomplished by working together along definite lines. Local, county, and city health officers are urged to acquaint, as far as possible, the people of their county or city with the facts regarding the cause of typhoid fever, its avenues for spreading, and the care to be exercised in disinfecting the discharges from the body during the disease and its convalescence; and the attending physician to exercise the care and vigilance due from him along the same lines.

ORIGIN AND CAUSE OF TYPHOID FEVER.

Typhoid fever does not arise of itself, nor does a simple fever "run into typhoid fever," as is at times claimed by physicians not sure of their ground. A fever that is so suspicious in its character as likely to "run into" typhoid fever should be treated as typhoid fever from the first, and all necessary precautions as to isolation and disinfection instigated at the beginning. *Typhoid fever is caused by a specific organism, and always arises from a pre-existing case.* This organism escapes from the patient through the discharges from the bowels and through the urine, which fact indicates at once what must be done to prevent the spread to those in contact with the patient, or to milk, water or foodstuffs, later to be consumed by another, with production of the disease. These micro-organisms may be present in the urine or bowel movements for a considerable length of time after apparent convalescence, and patients should be urged to use extreme care in the disposal of their discharges at this time. The typhoid fever organisms are difficult to destroy, withstanding the effects of extreme cold for indefinite periods, and only successfully destroyed by strong chemical disinfectants, or by boiling.

METHOD OF SPREAD.

1. *By Water.*—Typhoid fever germs from the bowel contents or urine of a previous case gain entrance to the water, grow and multiply, produce the disease when the water is used by another. These germs may have been washed into the water supply from body discharges of a typhoid fever patient, thrown on the surface of the ground, or gain access through seepage from a privy into an adjoining well or other source of water supply. One of the most serious outbreaks in this State arose from a sewer leaking directly into the city well. Springs, wells and streams can become infected in this way.

2. *By Milk.*—Milk can become infected by those caring for the milk and milking utensils while at the same time nursing a typhoid fever patient—the contagion being carried directly to the milk from the hands; or by diluting the milk or washing the utensils with an infected water; or by flies, swarming from an open privy with contents not disinfected; or from the patient's soiled room or bedding, and subsequently depositing the filth collected on their feet in the milk or milking utensils. Flies in the same way can infect water.

3. *By dust*, containing typhoid fever organisms, settling in water, milk, or other foods.

4. *Flies*, as stated above, visiting typhoid discharges and contaminating milk, water, or other food.

PREVENTION OF TYPHOID FEVER.

This can only be done by adopting such measures as to render impossible the contamination by typhoid organisms of the water and milk supply, and especially of the former. Wells should be bored or driven and should not be so placed as to in any possible manner receive drainage from a privy, or have surface water washed in, as is frequently the case. Water from small streams draining large areas and subject to contamination should not be used. Springs should be protected as carefully as wells; both as a rule represent simply surface drainage. Cities, where possible, should have a gravity water system from a protected source, and adequate sewerage. In small towns, where a gravity system and sewerage is not feasible, a serviceable community well or wells should be driven or bored, as individual wells which are generally dug and not cemented are unsafe on account of privy and surface contamination. Privies and wells cannot with safety occupy common ground and experience shows that it is safer, in preventing typhoid fever, to secure a pure water supply than to depend upon complete removal or destruction of privy contents. Typhoid fever patients either in the early stages of the disease or during convalescence, are apt to cause surface contamination, in many cases long distances from the subsequent water supply affected, making it imperative that the source of water supply should be absolutely protected. Again, water rich in organic material is dangerous, as it furnishes a typical medium for the growth of typhoid fever organism.

In incorporated cities and towns the responsibility for the spread of typhoid fever generally rests with the mayor, council and the city health officer. Milk infection can generally be traced to a case of typhoid in the family, and produces usually but localized cases. Dairies should be certain of a pure water supply, and the sale of milk from any dairy in which typhoid fever exists should be prohibited. The same is true of families supplying milk. Flies, as carriers of typhoid fever, probably do not receive the credit properly belonging to them, and the typhoid fever patient and his discharges should be carefully guarded against the visits of flies. The manure heap is their favorite breeding place, and these should not be tolerated in any community. The small towns throughout the State, and in many cases cities with a population of two or three thousand, allow the accumulation of manure around stables to an extent scarcely to be thought possible, unless by actual inspection. This is often, however, but an evidence of the lack of energy, and general carelessness of the city government and citizens generally, and further investigation will disclose the fact that infectious diseases are not quarantined, that kitchen sinks open into the street, and that the well and privy are near neighbors.

CARE OF A PATIENT.

1. Isolate as far as possible and prohibit those nursing from in any way attending to other household duties, especially about the kitchen.

2. Keep the room screened from flies, or if this is impossible, keep the patient's bed covered with mosquito netting. The urine and bowel discharges must be guarded against flies.

3. Receive the urine and bowel discharges directly into one of the following solutions allowing them to remain in the solution after thorough stirring with stick, for at least one hour:

(1) Chloride of lime (best quality).....6 ounces
Water .....1 gallon

Use one quart for each discharge from the patient. Discharges from the mouth or throat should also be received in this solution:

(2) Corrosive sublimate .....2 drams
Muriate of ammonia.....2 drams
Water .....1 gallon

This must be dissolved in wooden bucket or earthen crock and used as No. 1. It has the advantage of being odorless.

4. Immerse all soiled linen or clothes that come in contact with the patient in sufficient amount of solution No. 2, and allow to remain for at least six hours before laundrying. Or the soiled linen may be placed directly into a wash-boiler containing water and thoroughly boiled for one hour.

5. The hands of the nurse should be disinfected in solution No. 2 whenever soiled.

6. Direct that all water and milk used by all in the household be boiled, unless absolutely sure the infection came from some other source.

7. Compel disinfection of urine and bowel discharges during convalescence.

8. Discover, if possible, the source of the contagion; warn others of the danger of infection; report promptly to your local health officer, who is thereby able to take such precautionary measures for the community as is demanded.

SEWAGE DISPOSAL.

BY CHARLES FRANCIS, C. E.

Paper read at the Conference of the State and Local Boards of Health, Des Moines, November, 1907.

The great end and aim of State and Municipal Boards of Health should be, and we hope, is, the raising of the standard of health, by the encouragement of healthful and wholesome methods of living.

The importance and real value of a commission having such a motive, if it be lived up to, cannot be told.

The subject is so comprehensive, causes so wide a range, that it is difficult to say where it begins or ends.

Certain specific matters are very properly left to Boards of Health. Epidemics of infectious diseases are left to be dealt with by the Local Board of Health, and this, in the great majority of cases, seems to be all that this Board is willing to do for the public health. The Health Officer being a physician, it logically follows that the healing of the sick and the stamping out of disease *where it appears* is the first and all important question. The prevention of disease by the application of sanitary rules and methods, the study and practice of hygienic principles, the building up of resistance, putting an army of leucocytes into proper fighting trim so that it may, when called upon, successfully resist the invasion of the disease pathogenic germ—these should be first with the Health Officer. It certainly is a most inspiring thing, the knowledge that our greatest physicians are pressing their highest and best thought and deepest study today upon hygienic problems. While the great sanitary questions as to water supply, sewerage, sewage disposal, ventilation of school and public buildings, the proper cleaning of streets and alleys, sanitary plumbing, etc., are generally left to commissions, committees of the council or other boards, the physician is coming to be more and more in evidence in discussing these matters.

Our purpose today is to discuss in quite a general way the disposal of sewage, which is among the most important of all factors in healthy and wholesome methods of living. Perhaps no one subject occupies so large a space in the studies and discussions of practical sanitarians as this. We may omit here the discussion of the disposal of manufacturing wastes, and, as our state is largely devoted to agriculture, the study of the disposal of the wastes incidental to an agricultural community will be most profitable to us.

You all know that the most dangerous pollution of potable water proceeds from domestic sewage.

Here may be found all the pathogenic germs; the death-dealing typhoid bacillus, the terrible Klebs-Loffler—the universal colon—a germ to be reckoned with—the most dreaded bacillus tuberculosis, and many others.

Now the problem before us is how to treat this sewage so that the effluent from whatever system we employ shall be to a great degree harmless when discharged into a stream. We cannot hope to purify sewage wholly, but we may largely free it from its dangerous elements, practically and economically.

The problem is almost wholly a local one, that is local conditions control the proper solution of it.

Generally we may say, that, for the cities and towns of this State, particularly the smaller ones, the system combining the septic tank, so called, and intermittent filters is well adapted to the purification of the sewage for filtration and the action of the anaerobic bacteria in a properly constructed septic tank is most extraordinary in the breaking down of the solids, and in the mysterious hydrolysis, so that a much smaller filtration area is required than where the filters are used without the tank. It is to be understood that the purification of the sewage is almost wholly done by the filters, but without the tank the filters would have to be about seven times as large as where a tank was used.

In practice it is generally considered that the tank capacity should be sufficient to contain one day's (24 hours) discharge of the sewage of a community. This means quite a considerable amount of construction and expense. Thus, for a town of 5,000 inhabitants, say 50 gallons per day for each inhabitant, there would be 250,000 gallons per day to be purified. This would require two tanks each 70 feet long, 16 feet wide and 15 feet deep. For filtration I should prefer to have four filters, each to have a surface area of 700 feet, say 35x20, to be worked intermittently, giving each filter 8 hours of work and 24 hours rest. The construction of these filters must include the under-drains to carry away the effluent. Now with this plant properly constructed and carefully looked out for you would in a short time, that is, after the tank and filters had gotten well to work, have an effluent that would analyze as well as nine-tenths of the water that you consider suitable to drink.

The difficulties and main objections to this system are the first cost and the care and maintenance. While the first cost might not be a very great objection, the expense of daily care and maintenance might be objected to.

A machine to do the work expected of a plant of this kind will not take care of itself. It must be constantly watched and looked out for by competent and faithful men. The tank must be so constructed and placed that the surface of the liquid is maintained at a constant level. It must be so arranged that the sewage enters and leaves the tank below the surface of the liquid. Under these conditions the surface will soon be covered with a thick scum, sometimes two or three inches thick, which gives it the essential anaerobic character. The intermittent dosing of the filters must be very carefully attended to. The theory is that the air follows the sewage down through the sand; the oxygen of the air unites with the nitrogen of the sewage forming nitric acid, which in turn seizes upon the various salts in the sewage, making nitrates and nitrites of these salts—soda, lime, magnesia, etc. We see that this sort of purification plant means some expense and a great deal of care, both justifiable in view of the wonderful results obtained.

I commend the study of the septic tank in connection with the intermittent filters, as an absolute sure method of reducing domestic sewage to potable water; for the experiments at Andover and Lawrence, Mass., have proved beyond a doubt that such results may be accomplished. While it is believed that this is the only method by which sewage may be purified yet, in view of the great first cost of this system as applied to large cities (Mr. Rudolf Hering estimates the cost of a purification plant which would be adequate for the sewage of Chicago would be in the neighborhood of eighteen millions) it might be considered prudent to adopt the method of dilution and then discharging into a stream, as is now done in Chicago. The ultimate intention is to dilute Chicago's sewage with a flow of 10,000 cubic feet of water per second taken from Lake Michigan; that is with about 250 times its bulk of water. This will not remove the bacterial danger that sewage polluted water is sure to contain, but it may be said that by this great dilution the filtration of the water taken from the stream below Chicago's outlet will be possibly a less difficult and expensive matter. Moreover, the cost of the sewage purification is in the same manner divided; Chicago discharging its sewage into the Illinois river, so largely diluted as to be inoffensive at least, and the cities below filtering this water for domestic use.

Personally I am not all in favor of this proposition, as the nuisance will never be less than it is now, and it will grow, and in not so very long a time, to be intolerable.

Then the abatement of this nuisance will be a very serious problem. Better spend eighteen millions now for a proper plant than fifty or a hundred millions by and by.

There may be other methods of treating sewage, but I have yet to learn of any practical degree of purification being accomplished otherwise than by intermittent filtration.

PUBLIC WATER SUPPLY AND SEWERAGE.

BY CHARLES FRANCIS, C. E., DAVENPORT.

These are very important factors in the public health, and it is most unfortunate that, while the value of the water supply is fully recognized the very great importance of sewerage system as a necessary part of the water supply is so little understood or appreciated.

The value of an abundant supply of wholesome water in a community is without measure. This goes without saying. Everybody knows it, and it will not be discussed here.

The general idea of a public water supply, referring now to smaller cities and towns, "or less than 5,000 inhabitants," as the law has it, is this: to drive a well, set up a tank, provide a pump and engine, and distribute the water through the town by pipes, etc., and to charge a rate per thousand gallons, or per tap, bath tub, and sink and so on, sufficient to pay interest on first cost, to provide a sinking fund and to pay for maintenance. This is quite right and proper as far as it goes, but it does not go far enough—it is not a complete plan.

It is a great convenience certainly, to have good wholesome water brought into your house; it means a greater degree of cleanliness, for the ease with which it is had means a larger and more general use of it, and thus its introduction becomes an excellent hygienic measure. But this water so conveniently applied to your premises is used and is changed into sewage in the using and this sewage must be taken away from your premises just as thoroughly and effectively and with just as much pains and care as were used in introducing the water. Now the question is what is to be done with this sewage? It cannot, or should not, be thrown into the street or alley, nor should it be allowed to drain away to low grounds. Again, those most common of all pretenses of disposing of sewage, known as leeching cesspools, should not be thought of for a moment, for they are simply pestiferous abominations, which act well for a short time and then become very dangerous nuisances.

The only way by which sewage can be properly removed from premises, dwellings and the like is by a properly constructed sewerage system with its purifying plant at its outlet; and correlative to this we may say with absolute certainty that the sewerage system is a very important part of the water system; just as important a part of it, in fact, as the well is, or the pump, or the water pipes and connections.

Formerly cities and towns of less than 5,000 inhabitants were allowed by law (vid. Code Secs. 738-739, P. 307) to assess abutting property for the purpose of sewerage construction. The Thirtieth General Assembly repealed this law (30 G. A., Chap. 26, Sec. 1, P. 19). The Thirty-second General Assembly passed a law allowing cities and towns of less than 5,000 inhabitants to tax for sewer outlets and purifying plants. (Thirty-second General Assembly, Chapter 41, P. 31.)

Now, with this last enactment in force, the construction of sewers in small cities and towns is fully provided for, if it becomes established (it certainly is a fact), that the sewerage system is a part of the public water supply.

Thus: a small city or town having determined to establish a public water supply, should, as a part of the engineering of this project, have an estimate made of the approximate cost of an adequate sewerage system, and the money value of the water plant should include the cost of the sewerage system, and the water rate established on the basis of the whole cost.

When the sewerage system is fully paid for, say in fifteen years, the water rate may be reduced, so as to include only the maintenance of the sewerage system. But in any extension of the water system, the water rate should include the cost of the sewer extension, which rate should be maintained only until the sewer extension is paid for.

It would seem that this would be a simple, feasible and by no means burdensome solution of the problem of sewering small cities and towns. Chapter 41 of the Laws of the Thirty-second General Assembly, authorized cities of the second class to levy annually a tax not exceeding three mills on the dollar to be used solely for the purpose of constructing outlets and purifying plants for sewers, and while there may be some difficulty in some cases, in deciding just where the sewer outlet begins, and the sewer-

age system ends, yet it is believed that this will not prove to be an insurmountable obstacle.

There can be no doubt that some means should be provided by which small cities and towns may construct a general sewerage system. It is imperatively demanded in those cities of the second class which have or contemplate having a public water supply. One solution of the problem is presented here. It would be well to have this matter fully discussed, by which discussion some remedy, if not the one herein suggested, then some other may be found, by which the smaller cities and towns may be properly sewered, and be allowed to apply proper sanitary and hygienic methods in their communities.

The above article was read before the Iowa State Board of Health at the meeting of August 23d, and on motion the secretary was instructed to consult the attorney-general relative to the legal points involved.

The board fully realizes the deplorable condition of many of our smaller towns, owing to the lack of sewerage facilities, and if no legal obstacles intervene the method outlined by Colonel Francis offers the best solution of ths vexed problem.

DANGER FROM USE OF IMPURE ICE.

As ice and iced drinks are so much in demand, it is important that we should know that its direct consumption may occasionally be the cause of disease.

The number of bacteria in ice varies from a few to 10,000 or more per cubic centimeter, depending upon the source of supply and the length of time that it has been in a frozen condition. Ice obtained from large quiet bodies of water as lakes or ponds contain less bacteria and other impurities than that obtained from running streams or small ponds where the entire body of water becomes frozen. The surface layer of ice, especially if it is "snow-ice" containing air bubbles or visible impurities contains more bacteria than the clearer portions. In quiet bodies of water, the mere process of freezing leads to a "self-purification"—by eliminating about 90 per cent of the bacteria of the water with other organic and inorganic substances. In running streams, however, the degree of purification is much less. Although a few bacteria can multiply at a freezing temperature; there is no multiplication in ice; on the other hand many are soon destroyed. Thus it has been found by experiment that about 50 per cent of typhoid bacilli are destroyed at the end of the first week; 90 per cent in two weeks; 99 per cent in four weeks; that only a very few remain alive for three or four months and that all are destroyed in six months.

It will thus be seen that there is very little danger from the use of ice, especially if it has been stored for five or six months. Nevertheless, it occasionally happens that cases and sometimes epidemics of typhoid fever are traced to the ice supply; once in a while also some other disturbance of the gastro-intestinal canal is traceable to the use of ice.

Ice should be made from the purest water obtainable. This is especially true of artificial ice, which is usually stored but for a short time or not at all. Ice should not be placed directly in water or on food unless it is absolutely certain that the water from which it was made was pure and safe for drinking purposes.

SANITARY WATER ANALYSIS AND WATER PURIFICATION.

BY C. N. KINNEY, B. S., CHEMIST TO THE STATE BOARD OF HEALTH.

In discussing this subject it is not my intention to present anything new concerning sanitary water analysis, but to give a practical treatise that should be helpful to those responsible for the health and prosperity of the communities they represent.

THE OBJECTS OF A SANITARY ANALYSIS OF WATER.

It has been demonstrated that water furnishes a *source* of disease when polluted, and as population increases, this chance for pollution is more frequent especially in small towns where there is an inadequate disposal of sewage and refuse.

Water is unfit for drinking purpose when contaminated with such germs or substances as either produce disease or are detrimental to health. The effect on the human organism of water loaded with organic matter, not sewage, is beginning to be better understood, and now that larger supplies per capita are demanded, city water companies are put to the test.

When city plants were established years ago, the small supply needed could be obtained probably pure, but as pollution increased, more sewage and refuse was dumped near the plant, residences and factories encroached upon the drainage area, new wells were dug, the pumps were worked harder to furnish the needed water, and the impure water had less time to purify than formerly.

For the above reasons and many others that could be cited, it is highly important that the public water supply and its purity be carefully guarded, even more so than foods and drugs, as the consequences attendant upon the consumption of impure water are far more numerous and vital to the public health. This fact is coming to be more and more realized in the middle west as population increases.

Primarily the most dangerous thing in a potable water is human sewage, which, if from diseased persons, may contain disease-bearing germs and is therefore very likely to reproduce the disease in other persons drinking such polluted water, thus spreading such disease broadcast in the community. One may perhaps drink water charged with human sewage without disease-bearing germs and not become sick. But water thus contaminated will debilitate and run down the vitality of the person. Such water will also furnish a splendid medium or culture bed for the development of micro-organisms. The fermentation produced by disease-bearing germs may cause stomach troubles, diarrhoea,

indigestion, etc., especially during the summer months. The conditions may arise from contamination by human sewage, from barnyards and creamery wastes or any other easily fermentable organic matter. Water so contaminated is deleterious to health, especially so for children and persons of weak vitality.

As before stated, the condition most dangerous and most dreaded in water is the presence of disease-bearing germs, and as such germs only come from an infected patient, they must get into the water by means of sewage. Water thus contaminated should be condemned at once.

It is true that a water may receive sewage and not contain disease-bearing germs, and such sewage may be heavily loaded with germs one week and contain none the next. If one could be absolutely sure that the sewage gaining access to the water regularly contained no disease-bearing germs, it would not be so dangerous to use, but this is impossible, to know. If one had some means of proving these germs present or absent and could make the test every few hours or days or weeks, we could better afford to allow sewage to gain access to the water, but this is also impossible.

The presence or absence of disease-bearing germs in a water is not the important or vital thing to a water analyst as many suppose. The germs of disease common to water, such as typhoid, etc., are in practice absolutely impossible to find or detect in a water supply.

Dr. Karl F. Kellerman, of the Bureau of Plant Industry and Water Purification of the U. S. Department of Agriculture, says:

"Practically speaking, therefore, typhoid bacteria cannot be accurately determined by any known method. In water badly polluted, even when you are certain they are present, it is practically impossible to prove them present." Dr. M. J. Rosenau, Director of the Hygenic Laboratory, Public Health and Marine Hospital Service, Washington, D. C., says: "'It would be like searching for a needle in a haystack on account of the great dilution in which these organisms appear." Which means, they are practically impossible to find. The same statement is given by Dr. Jordan, Dr. Russel, and others of our leading Bacteriologists.

Laws and Andrews in their report to the London City Council say, that the chance of discovering typhoid even in sewage is exceedingly small. They are entirely unable to find it in the sewage of London.

Out of the whole series of samples direct from the raw sewage of Eastern Hospital (Humeston) where there were forty cases of typhoid, they were unable to get but two colonies of which they were at all sure.

Mason says, "The search for the typhoid germ in water is becoming very unusual." Dr. W. H. Welch says, "We possess no satisfactory method for the determination of typhoid bacilli in water."

Being true then that a bacteriological examination cannot prove the presence or absence of typhoid bacteria in water that is known to be contaminated and to contain these germs, it is useless to look for them in any water, and no competent bacteriologist will attempt it.

For the analyst therefore to determine if a water is clean and fit to drink, he must ascertain the character and kind of pollution; or if there are other objectionable constituents in the water that would make it deleterious or dangerous to use. Even if there were no disease germs

in the sewage contaminated water, it should not be used without purification for the reason before given; also from an asthetic standpoint, it is revolting to think of using water contaminated with human sewage.

Many people, especially physicians, send small bottles of water and ask to have the water analyzed for typhoid germs. Obviously this is an impossibility. What they really need to know is, whether the water contains sewage, and is therefore liable to receive or contain typhoid or other form of disease-bearing germs. If the water contains sewage it should be condemned at once, whether it bears typhoid germs or not; they might be present today and absent tomorrow, or absent today and present tomorrow. And no one knows or can prove whether they are present or whether they are absent. Even if an epidemic of typhoid should break out, we should not expect to find the germs of typhoid in the water, because their period of incubation would probably be past. If the analysis of the water used by a family affected with typhoid indicates sewage contamination, it is presumed that this is the source of the disease. Of course typhoid may be carried by other means, milk, vegetables, etc., but not so likely as by water.

Another prevalent idea is that if the water is clear, colorless, and tastes well it is good water, when in fact the reverse may be true and the water be in reality one of the most polluted in the country.

The above properties are no criterion whatever as to the potability of a water.

Another false notion is, that if a water comes from a deep source it must be good for it could not be contaminated. Of course this is usually true, but not necessarily so. That water is purified by passing through many layers of soil or rock, depends upon the kind and character of the soil through which it passes. Many instances are on record where water has percolated through thousands of feet of strata and come out again still badly polluted and carrying disease-bearing germs through this great distance. The character of the strata and rate of flow determine the purification, and not the distance through which it flows. It is not the suspended matter visible to the naked eye that is most objectionable, but that part of the organic matter not readily discernable, or which is entirely in solution in the water, that causes the trouble.

Water purifies itself by means of oxidation, which may be caused or aided by certain kinds of bacteria. Certain organisms form a covering over sand grains in filter beds or soil, and as the polluted water percolates through and comes in contact with these bacteria, they feed on the organic matter in solution in the water and thus take up the organic matter or cause or aid its oxidation. It is therefore true that a water to be purified must pass through or over loose, porous soil where air can gain access. Sands, gravelly or light soils are best adapted to purify water as being most easily aireated. But they must not be too open so as to form channels where the water can pass through without contact with the bacteria-covered sand. In this region where blue clay abounds, the reverse conditions are often seen. Water could pass through miles of such material and stand for ages in such strata without purification. Why? Because the conditions are such that it cannot purify. It contains no oxygen and cannot get any or at least too slowly to affect it to any degree.

Organic matter has been laying in this blue clay for ages, or ever since the strata was deposited and still it does not decay. Is there then any wonder that water would not purify when coming from such a source? Waters from coal measures are likely to show the same conditions.

Another mistaken notion regarding a sanitary analysis is, that an analyst should be able to tell if a water is polluted without knowing whether the water is from deep or shallow wells, in coal measures, blue clay beds, ponds or what not.

If a knowledge of how an analysis is made was better known, it could be seen at once that it is necessary to know the source of a water, before a correct interpretation of the results of an analysis could be given. There is as much or more in the proper interpretation of an analysis as there is in the analysis itself. For instance, a water high in organic matter shows one of three things or all.

First, such water comes from surface wells not in contact with blue clay beds which would then indicate pollution. Second, it may come from organic matter found in deep wells in the vicinity of coal beds, or third, from blue clay strata.

In the last instance where the water is from coal measures or blue clay beds, the high organic matter found in the water, by the analysis, does not therefore mean pollution by sewage or easily fermentable matter. To prove the difference in this case as to whether the water is from a deep source or a shallow well, the count of the number of bacteria will show very few, if any, if from a deep well and probably very high if from a shallow well. But this condition is modified by standing in reservoirs. Also, if the chlorides run very high in an analysis it indicates either sewage pollution or water from a deep well, where more or less chlorides have been extracted from the soil or rock in contact with the water. Here usually the phosphates run the reverse of the chlorides and also usually the nitrates. The process chemically being usually the reverse in deep water than in shallow water, high for pollution and low for deep waters.

As a matter of justice, the analyst has a right to withhold conclusions as to the character of the water until all data is in his hands. Then he can discuss the analysis intelligently and be able to determine the character of the water. It is a mistaken idea that a better analysis of the water is had if the analyst does not know the source of the water. All determinations are made in duplicate and usually several analyses run at once, without knowing at the time which belongs to which. The record is then made up complete before the analyst sits down to look over the figures given by the analysis and the data furnished by the collector of the sample. It is from this combined summary that conclusions are made.

Of course there is no objection whatever by the analyst if for any reason the party sending the sample does not wish the source to be known. But in this case he should not expect the analyst to discuss the analysis or to draw conclusions. Whenever such data is not sent, the analyst should be told that the analysis only is desired and no interpretation needed. This would then be perfectly fair and satisfactory to the analyst.

In most instances the analysis only, in the hands of persons not familiar with water analysis, would mean little. The interpretation of the results is the difficult part and where the greatest skill is necessary. And, believing that most persons sending samples desire to know if the water is good and safe to use and above suspicion, I have tried to help out as best I could with suggestions or advice as to what to do in such cases, and if the analysis looks suspicious I request full data concerning the source of supply. Then with full data received usually a definite and correct conclusion can be given as to the character of the water.

One of the most troublesome things in the water supply of our State is the growth of micro-organisms, generally spoken of as Algae or water moss. Micro-organisms are low forms of life and may belong to either the animal or vegetable kingdom. They grow abundantly in waters that are rich in organic matter, or in some cases where there is the addition of considerable mineral salts in solution in the water.

Algae in its strictest sense is a flowerless plant of simple cellular structure, without mycelia, roots, stems or leaves. They contain true chlorophyl, starch grains, a nucleus, and often a cellulose cell wall. These are classed under the head of the Chlorophyceae. There are other nearly related forms known as the Diatomaceae, which were at one time classed with the animal kingdom, later as plants and as Algae, and now generally in a class by themselves. They often possess power of movement, have silicious walls, the markings on which are often of great beauty. This group generally inhabit lakes and ponds and shallow wells or reservoirs. They require light, but not too strong. They contain a substance similar to Chlorphyl, Diatomin, which is brown in color, and for this reason are often called "brown Algae." As this Diatomin often acts like Chlorophyl, these organisms can assimilate food material, a prominent form of which is the Osterionella.

Still another class, called the Schizophyceae, of which one sub-division is known as the Cynophyceae, have forms known as the "blue green algae," which give a peculiar odor to water which they inhabit. They contain chlorophyl with coloring matter (Cyanophyl, Phycocyamine, Phycoxanthine, etc.), are found in all colors and abound in lakes and ponds. The second subdivision of the Schizophyceae are the Schizomyeates. They contain no chlorophyl, but a coloring matter known as Phycocyan, or Phycochrome, which may act as chlorophyl. They propagate by cell division, have a firm cell wall but no nucleus. Of this class the most prominent is Crenothix, probably the most abundant in our water supplies of any form. The Crenothix are colorless, grow most abundantly in the dark, and especially in water rich in organic matter and iron salts, which iron collects and is deposited as Ferric oxide or hydrate in the gelatinous sheath with which the organism is coated. This form flourishes most abundantly in ground waters rich in organic matter and iron salts. This form often grows so abundantly as to close up entirely small pipes through which the water is fed, and is very troublesome. It often gives odor and taste to the water, and, if suddenly disturbed, will often make the water very turbid and brown. The water is then made unsightly, has odor and taste and tends to stomach disorders, and in this condition should not be used.

According to Whipple, there are some one hundred and eighty-six genera recorded, one hundred and eight plant and seventy-eight animal. Eighteen only are common; thirteen plant and five animal. A few others are occasionally seen.

It is, however, the above mentioned organisms, generally spoken of as algae, that are causing considerable trouble and some concern, and in some places even menacing the existence of the water system.

These organisms grow, as has been said, abundantly in water rich in organic matter and mineral salts. It is a fact that our State, with its black prairie soil full of human matter, as well as mineral salts, furnishes a fine field for this aquatic growth. Just as the land plants grow more luxuriantly in such soil, so also the water plants have more food material in water passing through this soil and grow consequently more abundantly therein. While this is true, a water that is fed a larger supply of food material in the form of sewage will grow correspondingly greater plant life, as a fertilized field is seen to grow more abundantly.

This being true, when in a water the algae life is very vigorous and abundant it is indicative of pollution, or an extra supply of food material.

Waters from deep wells do not have much microscopic life, unless stored in unclean reservoirs, where they really become surface waters and grow micro-organisms very abundantly, as they usually contain a large amount of food material. The study of the micro-organisms of a water therefore aid very much in determining the character of the water. This algae does not produce disease in persons drinking water in which they occur in moderate numbers. But they furnish food for bacteria, animal life and the fungi to feed upon and multiply, thus tending to cause indigestion, diarrhoea, stomach troubles, etc. But when they are abundant, often fifty thousand to the cubic centimeter, they may cause the water to become unsightly and to have a disagreeable taste and odor, and, of course, the above effects multiplied.

Fortunately, through the able works of Dr. Moore, of the Bureau of Plant Physiology, Department of Agriculture, a method of combating this pest has been found. Dilute solutions of Copper Sulphate were found to be toxic to algae, as well as disease germs. One part to one million (1,000,000) parts of water being found usually sufficient to kill all algae in a short time. To use this material, which is possibly poisonous in large doses to the human organism, a knowledge of the mineral constituents of a water must be known. Properly handled, there is no danger whatever in its use. The water must be made alkaline, if not already so, before application. This renders the copper insoluble, which clings to and kills all algae life, bacteria, etc., and carries them down to the bottom of the reservoir with all suspended matter, leaving the water clean and free from algae, and with very few bacteria left and no copper. Copper is also very highly toxic to pathogenic bacteria—the most virulent forms of typhoid and cholera are killed in three hours by a solution of one part to 500,000 parts of water. Mosquito larvae and the low animal organisms are also quite susceptible to its action, although less so than the vegetable life. Copper is so toxic to some forms of vegetable life that inconceivable small amounts will kill. For example, Dr. Bain found

that one part of copper to 25,000,000 parts of water was fatal to apple seedlings in one day, while one part of copper to 700,000,000 parts of water will seriously affect them if applied to the roots.

Copper medicinally acts like silver and zinc on the human organism, which is not very toxic, and, as the amount used to purify water is so small, a person will have to drink twenty quarts a day to get an amount he could even taste, while fifty quarts per day would have to be drunk to reach even a medicinal dose of copper. Then, too, it must be remembered that it is expected that all copper in solution is precipitated by the alkaline water before it gets to the consumer, so that there is no danger in its use. Also that this treatment requires but a few hours and only a few applications per season, so that there can be no objection to it. We have tried the process frequently and have used it in a number of water supplies with entire satisfaction.

Of late years chemical purification plants are being added to water supplies affected with objectionable numbers and kinds of bacteria or algae, and are found to be successful, not only in removing the bacteria and algae life, but waters that are very hard can at the same time by the same process be softened. The process is not expensive and does not require experts to maintain efficiency.

The effect of storing ground or deep waters in open or closed reservoirs where air can gain access, or the storing of surface waters, is of great interest. Surface waters collected in ponds, lakes or reservoirs become stagnant if organic matter gains access or the ground is swampy. The depth does not affect this stagnation, more than the change in temperature of the shallow body or winds may affect the character of the organic life. The dead organic matter collecting at the bottom soon becomes stagnant for want of air, and remains thus until a change in temperature affects the density of the surface water, causing it to sink and the bottom layers to rise.

The bottom layers of water in a pond should be drained off at inervals and allowed to go to waste during the period of stagnation, in the same manner that a room is ventilated. Deep-seated waters, when stored in tanks or reservoirs, may quickly become very bad, as they are usually very rich in mineral food material and in contact with the air and light are really in condition of surface water, and for this reason are usually worse than shallow waters. Their increased iron, hardness and other mineral contents, usually high, make them less desirable for boiler purposes and general industrial use, as well as for potable purposes. Waters from deep wells should be invariably stored in the dark. To boil water is not satisfactory because so often imperfectly done, and the trouble and expense necessary to do the work, and also it makes the water less palatable, due to the driving out of its dissolved gases. In boiling the killing of the harmless bacteria, as well as the pathogenic forms, many believe to be detrimental. Also distilled water is, in my judgment, not the best when made from water containing considerable organic matter, or from many deep waters, as it is usually quite alkaline, due to free ammonia.

I want to give you the water formula of Dr. George Whipple, from his

little book, just off the press, entitled "The Value of Pure Water," and this leads me to answer the question, What is pure water? Most of our cities and towns which contract with water companies call for *pure and wholesome water*. Do we get from the companies what their contract or franchise calls for?

A pure and wholesome water is a water that contains no disease-bearing germs or sewer contamination, or that does not contain large amounts of easily fermentable organic matter from any source; that contains no deleterious or poisonous mineral constituents or excessive amounts of any mineral salt. The water must be clear and colorless, without objectionable taste or odor, and must be of a suitable temperature.

The following formula has been developed by Dr. Whipple, by which a fair estimate of the value of city water can be obtained, as follows:

If a water is impure or defective in any one or more of the above given conditions for a pure water as cited in the definition, the following formula can be applied and the relative value of the water furnished can be compared with a pure water. If the water furnished a city is hard it is not as good as soft water, and should not cost the consumer as much as pure water. Just how much less the value of such hard water is, the formula will give. The same depreciation in value of a water which is subject to typhoid can be determined. Also other defects, as color, odor, turbidity, etc., as follows:

Value depreciation in Dollars of a water supply due to impurities—

(1) Typhoid Formula, $D = 2.75\ (T-N)$
D = Dollars, T = Typhoid death rate per 100,000 per your town.
N = Normal Typhoid death rate, (estimated at 20 per 100,000).

Thus for example the average Typhoid death rate for the United States is thirty-five per 100,000. Then substituting in the formula we have the depreciation in value of $D = 2.75\ (35-20)$, this gives us $41.25 per million gallons as the depreciation in value of such a water, or about $15,000 per year for 1,000,000-gallon per day plant.

(2) Hardness formula: $D = H/2$, where H = the hardness of the water.

(3) Temperature formula: $D = \frac{(d-45)^2}{180}$ where d = average temperature during four warmest months.

(4) Physical characteristics: $D = 20\ \frac{Pe - Pt - Po}{10}$

where Pe = per cent of people who object to color.
where Pt = per cent of people who object to turbidity.
where Po = per cent of people who object to odor.

These formulas are arbitrary and may not be exactly correct, but they serve as a guide in arriving at some valuable conclusions as to the money value of a water supply. I can see no reason why people should not pay for water the same as for any other commodity, i. e., according to the quality. If a water is poor in some respects, people should not have to pay as much for it as they should for a pure water.

If persons in authority in cities and towns should insist on lower water rates for an inferior grade, the water companies would soon be looking for means to remove the objectionable features in their water supply. This would very quickly result in a much higher grade of water furnished. In addition a more careful and frequent testing and inspection of water supplies would follow, with the obvious result of saving many lives annually and the conserving of public health.

MEAT INFECTION.

BY J. H. KELLOGG, M. D., BATTLE CREEK, MICH.

Everybody knows that by eating raw beef or pork one may acquire a tape-worm, or a number of tape-worms, and that in eating raw pork one runs the same risk of contracting that incurable malady, trichiniasis. Those who dread tape-worm and trichinae abjure raw beef and pork.

I will not speak further of these well-known and widely spread infections, but of a newly discovered form of infection which involves all forms of meat, fish, flesh and fowl, cooked as well as uncooked. This form of infection is not due to animal parasites, but is a germ of infection, and one to which every meat-eater is exposed. Everyone is familiar with the readiness with which meats of all kinds, and particularly fish, oysters and other so-called "sea food," undergo putrefaction. The process of decay begins within an hour or two after death, under the influence of putrefactive bacteria which are always present in the colon of animals, upon their skin and in the atmosphere about them. These germs increase with incalculable rapidity in dead flesh, the food in which they naturally thrive the most luxuriantly. They are on this account always present in every morsel of fresh meat eaten. Ordinary cooking does not destroy them. They are very well able to withstand the ordinary cooking temperatures. Salt and smoked fish and other meats present these germs in vast multitudes. "Prime beef" and "game" are so far advanced in decay that every minute particle of such meats is fairly alive with swarming germs.

When swallowed into the stomach, the germs are in part destroyed, but many of them escape destruction by the action of the gastric juice, and, finding their way down into the colon, they continue to grow and develop there in the mucus which covers the intestinal wall, and thus maintain a constant and active putrefactive process in this part of the intestine.

These germs of decay are unquestionably one of the most potent causes of many, if not most, chronic maladies, and especially of that most common of diseases, intestinal autointoxication.

As evidence of the truth of the above statements, I present the following results of a carefully conducted series of observations made at the writer's request by Dr. A. W. Nelson, bacteriologist of the clinical laboratory of the Battle Creek Sanitarium.

Various specimens of meat were purchased in the ordinary way in the market, wrapped in clean paper and brought immediately to the laboratory, where cultures were taken at once. The meat was then taken

to the diet kitchen and cooked (well done), after which cultures were again made.

The following table shows the number of bacteria per gram of moist material before and after cooking:

Specimen	Material	Bacteria Per Gram (Moist)	
		Aerobes	Anaerobes
No. 1.	Beef, raw	105,000	90,000
	Beef, fried, outside	none	none
	Beef, fried, inside	3,000	2,000
No. 2.	Beef, raw	104,000	80,000
	Beef, broiled, outside	1,000	none
	Beef, broiled, inside	125,000	18,000
No. 3.	Beef, raw	110,000	14,000
	Beef, boiled, outside	none	none
	Beef, boiled, inside	5,000	3,000
No. 4.	Beef, raw	80,000	40,000
	Beef, roasted, outside	35,000	90,000
	Beef, roasted, inside	150,000	160,000
No. 5.	Codfish (soaked to remove salt), raw	30,800,000	47,600,000
No. 6.	Fish, fresh, raw	960,000	870,000
No. 7.	Sardines (in oil)	16,800,000	14,000,000

In another experiment, specimens of meat were secured, as served on the dining tables of one of the prominent city hotels, and taken at once to the laboratory, where without delay bacterial cultures were made. The following table shows the number of bacteria per gram of moist material:

Specimen	Material	Bacteria Per Gram (Moist)	
		Aerobes	Anaerobes
No. 8....	Sirloin steak	280,400,000	378,000,000
No. 9....	Tenderloin (well done)	11,200,000	25,200,000
No. 10....	Tenderloion (rare)	84,000,000	168,000,000

In the next experimental study, two young chickens of equal size were purchased in the market, one (Specimen No. 11) drawn, the other (Specimen No. 12) undrawn. Both were placed under the same conditions in a room at 70 degrees F. Bacterial cultures were made at frequent intervals, with the results given in the following table, the figures showing the number of bacteria per gram of moist material:

Hours	No. 11, Drawn		No. 12, Not Drawn	
	Aerobes	Anaerobes	Aerobes	Anaerobes
3 hours after death	4,500	5,650	5,000	6,500
2nd day	8,500	9,000	10,000	12,000
3rd day	17,000	16,000	60,000	20,000

Specimens of several kinds of meat were purchased in the market, and at once taken to the laboratory for study. Cultures were made immediately on reaching the laboratory, and again after the meat had been allowed to stand (covered) at room temperature for twenty hours. The following table shows the results of the bacterial counts:

Specimen	Material	Bacteria Per Gram (Moist)			
		Immediately after purchase		After being kept at room temperature for 20 hrs.	
		Aerobes	Anaerobes	Aerobes	Anaerobes
No. 13.	Large sausage	560,000,000	420,000,000	770,000,000	490,000,000
No. 14.	Small sausage	854,400,000	663,000,000	770,000,000	640,400,000
No. 15.	Round steak	420,000,000	560,000,000	750,000,000	840,000,000
No. 16.	Roast beef	252,000,000	560,000,000	728,000,000	750,000,000
No. 17.	Smoked ham	47,320,000	43,120,000	616,000,000	750,000,000
No. 18.	Hamburger steak	128,000,000	129,000,000	784,000,000	700,000,000
No. 19.	Pork	635,600,000	126,040,000	952,000,000	1,680,000,000
No. 20.	Porterhouse steak	31,920,000	30,800,000	336,000,000	700,000,000

Of course in the winter time, through the diminished amount of dust in the air, air germs are less abundant. On this account, and because of the generally low temperature, specimens of meat may be obtained in winter which are comparatively free from germs; but in the summer time meat is practically always swarming with bacteria. Even in the winter time certain meat products abound in germs. For example, a specimen of raw liver obtained in January was found to contain 8,400,000 aerobes and 1,120,000 anaerobes per gram of moist material, or 269,800,000 bacteria per ounce.

Of the two classes of germs named, the aerobes are for the most part acid-forming germs. But this cannot be said of the anaerobes. These organisms are poison-forming germs. They are the agents of putrefaction and of various germ diseases. A food which introduces these deadly organisms at the rate of ten to twenty-five billions to the ounce, as do pork, beef and sausage, must certainly be classed as unclean, and fit only for the compost heap. Only a turkey-buzzard or a hyena could thrive on such a diet. When thousands are daily indulging themselves in this carrion dietary, what wonder that Bright's disease, enteritis and other maladies due to germs and germ poisons are so rife and so rapidly increasing?

It is quite as important to keep the inside of the body in a sweet, clean and wholesome condition as to maintain a wholesome state of the external.

These facts are well worth considering.

MUNICIPAL INSPECTION OF MEATS AND DAIRY PRODUCTS.

BY LOUIS A. THOMAS, M. D.

Pure food and inspection of articles and places for their preparation or manufacture is an important branch of sanitary science, and properly belongs to the department authorized and organized to safeguard the public health. The law enacted by the Thirty-first General Assembly should be looked upon simply as a beginning. The provisions of the present law fail to compass the most important features of the subject in that it deals with the chemical and quantative aspect of the question to the exclusion of the sanitary features.

While it is not our intention to underestimate the serious consequences sometimes resulting from the use of adulterated articles of food, or the need for stringent prohibitive regulations, we contend that this is an evil of but small proportions when compared to the loathsome and disgusting conditions pertaining to the preparation and quality of the meat and milk supply, and that far more disastrous results are produced through consumption of diseased or contaminated animal commodities than from chemical adulterations.

The Federal meat inspection law now being rigidly enforced at all packing houses engaged in foreign or interstate commerce, if unsupported by State or local restrictions may prove a boomerang loaded with destruction to the very communities raising and supplying the choicest live stock in the world. Since the new Federal regulations have been put in force the cattle buyers at all of the large centers of the packing industry have refused to pay for cattle until after slaughter and inspection by the Government Inspectors. If the carcass is declared by these officials to be diseased or otherwise unfit for consumption as food, it is sent to the rendering tank to be manufactured into fertilizer, and the shipper is required to stand the loss. As a result, there is now a large decrease in the receipts of so-called "canners" at the various stock yards, local shippers finding it more profitable to dispose of these to the local butcher at home. Hence, the people of Iowa, who by rights are entitled to the best and choicest of meats, are compelled to live upon the carcasses of old worn-out cows, unthrifty calves, cattle and hogs in advanced stages of tuberculosis, and occasionally a choice steak from a fat steer suffering with actinomycosis (lump jaw).

Perhaps some may think this overdrawn; if so, they should investigate as to the class of cattle and hogs purchased by the local butcher, and then visit the local slaughter houses of almost any town in the State. The repulsive conditions to be seen in most of these institutions would, if known, arouse the indignation of the whole community. Many of the butcher shops present a tolerably clean appearance to the customer, and the supply of meats on hand may be carefully arranged to meet the eye

of the fastidious housekeeper. But go behind the scenes into the "green room"; investigate the cooling room and cellar, then question the employes as to their personal freedom from diseases such as tuberculosis, gonorrhea and syphilis. Some butchers are more careful than others, but they are the exception rather than the rule. Nothing can be more loathsome and revolting to the senses of decent people than the thought of eating food handled and probably contaminated by these and other agencies, and yet the carelessness exhibited by many employers of this class of labor is indicative of the danger, and personal observation furnishes ample evidence that these conditions exist to an alarming extent.

There is indeed urgent need for general inspection of all animal products, of the places where such articles are prepared and kept for sale, and of the persons employed in handling them. Such inspection, to be reliable and complete, must extend to the very door of the actual consumer, and should include butcher shops, slaughter houses, bakeries, dairies, hotels and restaurants; likewise all persons employed in these establishments should be required to produce satisfactory evidence that they are free from tuberculosis, syphilis and other communicable diseases.

Under Section 2568 of the Code, Local Boards of Health are clothed with authority to "make such regulations as are necessary for the protection of the public health respecting nuisances, sources of filth, causes of sickness, rabid animals and quarantine, not in conflict with any regulations of the State Board of Health." The conditions referred to are a serious menace to public health, therefore it would seem that Local Boards have the authority to make and enforce such regulations as will protect the public within their jurisdiction.

The various municipalities should provide for a local system of food inspection and the licensing of dairies and slaughter houses. Stringent regulations should be adopted requiring that all cows used for dairy purposes shall be submitted to the tuberculin test, and that the meat of slaughtered animals be inspected under a system similar to that adopted by the Federal government. When possible a competent veterinarian should be appointed as inspector. Private slaughter houses should be abolished and in lieu thereof each municipality erect and maintain a sanitary building properly equipped with modern conveniences so arranged that each local butcher can be accommodated with a separate slaughter room at nominal rental. The regulations should prescribe that all animals, the meat of which is to be used for human food, shall be slaughtered and inspected in the local abattoir, or in establishments under Federal inspection.

Regulations defining the sanitary arrangement and inspection of dairies should likewise be adopted and properly enforced. The Local Board of Health should also require that all persons engaged in the handling, manufacture or preparation of meat and dairy commodities should produce satisfactory evidence that they are free from tuberculosis, syphilis and other communicable diseases. Iowa, with its rich agricultural interests, can afford to use the best and choicest of these commodities at home, and the people have the right to demand that the refuse is no longer dumped on the local markets.

TO AUGMENT HEALTH, WEALTH AND HAPPINESS.

BY BURTON ROGERS, D. V. M.

The Iowa Experiment Station at Ames recently tested a herd of cattle for tuberculosis with tuberculin. Those reacting and thus considered tuberculous were placed in a separate lot, and those not reacting and therefore considered as free from tuberculosis were placed in another pen. Then twenty-six healthy pigs were put in each pen with the cattle. A few months later, when the hogs were mature, they were sent to market for slaughter and carefully followed to the government inspector.

Twenty-one of the hogs that had associated with the tuberculin reacting cattle were found to be tuberculous, while *none* of the others were diseased.

Not only did the *tuberculin*, but so did the *hogs* test the cattle.

While a Federal Veterinary Inspector in 1904, the writer instituted an experiment in an Iowa packing house, and which has been continued since, namely, of tagging all the hogs bought direct from the farmers. Recently the State Veterinarian ordered the cattle to be tested on fifteen of the farms from which tuberculous hogs came, and in every instance tuberculin reacting tuberculous cattle were found.

Again, the tuberculin and the tuberculous hogs paralleled in testing the cattle.

During the fiscal year 1907 the five million farmers of this country marketed 31,815,900 hogs that were slaughtered and United States inspected. 430,177 of these were found to be tuberculous, 65,618 being badly enough diseased to be unfit for food. These 430,177 tuberculous hogs automatically tested dangerous tuberculous cattle and other products of the farms from which they came. Those *products* vitally concern the people of this Nation. However, the test was not complete for the reason that through the consecutive channels of trade, viz., from farmer to local hog buyer—to stock trains and Union Stock Yards—to speculators and packers—their identity was lost by the time they reached the inspector and were found to be tuberculous.

We are short-sighted, indeed, if we do not realize that the simplification of this perplexing problem, in the West at least, is to require that all animals entering the channels of trade, for a limited time, be tagged with tags that will remain until the animals have been inspected. These are the farms that need immediate attention; the vast majority of the others do not. It is the quickest way to bring many unsuspecting farmers face to face with the fact that *they* need to do *something*.

Tuberculous cattle mean tuberculous calves; tuberculous hogs; tuberculous chickens, and, last but not least, tuberculous babies and tuberculous people.

If it is a function of the state to protect purchasers from *harmless* deceptive manufactured substitutions and frauds that merely fail to give value received, it is primarily manifestly more important to protect consumers from *dangers* that are hidden yet menace life and health. One is a coated pill that contains a *harmless nothing*—the other an unrecognized and unrealized *dangerous* something. The Romans' first law was "Public Safety."

Since the government and the communities have allowed insufficiently informed and non-convinced men to build up a business upon an insecure foundation without protection or restraint, it has a co-operative duty for a limited length of time, rather than an *immediate* persecutive duty toward these unfortunate owners of tuberculous stock.

The individual should not be wholly burdened, but the community should partially co-operate by appropriate apportionments of taxes for public good, because we do not at present know which are and which are *not* safe, which necessitates considering *all* uncertified raw dairy produce as possibly dangerous. The state should eradicate the doubt.

A campaign for the eradication of tuberculosis should be divided into a series of chronologically successive stages, each reasonably limited in time by law.

First—*Education*.

Second—*Convincement*.

Third—*Co-operation*.

Lastly—*Prosecution* (if need be).

Under no circumstances should the order be reversed. Today most tuberculous people are sufficiently informed and convinced in doing that which will prevent infecting their fellow beings. Thanks to the medical profession, the *inter-human* transmission of tuberculosis has almost ceased to be a problem in many progressive quarters. It was largely a matter of *individual* effort, and so today animal tuberculosis in its relation to man is *the* paramount problem, and since the individual cannot protect himself, it is a need for government effort.

THE ECONOMIC ASPECT OF THE MODERN TREATMENT OF TUBERCULOSIS.

BY J. W. PETTIT, M. D., OTTAWA, ILL.

The successful application of a therapeutic principle depends quite as much upon correct methods as upon the correctness of the principle itself. We have passed through the period of skepticism with regard to the modern treatment of tuberculosis and entered upon an era of enthusiasm and activity. All that is now needed is to give our activities proper direction. There is a prevailing impression that because the treatment consists of the use of such commonplace and familiar agencies as fresh air, nutritious food, and rest or exercise, that the methods by which these are applied are a matter of comparative indifference and are easy of application. This has led on the one hand to an unsuccessful attempt to

carry out the treatment by methods so crude and imperfect that they would only be accepted by the exceptional patient, and on the other by such lavish expenditure as to bring the treatment within the reach of only a few. The treatment is neither simple nor easy, and of necessity relatively expensive. This makes it necessary to take cognizance of the economic aspect of the question.

It has been my privilege during the past year and a half to visit many of the leading sanatoria in this country. The most casual observer cannot fail to appreciate the fact that any attempts to carry out the treatment according to the standards set by the institutions to which we naturally look for guidance must fail because of the enormous expense attending their construction and maintenance. Much to my surprise, I found that four of the leading institutions have cost approximately one million and a quarter of dollars and accommodate about five hundred patients or less. This is a per capita cost for equipment alone of approximately $2,750, which is expended for housing a class of patients who should not be permitted to live in a house except of the simplest construction, and certainly should not sleep between massive walls, no matter how constructed. Upon inquiry I found that this irrational method of procedure grew out of the fact that the medical men who are supposed to direct and control their construction and management have practically nothing to say, and that the physicians in charge are quite as much opposed to this extravagant and unscientific method as those who are in a more independent position to criticise. These institutions are for the most part simply an expression of the vanity of the rich, and should not be accepted as models for our imitation. This is extremely unfortunate, and especially just at the present time, when the demand for these institutions is so great that there is danger of the whole system being broken down by unnecessary expense. It may be said with some appearance of reason that it is nobody's business if certain rich men desire to give expression to their vanity by building expensive sanatoria, but it certainly does concern the general public when it is attempted to follow their example in the construction of institutions which must be built at public expense, or by numerous private subscriptions. As an illustration of the slavish adherence to the expensive and unscientific method which it is my purpose to condemn, I call attention to an item in a recent number of the Journal of the American Medical Association to the effect that the city of New York has decided to build a sanatorium for charity patients costing two millions of dollars which will accommodate only eight hundred patients. Two millions of dollars properly expended should be made to accommodate eight times eight hundred patients, and to the decided advantage of the patients themselves.

While preparing this paper I received the annual report of a semi-charitable institution in the East. It represents a total investment of one hundred thousand dollars, with accommodations for thirty-five patients, at a per capita cost of $17 per week for maintenance. An earnest plea is made for further donations for buildings to increase the capacity to fifty, with the statement that by so doing they can bring the per capita cost to about $12 per week. In these two illustrations I have not

selected exceptional cases. I think they fairly represent the average expenditure now being made in such institutions.

There is no phase of the tuberculosis problem which demands more immediate and careful attention than how we shall expend our money in the care of tuberculous patients, no matter whether at public or private expense.

The modern treatment of tuberculosis is primarily based upon life in the open air. To meet this demand we must make a radical departure from the conventional plan of hospital construction. It was perfectly natural that these sanatoria should at first copy the usual methods of hospital construction, hence has arisen altogether too expensive a type. The great difficulties encountered in carrying out the open-air treatment are so formidable that any method which will cheapen or simplify the treatment should be favorably considered. Providing tuberculous patients with sleeping apartments in substantial buildings is not only unnecessary but in violation of an essential principle which has for its object supplying the patient with fresh air. The simplest and least expensive method which will protect the patient from the inclemency of the weather and supply him with the largest possible amount of the best possible air is the one which commends itself for scientific and economic reasons. We should proceed upon the principle of the greatest good to the greatest number. If we can make a given sum of money which is now expended in the care of one patient provide for several it is our duty to do so. This can and ought to be done. This is the problem which we have been trying to work out at the Ottawa Tent Colony, and, we believe, with some degree of success.

Theoretically the tuberculous patient should live in the open air all the time. This, however, is not practicable. He must have a warm place in which to eat, dress, undress, bathe and perform his toilet. This makes it necessary to provide an administration building where he can dine and spend the hours especially set apart for social enjoyment. A bath-house with toilet facilities is of course necessary. At all other times the only protection he needs is from rain, snow and high winds. A properly constructed tent which can easily be heated for the short time necessary to dress and undress completes the equipment. This can be done at a per capita cost of $300, and provide the patient with accommodations which will be acceptable to any except the most fastidious. Any attempt to provide accommodations for this latter class will fail, because it is necessary for all to give up many of those things pertaining to our present method of living if they are to recover. A calculation based upon the above data shows that the cost for equipment need not be more than from ten to twenty-five per cent of what is now expended. The difference between the interest on the money invested in these more expensive institutions and the depreciation of their property, and three hundred dollars, the sum actually necessary, will cure one or two incipient cases each year. This in addition to providing for from four to ten patients where one is now accommodated.

While there has been much criticism of the lavish expenditure in most of our first-class institutions, I am not aware that any attempt has hitherto been made to determine approximately the amount actually needed. Where a protest has been made the tendency has been to go to the other extreme and provide an equipment so very meager and unattractive that none but the exceptionally courageous patient would accept the accommodations offered. This has been true of many of the tent colonies which have been established, and in some respects is quite as serious a mistake as has been made in the other direction. We must meet the demands of the average patient, and on his own terms. We must not make the treatment so expensive that he cannot afford it or so cheap that he will not accept it.

Since it has been demonstrated that the tent is practicable in a cold climate, it should be used more extensively. It fulfills the conditions most perfectly from a scientific standpoint. The difficulty in keeping patients in the open air is well known. Every temptation placed before them in the way of indoor comforts only adds to the difficulty. As well might we seat a hungry man at a table laden with good food and expect him not to eat as to place a tuberculous patient in a comfortable building and expect him to keep his doors and windows open. A few patients will do it; more will not. The only way to insure patients getting fresh air is to place them where they can get nothing else. To be consistent we must keep our patients out-of-doors not part of the time, but practically all the time. In no other way can this be done so easily and satisfactorily as in a tent. It is generally conceded that a tent is an ideal method of housing tuberculous patients in a mild climate. Every argument which may be urged in favor of its use in a mild climate applies with equal force to any section of the United States. Precedent, prejudice, misconception and ignorance must be overcome before the value of a tent in the treatment of tuberculosis will be recognized. No amount of argument will settle this question. A practical demonstration is all that is needed to convince the most skeptical.

The cost of food is the most expensive item in the treatment of tuberculosis. Any attempt to cheapen this feature by cutting down the quantity or cheapening the quality will tend to nullify the treatment just to the extent to which this is done.

The physical element must be also considered. This makes it necessary to provide certain forms of amusement and recreation, which adds somewhat to the expense. There is another feature in the more expensive institutions which is bad. The morale of too much extravagance is injurious to the future of the patient. For example, take a young man who has never had more to supply his wants than is afforded by a meager salary of ten or fifteen dollars per week. Give him an opportunity to cultivate the extravagant tastes inculcated by a sojourn of several months in a luxurious sanatorium, and then send him back to his former method of living, or, what is more likely, with his earning capacity greatly diminished, and what is the inevitable result? If he is not demoralized he is a young man of more than ordinary stability of character. This argument is not far-fetched, but based upon facts.

In the location of many of these institutions some one feature—as, for example, a beautiful outlook—has been allowed to dominate the whole situation. This in many instances has led to their being located far away from centers of population and food supply—in places not easily accessible, even to the extent of being several miles from a railway station. Not infrequently water is difficult to obtain, and only at great expense. These are minor mistakes, but in the aggregate add materially and unnecessarily to the expense. Not infrequently the acceptance of a donated site is an unfortunate investment.

This whole question must be considered from a business standpoint and conducted on business principles. Just in proportion as we depart from business methods in the conduct of these institutions, just to that extent do we impair their usefulness and invite failure.

Any proposition looking to the care of the vast army of consumptives resolves itself in its final analysis into a question of dollars and cents. It is not possible except on the most extravagant scale to provide for even a majority of these sufferers; therefore it is the duty of those most prominently identified with their care not only to devise inexpensive methods, but to firmly oppose the present tendency to extravagance and lavish display which characterizes all of our leading sanatoria.—Reprinted from Medicine.

WHAT SHALL WE DO WITH THE QUESTION OF ANIMAL TUBERCULOSIS?

BY J. W. KIME, M. D., FORT DODGE, IOWA.

In the discussion of this question we must bear in mind the various interests involved, and, in so far as we may be able, pursue a course in harmony with these varied interests.

"Salus populi suprema lex est." While this motto must always stand first, while everything else must be subordinate to the health of the people, we must by the exercise of good judgment do all that may be possible to protect the public health without seriously interfering with the private interests of individuals.

The effort to free our herds and droves from tuberculosis is one so vast that we must have the co-operation of every possible factor and the opposition of as few as may be possible.

As sanitarians we are apt to be inspired with altruistic motives which impel us to proceed along straight lines toward the object to be accomplished or the thing to be attained.

In attempting any great reform it is usually best to proceed along lines of least resistance. Had our temperance friends long ago recognized this principle there would be less intemperance today.

In undertaking the eradication of tuberculosis from our cattle and swine—and by so doing lessening the prevalence of the disease in man—we must bear in mind, first, the interests of all the people of the state as regards sanitation; and, second, the interests of those engaged in the

various branches of the live stock business—the breeder and stock-raiser, the dairyman and those who handle the products of our herds and droves.

There is no dissenting voice as to the desirability of cattle and swine that are free from disease. We have then but to deal with ways and means of accomplishing this end.

In the allied branches of the live stock business vast sums of money are invested in Iowa. It is the chief industry of the state. Anything, therefore, which threatens in any manner to bring loss to the capital thus invested will meet with strenuous opposition.

We must then do all that we may be able to minimize this loss and to so distribute it that all who are benefited may also sustain their share of the loss. For it is not the owners of the herds alone who will profit by the eradication of tuberculosis, but every individual who consumes any of the products of the dairy or the shambles.

The prevalence and extent of tuberculosis in our cattle and swine in Iowa are unknown. Sufficient is known, however, that the subject assumes an importance of the first rank and demands our earnest consideration, not only as medical men, but as citizens of the State.

Millions of dollars are lost to the agriculturists of Iowa annually from this disease. To animal tuberculosis we may attribute a large percentage of human tuberculosis. In a twofold capacity, then, our profession is greatly interested in this question.

In bovines dairy cattle stand first in number of those affected. It is the dairy cow also that bears the closest relation to the human family. Indeed, a large and increasing percentage of the genus homo is wholly dependent upon the cow for its existence. Among women in affluent circumstances in this country, less than 25 per cent are able to nurse their own children. The necessity for a pure milk supply for this class of infants alone is therefore most urgent.

It is the careful housing, the indoor life of the dairy cow which serves as her undoing.

From numerous tests of dairy herds throughout the State we may conclude that 10 per cent, at least, of our dairy cows are suffering from tuberculosis. At Fort Dodge we recently found 23 per cent of the dairy cows supplying milk to the city afflicted with this disease. In one herd 90 per cent were condemned. At Webster City only last week 68 per cent were found diseased.

Other bovines are less affected than are the dairy cattle. Two per cent is probably sufficient to cover these classes. We have 1,555,000 dairy cattle in the State, worth $47,000,000. Ten per cent, or $4,700,000 worth of these cattle, are tuberculous. There are 3,881,000 stock cattle in Iowa, worth $81,000,000. Two per cent, or $1,600,000 worth, are tuberculous, making a total of $6,300,000 worth of bovines that are thus diseased.

To the dairy cow may be traced practically all the swine tuberculosis in the State, the milk from creameries and from the farms distributing far and wide the tubercle bacilli from a few infected animals.

Swine tuberculosis is, so far as known, a modern disease. It is also rapidly on the increase. Where only a few years ago but a very few hogs were known to have tuberculosis, it is now certain that not less than two per cent of all hogs in this State are afflicted with this disease.

We have in the State 8,413,000 swine, valued at $54,000,000. The loss from swine tuberculosis is therefore not less than $1,800,000 per annum. Making a total loss of more than $8,000,000 to the farmers of the State on account of bovine and swine tuberculosis. This loss is more than three-quarters of all the taxes assessed against all the farm lands in Iowa.

This is, briefly, the financial problem with which we have to deal.

Tuberculous cattle are a menace to everything about them—to swine that follow them and feed upon their products or their carcasses, and to persons using their flesh, milk and other dairy products.

Tuberculous cattle transmit their disease to other bovines about them through milk to their calves; through soiled food left in their feeding boxes; through pastures soiled by droppings from animals with tuberculous ulcers of the intestines, and through the spray from coughing which infects the stalls about them.

One diseased animal in a herd may thus soon infect all the members of the herd, as was done at Fort Dodge, where in one herd of twenty-five but two were left.

To swine their disease is transmitted through milk, and especially through the skimmed creamery milk; through their dejects which contain tubercle bacilli; through their dead carcasses, and from pastures infected by them. It is seldom that the swine are found free from tuberculosis on farms where the cattle are infected with the disease.

Tuberculous cattle are dangerous to the public health through their milk and through their flesh when used for food. Milk often contains tubercle bacilli when the udder is free from disease.

The Iowa statute concerning the pasteurization of milk is not complied with and is inefficient if it were. Sterilizing the milk is at best beginning at the wrong end. In my judgment, we will never lessen the ravages of tuberculosis in bovines, in swine or in man to any appreciable extent until the tuberculous dairy cow has been removed. She is, par excellence, the guilty party, and about her centers most that is important in our efforts to stamp out this disease.

Animal tuberculosis must be stamped out. To this all interests are agreed. As sanitarians we demand it in the interests of the public health. As stockmen it is demanded in the interests of our droves and herds.

A practical working plan must be evolved—one which meets the approval of all the people of the State and of the stockmen as a class. It is clearly impracticable for the State to compensate for such a tremendous loss. The agriculturists will not uncomplainingly sustain it. It is a burden which we must all share.

The movement must be intelligently planned and carried out. It must be statewide and continuous until the end sought has been accomplished.

Fully appreciating the difficulties of working out the details of a plan so elaborate as to meet all the requirements, I present for consideration a contribution toward this end.

To the department of veterinary medicine of the State the work belongs. This department was organized and exists for the purpose of dealing with all questions pertaining to the domestic animals of the State. The State Veterinarian must therefore be entrusted with this work.

He should be empowered by the Legislature to organize a force of assistants sufficient to cope with the situation. An Assistant State Veterinarian should be assigned to the work in each county of the State.

The County Veterinarian should organize a force sufficient to test with the tuberculin test every bovine used for dairy or breeding purposes, in his county, once each year for a period of not less than five years. The counties should be required to levy a special tax sufficient to pay the salaries and expenses of the County Veterinarians and their assistants in the work. A State appropriation should be made to pay the additional expenses of the State Veterinarian's office.

The testing of all bovines should be done free of expense to their owners, who should be required to co-operate with and render all possible assistance to the County Veterinarians, free of charge, when testing their own herds. The various communities in which the veterinarians may at any time be working should also board and lodge them without expense.

All cattle responding to the test should be tagged and placed in quarantine, where they should be thoroughly isolated from the healthy cattle upon the premises and on surrounding premises. If deemed advisable, central quarantine stations might be established at various convenient points in the county, where all condemned cattle might be segregated until disposed of as provided by law.

All premises where tuberculous cattle are found should be thoroughly cleaned and disinfected under the supervision of the County Veterinarians.

The State should not pay for the cattle condemned, but should provide for all possible salvage from them.

Cattle placed under quarantine for tuberculosis should be disposed of by their owners by:

1. Selling them at abattoirs under government inspection.
2. Selling them to local butchers, to be killed under inspection of competent veterinarians.
3. Killing them and burning their carcasses.
4. Keeping them for breeding purposes under quarantine, according to the method of Bang.

It should be unlawful to ship any cattle into the State, for any purposes whatever, that have not been tested with the tuberculin test within 90 days prior to shipment within the State, except when shipment is made to abattoirs under government inspection and there to be held in quarantine until killed.

Cattle may pass through the State in transit, without unloading except for feeding, without the tuberculin test.

It should be unlawful to buy, sell or transfer the ownership of any cow for dairy purposes, or of any bull for breeding purposes, without a certificate from a competent veterinarian that the animal has been tested with the tuberculin test and found free from disease within six months preceding such sale.

All dairy cows suffering from tuberculosis should be dried up at once and be prepared for the market or be kept for breeding purposes according to the method of Bang.

For convenience in testing, cattle should be gathered into bunches of not less than twenty-five in neighborhoods throughout the counties. This

would necessitate the testing of two such herds each working day of the year, as there are, on an average, 15,000 dairy cattle per county. This would require two veterinarians and four helpers. The expense to the county would be about $7,000 per year. The average cost of testing would therefore be about 50 cents per head.

After the first year the number of tuberculous cattle would rapidly diminish. At the end of the fifth year but little tuberculosis would be found either among our cattle or swine in the State.

It would be necessary to destroy but very few cattle—those that were in the advanced stages of the disease and those suffering from generalized tuberculosis. Animals thus advanced with the disease would soon die from it; they are also a source of great danger to other cattle and swine about them, and they therefore are worse than worthless to their owners.

By fattening and killing condemned cattle under inspection their carcasses would bring just what they are worth for meat.

The flesh of tuberculous animals is not especially dangerous, as it is cooked before eating and the parts used for food are seldom affected with tuberculosis. Under inspection all dangerous carcasses are rejected. Now we eat them.

The cleaning up of a man's herd and the removal from it of all tuberculous animals is worth far more than it will cost him.

Under Bang's method calves from tuberculous cows are taken as soon as they are dropped and are never permitted to suck the mother cows, but are raised on the milk of healthy animals. Calves from tuberculous cows or bulls are free from tuberculosis. In other words, they do not inherit the disease. Neither does man.

As to swine tuberculosis, now rapidly on the increase in Iowa, many communities being placed on the blacklist of the large packing houses and the losses running into the millions of dollars, I believe at the present time we need do but little if we proceed along the lines here indicated. The removal of the tuberculous cow will rapidly eliminate swine tuberculosis in the State.

In the discussion of this question I have considered all tuberculous animals as a total loss, as the loss from these animals and the continuous propagation of the disease to their progeny and their associates more than compensates for any value the animals themselves may have. If disposed of, however, in the manner proposed, there will be a large salvage from these infected animals.

While it would be desirable to deal more radically with this question and go to the root of the matter by testing all bovines, instead of dairy animals only, much may thus be accomplished and a long step be taken toward the ultimate eradication of tuberculosis from the State.

THE EXPENSE.

The question is largely a financial one. Will it pay? The annual cost for five years will be about $7,000 per county of $700,000 for the state. It will increase the tax levy about one mill. The total cost would be about $3,500,000 for the five years. We would go far toward the ex-

termination of bovine and swine tuberculosis and human tuberculosis would be materially lessened.

Under the present conditions we will suffer to the extent of $40,000,000 in the next five years and then have more tuberculosis than we now have among our cattle and swine.

I estimate that the State would profit the difference between three and one-half millions and forty millions of dollars which would be a reasonable return for the capital invested even in these days of high finance.

But more than this, the danger to human life would be greatly lessened and Iowa would set an example worthy of adoption by her sister states.

THE DISPOSITION OF TUBERCULOSIS CATTLE.

BY DR. G. A. JOHNSON, GOVERNMENT INSPECTOR IN CHARGE, SIOUX CITY, IOWA.

In presenting for your consideration some thoughts upon the disposition of tuberculous cattle, I shall assume that you are all familiar with the disease, its character and importance. For this reason it will be unnecessary to burden you with a discussion of this phase of the subject, further than to state, that it is a peculiarity of tuberculosis that extensively diseased animals may, and often do appear to be perfectly healthy, and it is this peculiarity which makes the handling of the disease such a difficult problem. Or, to put it in other words: The great difficulty in dealing with tuberculosis lies in the fact that most men cannot understand or will not believe that an animal that eats and drinks heartily, that looks and acts as if healthy, that grows or lays on flesh readily, can be seriously diseased, yet this is the case. Animals, apparently healthy are often tuberculous. When the average stock raiser comprehends this, the solution of the problem of the control and eradication of this baneful scourge will be more easily solved.

I base this statement upon the fact that whenever any acutely contagious diseases, such as anthrax, black-leg, Texas fever, etc., make their appearance, steps are at once taken to stamp them out. If such action should be taken with these, it is much more important that similar action should be taken with tuberculosis, which causes an annual loss in this country many times greater than all the other contagious diseases together, and which is now allowed to continue its ravages with practically no action being taken to eradicate it, or even to control its spread. How do you account for this peculiar condition? I explain it in this way: The acute diseases produce a train of symptoms showing clearly that the animals are sick, and the usually large and rapid death rate demonstrates the necessity of prompt action. With tuberculosis it is different. The disease progresses very slowly and the symptoms are practically invisible except in the last stages. In the one case all understand the animal is diseased, while in the other, the average man does not comprehend the condition and is loath to believe that the animal is diseased.

I am glad to say, however, that progress is being made, and that the average stock raiser is beginning to grasp the situation. The raiser of healthy stock is beginning to wonder why we should continue to help pay the losses of his neighbor who is raising diseased animals, for this he does under the present system of marketing.

Before taking up the principal part of my theme I wish to direct your attention to one very essential and vital point, the diagnosis of tuberculosis. In eradicating or controlling the spread of acutely contagious diseases, which have a short and somewhat definite period of incubation (the time elapsing after an animal is exposed before it presents symptoms of the disease), it is not absolutely essential that an accurate diagnosis be made, because the disease can usually be stamped out by quarantining the infected herd or herds until the disease has run its course. But with a disease that has no distinct period of incubation and one that develops as slowly as tuberculosis usually does, quarantining is not practical, more especially when the disease is so wide-spread and so prevalent as tuberculosis is. Therefore, the first essential step in any plan looking to the control or eradication of tuberculosis is a correct and accurate diagnosis. This is absolutely essential in order to become reasonably certain which animals are and which are not affected, and thus make it possible to separate the diseased from the healthy cattle.

With our present knowledge of tuberculosis there is but one accurate method for diagnosing the disease in the live animal, and that is the tuberculin test. Strange as it may seem, tuberculin, when properly used, is one of, if not the most accurate diagnostic agents known to medical science. Hence we may state that the first essential in the work of controlling or eradicating tuberculosis is to test the cattle of infected herds. This work should be done by thoroughly reliable and competent men, preferably under the direction and supervision of the State Veterinarian.

The testing of animals is a comparatively simple process in itself, but it leads to the very serious and important question: What shall be done with the diseased animals after they have been discovered? The two general plans that have been and are now being generally followed may be termed the "slaughter method" and the "Bang method."

The slaughter method has been variously modified at different times and places, but the one central principle has been that the diseased cattle must be destroyed within certain periods, according to the conditions prevailing at the time and place of the test. The cattle may be slaughtered at once or they may be fed for a time and then slaughtered. In some instances the cattle are appraised at a valuation of healthy stock. They are then destroyed by the State, burned or buried, and a certain percentage of the appraised valuation is paid by the state.

In other instances the cattle are appraised as above and then sold for slaughter, subject to post-mortem inspection, the State making up the deficiency between the fixed percentage of the appraised value and what the cattle bring for meat. In still other instances the owner is compelled to sell his affected cattle for slaughter, subject to post-mortem inspection without any reimbursement from the State. In the latter case the owner receives only the meat value of the affected cattle. All these methods are more or less wasteful and unsatisfactory, especially when

dealing with valuable breeding animals. It has been demonstrated that the disease usually progresses so slowly that most animals will live from two to five years after becoming infected, especially when the cattle are kept under favorable conditions rather than under conditions favorable to the tubercule bacilli.

During most of the lifetime of tuberculous animals they are capable of breeding and the cows will raise their calves and give milk nearly as well as if they were not diseased, and yet, strange as it may seem, such animals are the ones that generally spread the disease to healthy individuals.

Taking advantage of these facts, Professor Bang, a veterinarian of Denmark, worked out a method known as the "Bang method," whereby tuberculous cattle may be safely kept so long as they prove useful. They are not slaughtered until they begin to show physical symptoms of the disease or become unprofitable. Under this method a tuberculous herd, by means of the tuberculin test, is separated into two parts, a healthy and a tuberculous portion. These herds are then kept separate and under conditions that will prevent the disease being carried, from the affected to the healthy cattle.

When a cow in the tuberculous herd drops a calf it is immediately taken away from the dam and fed upon the milk of healthy cows or upon the milk of its dam after having been thoroughly sterilized. Thus the healthy herd is gradually built up, while the tuberculous herd gradually grows smaller and smaller, until the disease is finally eradicated from the farm.

By a wide application of this method tuberculosis is gradually being eradicated from the herds of Denmark without great cost to the government or serious loss to the owners, other than the trouble incident to keeping two herds on the same farm under proper conditions. While the method has been followed with gratifying results in Denmark and some other European countries it is not very well adapted for this country, because of our different conditions and of our different methods of stock raising. At any rate it has not yet found much favor in the United States.

Most breeders do not have the time, the inclination, or sufficient knowledge of sanitary science to enable them to successfully carry on the work, without the supervision of an expert. Another class of breeders do not wish to be burdened with the trouble and expense of keeping two herds.

Again, many of our herds are so small that they would not be profitable if divided and kept in two separate and distinct places. Perhaps the objection most frequently advanced against the Bang method by the breeders of pure-bred cattle in this country is the fear that it would ruin their business if the public became aware that their herds were affected. This arises from the belief that there is a general prejudice against animals coming from herds known to have been affected and especially against young animals from tuberculous stock on the grounds that if the animal is not diseased at the time of sale it will be more liable to contract the disease. While this principle is true to the extent that animals from tuberculous progenitors may be most susceptible to the disease when brought in contact with the germs, it is not true if such stock is kept

away from them. It should be borne in mind that tuberculosis cannot be produced unless the germ of tuberculosis is introduced into the system, and consequently, when such animals are kept in healthy herds the possibility of their contracting the disease is very small. It makes, however, a very plausible point of objection to the introduction of any method looking to the control or eradication of the disease.

Another point: The Bang method has found but little favor among State or Federal officials, because the expense of maintaining the necessary supervision of the infected herds, to enforce the proper carrying out of the work, and to prevent the unscrupulous from taking undue advantage of conditions, would be so large as to be burdensome. For these reasons the slaughter method has been the one most in vogue in this country, but it has been demonstrated that this method is ruinously extravagant, and in some respects detrimental to the cattle industry, because of needless destruction of many animals that are valuable for breeding purposes.

With these facts in mind it has occurred to me that many of the objections to both the Bang and slaughter methods can be obviated by the farmer and breeder by leasing their tuberculous breeding cattle to the State or County upon the increase plan. The plan in general would be as follows: To have a specially arranged farm in various sections of the State or in each County if necessary. In this connection it might be stated that most counties now have a farm commonly known as the "Poor Farm," a portion of which might be set aside for this purpose. In case this should not be practical another farm could be secured by purchase or lease. The State Veterinarian should test all herds that are known to be infected or that the owner might request to have tested, and upon completion of the test all tuberculous animals of special breeding qualities, but free from physical symptoms of the disease, should be at once removed to the County Farm, while those showing physical symptoms of the disease or that do not have valuable breeding qualities, could be sold for slaughter under the usual conditions, thereby at once removing all tuberculous cattle from the farm, stables, etc., to be disinfected. The reason for slaughtering the cattle that have no special breeding qualities and those presenting physical symptoms of the disease, is self-evident—such cattle would not pay for their keep.

It would be immaterial, so far as the general plan is concerned, whether the State does or does not give compensation for the stock that is slaughtered. But personally I believe that better results would be obtained if the stock was appraised as if healthy and the State authorized to pay the owner the difference, if any, between what the animals brought at slaughter and a fixed per cent of the appraised valuation. The State or County would feed and care for the stock placed upon the County Farm, for which it would receive an equitable percentage of the increase, while the owner would receive the remainder. The division of the stock could be made at the end of each year. If it would pay the owner to keep on breeding this diseased stock on his own farm, which in the meantime would more or less rapidly spread the disease to his healthy stock, it would seem that it would pay better to have it bred on the County Farm,

where the most favorable conditions could be maintained, and the disease be kept from spreading to healthy animals. While it would probably cost more per head to raise the stock under the restricted conditions, as the State or County would have to raise them, the fact that these herds would be managed under the latest and most approved methods, the net returns would no doubt balance, if not exceed those of the average breeder.

It would be necessary under this method for the State or County to go to some expense to properly equip farms, but this need not be large as no expensive buildings would be needed. The principal item of expense would be the proper fencing of the farms so as to keep the calves and other stock from coming in contact with the diseased cattle, and the erection of needed shedding to protect the stock from inclement weather, and a plant for sterilizing milk for feeding the calves.

Under proper management the farms should be self-sustaining even with tuberculous stock. But if they were not, it appears to me that this expense would be much less than that of any plan of slaughter and reimbursement that would be anywhere near adequate to meet the demands of the average breeder.

Under any form of the Bang method, practically none of the diseased cattle ever recover sufficiently to be returned to healthy herds. So it would be understood that cattle once placed in the County herd, would remain there until removed by death or for slaughter.

The proceeds of all slaughtered animals would revert to the owners. Competent men should be employed to manage these farms under proper sanitary rules and regulations formulated by the State Veterinarian and approved by the State Department of Agriculture or the Governor. It should be one of the duties of the State Veterinarian to see that the sanitary regulations were properly carried out and any manager failing or neglecting to follow such instructions should be immediately removed.

In advocating this plan I am aware that some will take exception to it on the ground that the tendency will be for some parties to make political capital out of it; that it will be too expensive; that competent men cannot be found to manage such herds; that good results cannot be obtained with such stock; that the right types of animals will not be mated; etc., etc. In reply to such criticism it can be stated, without fear of successful contradiction, that if nothing is done to control or eradicate this disease until the items of politics and expense are eliminated tuberculosis will have full sway so long as any susceptible cattle are in existence. Or, to put it another way: tuberculosis is so wide-spread and so prevalent, it enters more or less intimately into so many different phases of our national business that it is impossible to make any general attempt to control or prevent its spreading without government aid, and when this is asked, the political pot begins to boil.

Regarding the interference it might cause with the plans and ideals of some breeders, it must be granted that it might temporarily check line breeding, but it should be remembered that if but a small per cent of the herd were affected, while it might retard development, it would not destroy it. On the other hand, if a majority of the herd were affected the line breeding could be followed with the cattle in the County herd, at

any rate the interference would not be so great as though all the affected cattle were slaughtered.

Among the advantages of such a plan over the slaughter or Bang method, it may be stated that it would obviate all danger of diseased animals infecting the healthy cattle, and this is the principal object of any method, and the one that can bring this about with the least possible expense is the best. It would practically reserve the full breeding value of all animals, except in the case of some special line breeding as referred to above. It would afford a perfect segregation of the animals into herds of 150 to 200 head, that could be handle much more economically than could a diseased and a healthy herd on each farm where tuberculosis might be found, as is done under the Bang method. Nor would it necessitate the needless sacrifice of valuable breeding animals as is done where the slaughter method is followed. Furthermore it would afford especially good opportunities to work out many yet unsettled problems relative to tuberculosis in particular and sanitary science as applied to cattle and cattle raising in general.

I have thus given you the general outlines of my plan. I might go on citing points in its favor and burden you with details, but I think enough has been said to throw the question open for discussion. I may be too optimistic in this matter, but from my present knowledge of the disease and the general conditions pertaining to it, this plan appeals to me very forcibly. On the other hand, I wish to state that if it impresses you as being impractical and visionary I hope that you will not hesitate to point out wherein it is weak and impractical, because if I am in error, the sooner the fact is demonstrated the better it will be for all concerned.—Read and discussed before the meeting of the Interstate Breeders' Association, March 6, 1908.

TUBERCLE BACILLI IN BUTTER; THEIR OCCURRENCE, VITALITY AND SIGNIFICANCE.

BY E. C. SCHROEDER, M. D. V., SUPERINTENDENT OF EXPERIMENT STATION, AND W. E. COTTON, EXPERT ASSISTANT AT EXPERIMENT STATION, UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF ANIMAL INDUSTRY.

The article deals with a phase of the tuberculosis question which has hitherto received less attention than it deserves. The previous work of Doctor Schroeder and other scientists of the Bureau, largely in connection with the tuberculous infection of milk, has demonstrated the imperative necessity of eradicating tuberculosis from our dairy herds in order to avoid the dangers incident to the consumption of this universal product of the cow. The present paper brings to light additional menace to the public health through the presence of tubercle bacilli in butter, which is as common an article of food as milk.

Our present knowledge points unmistakably to the fact that a very large amount of butter infected with tubercle bacilli is daily consumed

by our people. Furthermore, the experiments described in this work prove that butter is an ideal environment for the preservation of tubercle bacilli. It is shown that these micro-organisms when embedded in ordinary salted butter remain alive and virulent a long time; that after ninety-nine days they show only a doubtful reduction of pathogenic virulence.

In view of the importance of the subject to the general public I recommend the publication of the article in the circular series of the Bureau.

A. M. FARRINGTON,
Acting Chief of Bureau.

INTRODUCTORY.

Among the articles of human food usually eaten in a raw state nothing has a wider distribution than butter, and next to milk nothing fills a more important place. It appears on most tables at every meal and is eaten two or three times daily by almost every person. It may be transported long distances, and those who use it are seldom in a position to inform themselves about its origin and preparation and other facts which have a substantial bearing on its freedom from infection. Hence butter must be regarded seriously as a vehicle through which a live, infectious material may be distributed in a way that leads directly to the human stomach and in a way against which the individual has no means to protect himself.

While other infectious substances may be carried in butter, we will confine our attention at present to the tubercle bacilli it may contain, and briefly discuss their occurrence, vitality and significance.

THE OCCURRENCE OF TUBERCLE BACILLI IN BUTTER.*

On standing, or by passage through a centrifuge, milk separates into three distinct layers—cream, skim milk and sediment. The character, appearance, and relative quantity of cream and skim milk are too well known to require description. The sediment in fresh, pure, normal milk is so small in amount that it commonly escapes observation; it has a chalky, white appearance, and on microscopic examination is seen to be composed mainly of leucocytes and a little epithelium. In experiments made at the Bureau of Animal Industry Experiment Station a number of years ago, and recently repeated, it was found that tubercle bacilli, when they are present in milk, soon disappear from the skim milk and collect in about equal proportion in the cream and the sediment. This was true whether the cream separated slowly and naturally or whether it was forced to the surface of the milk quickly by the use of a centrifugal machine.

As tubercle bacilli have a higher and cream has a lower specific gravity than milk it does not seem unreasonable to infer that the bacilli

*A somewhat similar though independent investigation to that recorded in this circular is being conducted by Mohler, of the Pathological Division, and Rogers, of the Dairy Division of this Bureau, the butter being made from commercial cream by the usual commercial methods and then subjected to the same treatment in cold storage as obtains in the butter trade.

should gravitate away from the cream and leave it free from infection as it rises to the surface of infected milk. This inference, however, is erroneous; it would probably be true if cream was a homogeneous substance and not an aggregation of small spheres or globules. The minute bacilli evidently adhere to the relatively large cream globules with a tenacity that can not be broken by the existing difference of specific gravity, even when this is magnified by the application of a centrifugal force strong enough to press the cream into a semi-solid mass. From this conduct of tubercle bacilli in milk we may conclude that when they are present in milk they will be present in greater concentration in cream, and cream is the substance from which butter is made.

That tubercle bacilli are frequently present in milk has been demonstrated over and over again. Recently 26 samples of milk were taken directly from the Washington supply, each from a different dealer, and tested at the Experiment Station by guinea-pig inoculation, and 2, or 7.7 per cent, produced generalized, fatal tuberculosis.

Butter made from infected cream contains tubercle bacilli. This statement was verified by making butter from several lots of infected cream and testing its infectiousness through guinea-pig inoculations. The cream was derived in some instances from normal cow's milk that was intentionally soiled with small quantities of feces from cows that were passing tubercle bacilli per rectum, and in other instances from the milk of a tuberculous cow with a diseased udder.

TUBERCLE BACILLI MORE FREQUENT IN BUTTER THAN IN MILK.

Our results, as well as those of other observers, indicate that tubercle bacilli may gain a sufficient concentration in butter to serve for their detection even when it is made from milk in which they are too widely scattered to be found. Herr and Beninde *a* concluded from their investigations that skim milk, buttermilk, cream, butter, and sediment from infected milk contain tubercle bacilli, and that the most intensely infected of these substances are sediment and butter. Among 444 samples of butter tested by themselves and others, 60, or 13.5 per cent, were found to contain tubercle bacilli. Cornet *a* gives a table in his recent work on tuberculosis from which an idea of the relative frequency with which milk and butter are infected can be obtained. The table includes the tests made from 1890 to 1902 by a large number of reliable investigators. Among 1,527 samples of milk, 149, or 9.76 per cent, and among 775 samples of butter, 100, or 12.9 per cent, were found to contain tubercle bacilli. Broers, *b* of the Netherlands, has shown that 10 per cent of the milk of his country is infected with tubercle bacilli.

The figures here quoted refer to conditions in European countries. The instructive and important feature about them for us is that they justify the conclusion that tubercle bacilli can be found more frequently in butter than in milk. The percentage for milk given by Broers and that obtained from Cornet's table—10 and 9.76, respectively—are almost identical, and the same is true of the percentages of butter, namely, 13.5, by

a Zietschrift fur Hygiene, etc., Vol. 28, p. 180.
a Die Tuberkulose, Vienna, 1907, pp. 122, 123.
b Zeitschrift fur Tuberkulose, etc., Vol. X, No. 3.

Herr and Beninde, and 12.9 by Cornet. They enable us to say that butter probably contains tubercle bacilli in discoverable numbers 13 times for every 10 times they are sufficiently numerous in milk to be detected.

We have satisfactory reasons for believing that European cattle are more commonly tuberculous than American, and, consequently, that the figures obtained by European investigators regarding the frequency with which tubercle bacilli occur in milk and butter are too high for our country. But even with us the conditions are bad enough, as from 15 to 30 per cent of the cows from which our cities derive their milk supply are affected with tuberculosis. What this enormous number of tuberculous cows in dairy herds means for milk and butter infection may be judged from the facts presented in a bulletin *c* of this Bureau dealing with the danger from tubercle bacilli, not alone in the milk of tuberculous cows, but also in the milk of healthy cows stabled in a tuberculous environment.

Milk to be at all times free from tubercle bacilli must be drawn from cows neither affected with nor exposed to tuberculosis; in other words, it must be obtained under conditions that are not provided in the majority of our dairy herds, and hence tubercle bacilli are frequently present in milk. Since their presence in milk has been shown to mean their occurrence in greater concentration in cream and butter, we may end this portion of our article with the conclusion that butter must be regarded under existing conditions as a common vehicle for the dissemination of tubercle bacilli from cattle in a way that insures the exposure of persons to them.

THE VITALITY OF TUBERCLE BACILLI IN BUTTER.

The precise period of time during which tubercle bacilli remain alive and retain their virulence in butter is a question for the solution of which the available data are exceedingly contradictory. This is well shown by Cornet, *a* who states that Laser could find no live tubercle bacilli in butter after twelve days; that Heim records that all tubercle bacilli eventually die in butter, and that their maximum life in it is thirty days; that Gasperini found a reduction of virulence after thirty days, though the bacilli were still alive after one hundred and twenty days, and that Dawson did not observe a reduction of virulence until after three months and claims to have produced tuberculosis in a guinea pig by inoculating it with butter 8 months old.

The two extremes, twelve days and eight months, are too far apart to be satisfactory; either or both may be wrong; both certainly can not be right. A fairly large difference in the results obtained by different investigators may be reconciled on the assumption that they used different kinds of butter in their tests. Salt has distinct though weak germicidal properties; hence tubercle bacilli in heavily salted butter may live only a short time while in unsalted butter they may live and remain virulent indefinitely. Broers, *b* whose work on the presence of tubercle bacilli in dairy products seems very reliable, found that they will live three days in milk even when it has undergone changes to make it unfit for use as food, twelve days in buttermilk, and that they remain virulent in butter three weeks.

c Bureau of Animal Industry Bulletin 99.
a Die Tuberkulose, Vienna, 1907, p. 124.
b Zietschrift fur Tuberkulose, Vol. X, No. 3.

INOCULATION TESTS WITH GUINEA PIGS.

To determine more definitely how long the bacilli actually do live and retain their virulence, some infected butter was prepared at the Bureau Experiment Station and tested with guinea pig inoculations.

The milk of a cow affected with udder tuberculosis was drawn in the customary manner and set aside in glass dishes for cream to rise. The dishes had straight sides and were 10½ inches broad and 5½ inches deep. After twenty-four hours the cream was carefully skimmed from the surface of the milk and at once churned in a glass churn with a metal thrasher. When the butter had separated from the cream it was gathered and washed and worked until it was free from buttermilk, and then salted at the rate of 1 ounce of salt to a pound of butter. While the amount of salt in commercial butter varies greatly, this is the proportion most commonly used. The salt was worked into and distributed throughout the entire mass as evenly as possible, and the finished product was placed in a glass dish with a ground glass cover and kept without ice in a cellar in which the temperature remained fairly constant at 60° F.

From time to time guinea pigs were inoculated with portions of the butter; the amount received by each guinea pig, with the exception of Nos. 9683 and 9684, was 1 gram (15½ grains), injected, slightly warmed, from a syringe into the abdominal cavity. The two exceptions received only one-half gram each, as an insufficient supply of butter remained at the time they were inoculated to give them a full dose.

Table 1 gives the numbers of the guinea pigs, the dates of inoculation and death, the age of the butter at the time of inoculation, the number of days that elapsed between the inoculation and the death of each guinea pig, and the condition of the guinea pigs on post-mortem examination.

TABLE 1.

RESULTS OF GUINEA-PIG INOCULATIONS WITH INFECTED BUTTER OF VARIOUS AGES.

No. of guinea pig	Date of injection	Age of butter, in days *a*	Date of Death	Number of days from injection to death	Autopsy records
	1907.		1907.		
9250	May 9	1	July 5	57	Generalized tuberculosis.
9251	May 9	1	July 10	62	Generalized tuberculosis.
9252	May 10	2	July 5	56	Generalized tuberculosis.
9253	May 10	2	July 14	65	Generalized tuberculosis.
9254	May 15	1	July 5	51	Generalized tuberculosis.
9255	May 15	1	July 25	71	Generalized tuberculosis.
9256	May 16	2	May 23	7	Peritonitis.
9257	May 16	2	Aug. 15	91	Generalized tuberculosis.
9258	May 17	3	July 2	46	Generalized tuberculosis.
9259	May 17	3	July 19	63	Generalized tuberculosis.
9260	May 18	4	June 30	43	Generalized tuberculosis.
9261	May 18	4	July 15	58	Generalized tuberculosis.
9274	May 20	6	July 9	50	Generalized tuberculosis.
9275	May 20	6	July 17	58	Generalized tuberculosis.
9276	May 21	7	June 3	13	Inflammation of bowels and tuberculosis.
9277	May 21	7	July 29	69	Generalized tuberculosis.
9306	May 22	8	July 8	47	Generalized tuberculosis.
9307	May 22	8	July 22	61	Generalized tuberculosis.
9308	May 23	9	July 25	63	Generalized tuberculosis.
9309	May 23	9	July 9	47	Generalized tuberculosis.
9316	May 24	10	Sep. 25	62	Generalized tuberculosis.
9317	May 24	10	Sep. 25	124	Generalized tuberculosis.
9338	May 25	11	July 8	44	Generalized tuberculosis.
9337	May 25	11	Aug. 12	79	Generalized tuberculosis.
9350	May 27	13	July 14	48	Generalized tuberculosis.
9351	May 27	13	Aug. 28	93	Generalized tuberculosis.
9352	May 28	14	June 5	8	Pneumonia.
9353	May 28	14	July 18	51	Generalized tuberculosis.
9354	May 29	15	June 4	6	Pneumonia.
9355	May 29	15	July 9	41	Generalized tuberculosis.
9356	June 1	18	June 30	29	Generalized tuberculosis.
9357	June 1	18	July 26	56	Generalized tuberculosis.
9358	June 4	21	Aug. 1	58	Generalized tuberculosis.
9359	June 4	21	Aug. 4	61	Generalized tuberculosis.
9402	June 7	24	Aug. 1	55	Generalized tuberculosis.
9403	June 7	24	Sep. 16	101	Generalized tuberculosis.
9416	June 10	27	July 25	45	Generalized tuberculosis.
9417	June 10	27	Oct. 1	113	Generalized tuberculosis.
9430	June 13	30	Aug. 16	64	Generalized tuberculosis.
9431	June 13	30	Sep. 11	90	Generalized tuberculosis.
9432	June 15	32	July 5	20	Pneumonia and tuberculosis.
9433	June 15	32	Aug. 14	60	Generalized tuberculosis.
9549	July 2	49	Aug. 9	38	Generalized tuberculosis.
9550	July 2	49	Aug. 10	48	Generalized tuberculosis.
9647	Aug. 1	79	Oct. 21	81	Generalized tuberculosis.
9648	Aug. 1	79	Oct. 26	86	Generalized tuberculosis.
9677	Aug. 9	87	Oct. 21	73	Generalized tuberculosis.
9678	Aug. 9	87	Nov. 2	85	Generalized tuberculosis.
9683	Aug. 21	99	Nov. 4	75	Generalized tuberculosis.
9684 *a*	Aug. 21	99	Nov. 11	82	Generalized tuberculosis.

a Guinea pigs 9250 to 9253, inclusive, were inoculated with butter made on May 8, 1907; the remainder with butter made on May 14, 1907.

a All the guinea pigs died naturally with the exception of this one, which was killed for autopsy.

The total number of guinea pigs inoculated was 50. Of these, 5 died prematurely—1 affected with peritonitis, 1 with inflammation of the bowels and 3 with pneumonia. Two of the 5 showed lesions of tuberculosis and 3 died too soon after inoculation for tuberculosis to have developed sufficiently for detection. One guinea pig (No. 9684) was intentionally killed, and though it was affected with generalized tuberculosis its condition indicated that it would have survived ten days or two weeks longer had it been permitted to live. This leaves 44 guinea pigs that died of generalized tuberculosis, uncomplicated with other affections, due to virulent tubercle bacilli contained in the butter with which they were inoculated. An examination of the time that elapsed between inoculation and death of the 44 guinea pigs gives less evidence to show that tubercle bacilli in butter lose much of their virulence in the course of ninety-nine days than positive evidence of a great variation in the susceptibility of the guinea pigs to tuberculous infection. For example, one of the two guinea pigs inoculated with butter 10 days old died after sixty-two days and the other lived twice as long, one hundred and twenty-four days. Of the two guinea pigs inoculated with butter 27 days old one died in forty-five days and the other lived one hundred and thirteen days. Of the two guinea pigs inoculated with butter 49 days old one lived only thirty-eight and the other only forty-eight days; that is, both succumbed in less time than any of the four guinea pigs inoculated with butter only one day old. The butter 79, 87, and 99 days old failed to kill any of the six guinea pigs inoculated with it in less than seventy-three days. This is a little longer than the average for the butter that had been kept 49 days or less, but the guinea pigs inoculated with butter 99 days old received only a half dose, and one of them succumbed in seventy-five days.

We may safely conclude from the guinea pig inoculations that tubercle bacilli show no appreciable attenuation in ordinary salted butter in forty-nine days, and that they are still highly virulent after ninety-nine days, or more than three months. *a*. This conclusion is fairly compatible with the results obtained by Dawson, who found that no attenuation occurred until after three months, and with those of Gasperini, who found that bacilli were still alive after four months, though he observed some attenuation after thirty days.

SIGNIFICANCE OF TUBERCLE BACILLI IN BUTTER.

The relation of tubercle bacilli in butter to the public health is a more involved question than their simple presence and long-continued life and virulence.

Less than ten years ago, previous to the end of the last century, tubercle bacilli were grouped for all practical purposes in two classes, mammalian and avian, or those which affected man and other mammals and those which affected birds. No one doubted openly that bacilli from cattle, in meat and dairy products, were as injurious for man as those derived from persons. Pulmonary tuberculosis, or consumption of the lungs, was then, as now, the commonest form in which the disease mani-

a See note at end of this article.

fested itself, and this was explained by the assumption that the bacilli entered the body more frequently with the breath than in any other way, and that the greatest danger of infection was through dried and pulverized tuberculosis material that floated in the air as a fine dust.

The beginning of the present century brought with it a change of views. Attention was called to the fact that the inhalation theory to account for the frequent presence of tuberculosis in the pulmonary tissues had not been proven, and that living tubercle bacilli in dust were difficult to find or could not be found at all. The infectiousness of bacilli from animals for man was questioned, and the investigation of tuberculosis generally was given a fresh impetus through which many new facts and theories came to light.

As tubercle bacilli in butter are derived from bovine sources and usually enter the body only in a moist state, to understand the true significance they have for public health we must give some attention to the infectiousness of tubercle bacilli from bovine sources for man, and to the ways in which tubercle bacilli enter the bodies of those who become affected with tuberculosis.

Since Theobald Smith *a* published his studies on different varieties of tubercle bacilli, the evidence in favor of two distinct types virulent for mammals—the one found more commonly in bovine and the other in human lesions—has grown stronger. But different varieties or types do not necessarily mean different species or even subspecies. As Smith himself stated, "varieties have been found among nearly all of those specific forms of pathogenic bacteria which have received a considerable amount of attention." *b*. The term "varieties" is here clearly used to designate differences of a kind to be expected among the individuals of a large and widespread species, such differences as we know occur among higher organisms than bacteria with a wide geographic distribution. There is a distinct parallelism between a wide geographic distribution of higher plants and animals and the number and kinds of hosts a pathogenic bacterium may infect; hence there is no reason why the tubercle bacillus, which has received more attention and which affects more species of animals and more individuals than any other bacterium, should not have been found to include many different types, the extremes of which would leave us in doubt as to their specific classification if they were not connected by a chain of transition forms.

Mohler and Washburn, *c* after a comparison of many tubercle bacilli from different sources and a careful search of the literature, concluded that the more the subject is studied the more numerous the instances become in which bacilli of special types are found occurring naturally in animals far removed from the species which may be supposed to be their natural host. They obtained cultures of tubercle bacilli from human lesions that were morphologically and biologically bovine types, and in their summary of the investigations of others show that bovine types have frequently been obtained from man and human types from cattle.

a Twelfth and Thirteenth Annual Reports, Bureau of Animal Industry, 1895 and 1896. Journal of Experimental Medicine, Vol. 3, New York, 1898.
b Twelfth and Thirteenth Annual Reports, Bureau of Animal Industry, 1895 and 1896, p. 149.
c Bureau of Animal Industry Bulletin 96.

Fibiger and Jensen, *d* who likewise obtained typical bovine bacilli, virulent for cattle, from human lesions, recall that the Imperial German Health Office examined 39 cases of primary tuberculosis of the intestine and mesenteric glands and found that 13 among them were caused by bacilli of the bovine type.

Gorter, *e* after a careful study of tubercle bacilli from human and bovine lesions, found 7 among 21 cultures from human sputum which he regards as identical with the transition forms between human and bovine bacilli which he says are described by Rabinowitsch. He concludes that human and bovine bacilli are not different varietes, and that the conversion of the one type into the other actually occurs.

Sargo and Suess *a* showed that mutations occur in human tubercle bacilli and other types, which speak against grouping tubercle bacilli from animals of different species as special varieties.

Von Behring, *b* who ranks as one of the most widely recognized authorities on tuberculosis, found cultures of tubercle bacilli isolated from man of low virulence for cattle, and others of higher virulence for them than many cultures of bovine origin. He declares himself as opposed to the view that bovine tubercle bacilli may be harmless for man, and calls attention to the fact that they generally have a higher grade of virulence than human bacilli and are therefore to be regarded as more dangerous.

The British Royal Commission on Human and Animal Tuberculosis *c* concluded from its investigations that cow's milk containing bovine tubercle bacilli is clearly a cause of tuberculosis, and of fatal tuberculosis in man, and that a very large portion of tuberculosis contracted by ingestion is due to tubercle bacilli of bovine origin.

It does not seem necessary to add to this evidence to prove that the various existing types of tubercle bacilli are simply mutation forms of one specific organism. The presence of transition forms between human and bovine types; the occurrence of pure bovine types in human lesions and of human types in bovine lesions; the occurrence of bacilli highly virulent for cattle in human lesions; the generally greater virulence of bovine types for all species of animals, and the virulence, and greater virulence, of bovine types for anthropoid apes and monkeys, *d* or the animals in the zoological scale most nearly related to man, are facts that support the conclusion that bovine tubercle bacilli in butter and other dairy products are a source of great danger to public health.

THE GREATER FREQUENCY OF LUNG TUBERCULOSIS.

It is a fact that tuberculosis is more commonly an affection of the lung than of other portions of the body. The explanation for this, which was long regarded as satisfactory and is still accepted by many, rests on the assumption that the most important source of tuberculous infec-

d Berliner Klinische Wochenschrift, Nos. 4 and 5, 1907.
e Zeitschrift fur Tuberkulose, Vol. XI, No. 3, 1907. Also Inter. Centralb, fur die ges. Tuber. Fors., Vol. II, No. 1, 1907.
a Centralb, fur Bacteriologie, etc., Vol. XLIII, Part 1, pp. 422-529.
b Berliner Tierarz, Wochens., No. 47, 1902.
c Jour. Royal Institute of Public Health, Vol. XV, No. 3, 1907.
d Report of the British Royal Commission in the British Jour., No. 2430, 1907; Bureau of Animal Industry Bull. 52, 1905.

tion is finely pulverized tuberculous material, suspended in the air as dust, and the direct exposure of the lung to this dust through the process of respiration. If this so-called inhalation theory is true, and, as many of those who maintain it assert, tubercle bacilli can not pass through the uninjured wall of the digestive tract and reach the organs remote to it without leaving evidences of their passage, then tubercle bacilli in butter and other articles of food eaten by adults have no important significance for public health. Therefore to prove that tubercle bacilli in butter and food products of all kinds are dangerous we must give some thought to the mode of infection, or the portal through which the bacilli enter the body.

How strongly the inhalation theory was intrenched in the minds of medical men until quite recently is well expressed by Aufrecht *a* in the statement that considerable courage was required only a few years ago to characterize the theory as an unwarranted hypothesis for the wide belief to which no satisfactory evidence had been supplied. He, in 1900, *a*, and Baumgarten, b in 1901, pointed out that it had not been proven to be the exclusive or even the most important mode of infection with tuberculosis. In 1902 followed the experiments of Nicolas and Descos, *c* confirmed by those of Ravenel *d* in 1903, which proved that tubercle bacilli introduced into the healthy intestinal canal of animals rapidly passed through the uninjured mucosa and appeared in the great thoracic duct on their way to the venous circulation. Nocard and his pupils, Desoubry and Porcher, *e* had earlier shown that the passage of bacteria through the intestinal wall and their transference to the blood was possible. Chauveau, *f* in view of the constantly accumulating evidence that pulmonary tuberculosis in man and animals arises from infection through the intestine, calls attention to his investigations from 1868 to 1874, in which pulmonary tuberculosis was brought about by the ingestion of tuberculous material without the production of pathological conditions in the digestive tract.

This earlier work was followed rapidly by other investigations, which proved more and more conclusively that the introduction of tubercle bacilli into the body with food may lead directly to the development of pulmonary tuberculosis, without lesions in the alimentary canal and without intermediate lesions of disease between the digestive and respiratory organs. The most important investigations are probably those of Calmette and his associates, recently published in book form. *a*

These investigators claim, and present good evidence in support of their claim, that dust particles that enter the lung never penetrate deeper than the first branches of the bronchi; that tuberculosis is constantly a

a Berliner Klinisch Wochens., No. 27, 1907.
b Wiener Med. Wochens., Vol. 51, No. 44.
c Jour. Phys. et de Path. Gen., Vol. IV, 1902.
d Jour. Med. Resea., Vol. X, pp. 460-462.
e Comp. Rend. Soc. de Biologie, Vol. XLVII, 1895.
f Experiment Station Record, U. S. Dept. of Agri., Vol. XIX, No. 2, 1907. (Comp. Rend. Acad. Sci., No. 15, Paris, 1907.)
a Recherches experimentales sur la Tuberculose, effectuees a l'institut Pasteur de Lille, par Calmette et Guerin, P. Vansteenberghe, M. Breton, Grysez, Sonneville et Georges Pit, Paris, 1907. Reviewed in the monthly publication of the International Antituberculosis Association, Tuberculosis, Vol. VI, No. 5, 1907, pp. 256-259. Also in Zeitschrift fur Tuberkulose, Vol. XI, No. 2, 1907, pp. 163-166.

disease of which the infection enters through the intestine; that tubercle bacilli may penetrate the intestinal wall without causing lesions; that the bacilli may pass through the mesenteric glands without causing lesions; that the bacilli frequently cause primary lesions in the mesenteric glands of young experiment animals, but commonly pass through these glands of adult animals and cause primary pulmonary tuberculosis; that tuberculous processes in the lung never begin in the bronchi or alveoli, but constantly in the capillaries, especially in the finest capillary network of the subpleural tissue, etc.

Relative to this localization of the earliest stages of pulmonary tuberculosis, Aufrecht *b* says, "The fact is that the initial changes in the apices of the lung, as I have convinced myself by repeated anatomical examinations, do not spread from the terminal branches of the bronchi." He further says that he has "proven the cheesy tubercle in the lung to be associated not with the final branches of the air tubes, but with the terminal capillaries of the pulmonary arteries." While he is not a special advocate of the intestinal way as the sole mode of infection, he ends his article here referred to with these words: "The inhalation theory for lung tuberculosis is no longer tenable." Kohler, *c* who reviews Aufrecht's work, justly remarks that it deserves a wide recognition, as it supplies important arguments for a thorough revision of the older views about the development of pulmonary tuberculosis.

Fibiger and Jensen *d* conclude from their own investigations and a critical analysis of the reports from numerous widely separated hospitals that the former doctrine, which taught that primary intestinal tuberculosis is a rare disease, can no longer be held as valid. Among 289 children from 1 to 15 years old who had succumbed to various diseases, 44, or over 15 per cent, were found on autopsy to be affected with primary intestinal tuberculosis. These investigators say that we must, without doubt, return to our former view and regard the ingestion of raw milk as an important cause of primary intestinal tuberculosis during childhood. This view is in perfect harmony with Calmette's experiments, which proved that primary intestinal tuberculosis is of more common occurrence, with infection that enters the body through the alimentary canal, in youth than in adult life.

Orth *a* makes the statement that even with localized tuberculosis in the lymph glands and the lung we can not exclude the intestine as the portal of entry for the tubercle bacillus. At the international conference on tuberculosis, held in Vienna during September, 1907, he said that tubercle bacilli can enter the body from the intestinal canal, which might itself, however, remain completely unaffected, but that from the prophylactic point of view the channel of infection was of only secondary importance, as the object to be aimed at was the destruction of all sources from which infection might take place. As sources of infection he named milk and butter from tuberculous cows and sputum from tuberculous individuals

b Berliner Klinisch Wochens., No. 27, 1907.
c Intren. Centralb. fur die gesam. Tuber. Forsch., Vol. II, No. 1, 1907.
Berliner Klinische Wochens., Nos. 4 and 5, 1907.
a Berliner Klinsche Wochens., No. 8, 1907.

and bovine tuberculosis was characterized by him as undoubtedly infectious for human beings.*b*

Kliebs *c* has convinced himself that tuberculosis is a disease of the lymphatic system and may remain such until the end of life, and that infection occurs through the intestines, most frequently with bacilli contained in cow's milk. He claims to have established this as a fact with experiments made at Berne, and published in Virchow's Archives in the early seventies of last century. He says that he has found no reason to change his views, and calls attention to the conclusive manner in which they have been proven by the unimpeachable experiments of Orth, Von Behring and Calmette.

Gorter *d* adds his testimony to show that the intestinal mode of infection is not rare, and Bongert *e* showed with rats, as was shown by this Bureau *f* with hogs and cattle, that the injection of pure cultures of tubercle bacilli into portions of the body as remote as possible to the thorax caused pulmonary tuberculosis, and that without intermediate lesions to connect the location of the disease in the lungs with the portal at which the infecting bacilli were introduced.

Baumgarten *a* concluded after experimental studies and a review of the literature that for practical, prophylactic purposes we must consider not only the inhalation theory and ingestion as modes of infection, but all possible ways in which tubercle bacilli may enter the body.

It is not intended to give a complete summary of all the investigations that have supplied evidence to support the fact that tubercle bacilli can and do penetrate the wall of the digestive tract without affecting it and pass to the lung and there cause lesions. We have amply shown that the intestinal mode of infection for pulmonary and other forms of tuberculosis, unlike the inhalation of tubercle bacilli directly into the lung tissue, is not merely a theory, but a well established truth, which has forced its way to recognition in the face of considerable opposition. Hence we may assert that the frequency with which tuberculosis is a pulmonary disease can not be used as an argument to encourage an undervaluation of tubercle bacilli in butter; on the contrary, the mode of infection with tuberculosis, the certainty with which tubercle bacilli may enter one portion of the body and leave it unaffected and cause disease in other portions, condemns butter infected with tubercle bacilli as a serious menace to public health.

RELATIVE VIRULENCE OF TUBERCLE BACILLI IN VARIOUS SUBSTANCES.

A few words are required about the relative virulence of tubercle bacilli (1) in moist, opaque substances, like milk, cream, butter and cheese; (2) in dry dust from tuberculous material; (3) in translucent substances like sputum, and (4) in transparent substances like the infectious spray of droplets that may escape from the mouths of tuberculous subjects during more or less violent expiratory efforts.

b Editorial in New York Medical Record, Vol. 72, No. 22, 1907, p. 905.
c Deutsch Medic, Wochens., No. 15, 1907.
d Zeitschrift fur Tuberkulose, Vol. XI, No. 3, 1907. Also Intern. Centralb. fur ger. Tuber. Forsch., Vol. II, No. 1, 1907.
e Tierarz. Wochens., Vol. XV, No. 29, 1907.
f Bureau of Animal Industry Bulletin 93, 1906.
a Inter. Centralb. fur die ges. Tuber. Forsch, Vol. II, No. 1, 1907.

Cornet *b* is probably the strongest advocate of the dust-inhalation hypothesis. According to his views, dried, pulverized tuberculous sputum is the most important factor for the dissemination of tubercle bacilli and the transmission of tuberculosis from person to person, notwithstanding that he himself calls attention to the rapidity with which the bacilli die upon exposure to light and drying, and to the difficulty with which a tough, sticky substance like sputum is pulverized; also the fact that only a small fraction of a mass of sputum can reach a sufficiently fine state of pulverization to float in the air, or that fine state which he believes necessary for its direct introduction into the finest branches of the bronchial tubes.

The contrast between the life of tubercle bacilli from the same source in butter, 99 days or more, and in material that may become pulverized sufficiently under favorable circumstances to float in the air, is very impressive. It must be borne in mind that material sufficiently pulverized to float in the atmosphere of rooms is in a very fine state of subdivision, and hence offers an enormous surface, relative to its mass, for light to act upon and exert its germicidal influence. In the open, on streets and highways, where currents of air are stronger, particles of sputum may be blown about long before they can be suspended in the air in a way that will lead to their introduction into the mouth and nasal chambers, and their movement from place to place will insure their sufficient exposure to direct light to bring about their entire sterilization before they are so finely pulverized that they can be carried far into the body by respiratory processes.

Flugge and his associates *a* first showed that Cornet's dust inhalation hypothesis was faulty, and proved that even in the environment of tuberculous persons it was difficult to obtain dust capable of floating in the spray that contained living, virulent tubercle bacilli. For dust they substituted the so-called droplet theory. While it is certain that droplets containing virulent tubercle bacilli are expelled from the mouths of tuberculous persons during coughing and speaking in the form of a fine spray, they can have no great importance during their suspension in the air beyond the immediate environment of such persons, and hence can not account for the great frequency of tuberculosis as a disease of man and animals.

The droplets are either so heavy that they settle at once and attach themselves to various articles from which they can not be removed without considerable friction, or so small that the light can act on the contained bacilli from all sides and deprive them of their infectiousness in a very short time. The large droplets are a source of danger when articles of food are handled by or exposed to persons affected with tuberculosis, and because of this danger it is hoped that the time is not distant when stringent regulations will make it impossible for persons known to be tuberculous to come in contact in any way with food that is eaten by others, especially with food that is presented for sale in public markets. Bread, cake, milk, butter, fruit, etc., which

b Die Tuberkulose, Vienna, 1907, pp. 101-117.
a Zeitschrift fur Hygiene, Vol. 38. See also editorial in the Journal of the American Medical Association, October 12, 1901.

are eaten in the condition in which they are purchased or received from the dealer may be a serious tuberculous danger when they are talked and coughed over by persons affected with consumption or any form of open tuberculosis.

What we have said about sputum, as we stated in a former publication, must not be taken or used as an argument in favor of indiscriminate and unrestricted spitting. Although dried and pulverized tuberculous sputum holds no terrors that we can discover, there are no reasons to doubt that fresh, moist tuberculous sputum is a prime agent for the transmission of tuberculosis from person to person.

When sputum is deposited promiscuously on streets and in public places it may easily collect in the form of smears on shoes, trousers, and, more commonly and in larger amounts, on the skirts of women, and be carried into dwellings, where small masses are transferred to floors and furniture. This matter is not properly relevant to our subject, and therefore can not be discussed here with the care its importance merits. But no great imagination is needed to picture how sputum collected on the apparel of persons in the streets and elsewhere may indirectly infect articles of food, and how, in various and numerous ways, it may be a constant tuberculous menace in otherwise wholesome and sanitary habitations. Little children are first of all and most seriously exposed, because they are of low stature and the portion of the clothing most commonly soiled is that nearest the floor, which may have become contaminated by means of soiled shoes, skirts, etc. They spend much time playing on the floor and they frequently put their hands, soiled or clean, into their mouths, and are apt to eat articles that have been in contact with the floor without a thought about dirt or infection.

Unguarded spitting is dangerous, no matter by whom it is practiced, because it is not only the sputa of those who are consciously affected with tuberculosis that contain tubercle bacilli, but also that of persons who are apparently well, but unconsciously affected. The insidious character of the disease insures that persons of the latter kind will be fairly numerous in the places where free spitting can do the most harm.

THE EFFECT OF SUNLIGHT ON TUBERCLE BACILLI.

The rapidity with which tubercle bacilli die on exposure to light is shown by a series of guinea pig inoculations made at the Experiment Station with tuberculous pus obtained from the udder of the same cow that supplied the milk from which the butter, used in the butter guinea pig inoculations, was prepared.

After May 8th and 14th, the dates on which the two lots of butter used were prepared, the tuberculous disease of the cow's udder progressed very rapidly until a large tumor had formed which broke open and discharged a thick, glistening, pale yellow pus. Some of this pus was collected on September 24th and used as follows: A portion was spread smoothly in a translucent layer on a sheet of glass and exposed to direct sunlight; a second portion was similarly spread on glass and exposed to ordinary room light, but at no time to the direct rays of the sun, and a third portion was put on a glass plate in thick, heavy masses, fully as large as the largest masses of sputum ejected by tuberculous persons, and exposed to direct sunlight. With material from the three sheets of glass guinea pigs were inoculated from time to time, as is shown in the following tables. The inoculations were all subcutaneous and the dose of material in each instance was 1 milligram (about 1-65 grain).

The thin layers of tuberculous pus on the plates dried rapidly, the thick masses slowly. The material was more nearly opaque than sputum, but not so adhesive nor so elastic or tenacious; it contained innumerable tubercle bacilli. Compared with sputum it was easily pulverized, but for this purpose it was necessary to scrape it from the plates with a sharp instrument and to rub it for some time between two hard surfaces. The thick material was more easily removed from the plates, but not so easily pulverized; it had a tendency to break into tough, heavy scales, which, when ground, at first formed a coarse, heavy powder, of which the individual granules were spherical and difficult to crush.

The results of the guinea pig inoculations with the three different kinds of tuberculous material are shown in Tables 2, 3 and 4.

TABLE 2.

RESULTS OF GUINEA-PIG INOCULATIONS WITH TUBERCULOUS MATERIAL EXPOSED IN THIN LAYER TO DIRECT SUNLIGHT.

No. of guinea pig	Number of hours material was exposed	Date of inoculation	Date of death	Days from inoculation to death	Result
		1907.	1907.		
9921	1	Sep. 24	Oct. 30	36	No tuberculosis.[a]
9922	1	Sep. 24	Oct. 28	34	No tuberculosis.[a]
9923	2	Sep. 24	Oct. 28	35	No tuberculosis.[a]
9924	2	Sep. 24	Nov. 5	42	No tuberculosis.[a]
9925	3	Sep. 24	Oct. 31	37	No tuberculosis.[a]
9926	3	Sep. 24	Sept. 27	3	No tuberculosis.[a]
9927	4	Sep. 24	Oct. 30	36	No tuberculosis.[a]
9928	4	Sep. 24	Oct. 30	36	No tuberculosis.[a]
9929	5	Sep. 24	Oct. 30	36	No tuberculosis.[a]
9930	5	Sep. 24	Nov. 1	38	No tuberculosis.[a]
9935	6	Sep. 25	Nov. 2	38	No tuberculosis.[a]
9936	6	Sep. 25	Nov. 1	37	No tuberculosis.[a]
9939	7	Sep. 25	Nov. 1	37	No tuberculosis.[a]
9940	7	Sep. 25	Oct. 28	33	No tuberculosis.[a]
9941	8	Sep. 25	Oct. 29	34	No tuberculosis.[a]
9942	8	Sep. 25	Oct. 28	33	No tuberculosis.[a]
9945	9	Sep. 25	Oct. 30	35	No tuberculosis.[a]
9946	9	Sep. 25	Oct. 29	34	No tuberculosis.[a]
9947	10	Sep. 25	Nov. 4	40	No tuberculosis.[a]
9948	10	Sep. 25	Oct. 28	33	No tuberculosis.[a]

[a] The guinea pigs all died prematurely affected with inflammation of the bowels, due to unknown causes. With one exception, No. 9926, they lived long enough after inoculation for lesions of tuberculosis to develop.

TABLE 3.

RESULTS OF GUINEA-PIG INOCULATIONS WITH TUBERCULOUS MATERIAL EXPOSED IN CLUMPS TO DIRECT SUNLIGHT.

No. of guinea pig	Number of hours material was exposed	Date of inoculation	Date of death	Days from inoculation to Death	Result
		1907.	1907.		
9931	5	Sep. 25	Nov. 8	44	No tuberculosis.a
9932	5	Sep. 25	Nov. 4	40	No tuberculosis.a
9949	11	Sep. 26	Nov. 4	39	No tuberculosis.a
9950	11	Sep. 26	Nov. 4	39	No tuberculosis.a
9977	17	Sept. 27	Nov. 4	38	No tuberculosis.a
9978	17	Sep. 27	Nov. 4	38	No tuberculosis.a
9945	22	Oct. 1	Nov. 4	34	No tuberculosis.a
9946	22	Oct. 1	Nov. 8	38	No tuberculosis.a

a The guinea-pigs all died prematurely affected with inflammation of the bowels, due to unknown causes. They lived long enough after inoculation for lesions of tuberculosis to develop.

TABLE 4.

RESULTS OF GUINEA-PIG INOCULATIONS WITH TUBERCULOUS MATERIAL EXPOSED IN THIN LAYER TO ORDINARY ROOM LIGHT

No. of guinea pig	Number of days material was exposed	Date of inoculation	Date of death	Days from inoculation to death	Results
		1907.	1907.		
9933	1	Sep. 25	Nov. 2	38	Generalized tuberculosis.a
9934	1	Sep. 25	Nov. 13	49	Generalized tuberculosis.a
9951	2	Sep. 26	Nov. 4	39	Generalized tuberculosis.a
9952	2	Sep. 26	Nov. 4	39	Generalized tuberculosis.a
9979	3	Sep. 27	Nov. 6	40	Generalized tuberculosis.a
9980	3	Sep. 27	Nov. 6	40	Generalized tuberculosis.a
1	4	Sep. 28	Nov. 6	39	Generalized tuberculosis.a
2	4	Sep. 28	Nov. 2	35	Generalized tuberculosis.a
11	6	Sep. 30	Nov. 11	42	Generalized tuberculosis.a
12	6	Sep. 30	Oct. 31	31	Generalized tuberculosis.a
49	7	Oct. 1	Nov. 6	36	Generalized tuberculosis.a
50	7	Oct. 1	Nov. 2	32	Generalized tuberculosis.a
69	8	Oct. 2	Oct. 31	29	Generalized tuberculosis.a
70	8	Oct. 2	Nov. 18	47	Generalized tuberculosis.a
93	10	Oct. 4	Nov. 18	45	Generalized tuberculosis.a
94	10	Oct. 4	Nov. 4	31	No lesions of tuberculosis.

a The guinea-pigs, with the exception of Nos. 70 and 93, which were killed for autopsy, were all affected with inflammation of the bowels due to unknown causes.

Unfortunately most of the guinea pigs used in this experiment died prematurely from other causes than tuberculosis. All but one, however, lived long enough after inoculation for even very attenuated tubercle bacilli to have produced unmistakable, well-marked lesions of tuberculosis. The cause of death was invariably inflammation of the bowels, which also attacked a number of other guinea pigs confined in the same detached house. The outbreak of disease was probably due to errors in feeding for which a newly appointed employee, who attended the animals in the house in question, was responsible. This employee, contrary to instructions which he misunderstood, failed to feed the animals a sufficient amount of fresh vegetable matter. The whole investigation is being repeated and the results will be published at a future date.

The first table shows that tubercle bacilli in thin layers of pus, exposed to direct sunlight, die in less than one hour; the second that the same is true with tubercle bacilli in thick lumps of pus exposed less than five hours. How much more quickly the bacilli die than the given number of hours is not known, because it was assumed from the various investigations on the germicidal power of sunlight for tubercle bacilli with which we are acquainted that the bacilli would still be alive in respectively one and five hours. In our new series of experiments tests will be made for shorter periods of time.

The third table shows that tubercle bacilli in thin layers of pus exposed to ordinary room light may be alive aften ten days, and it also shows, since the same kind of pus was used in all cases, that the plates exposed to sunlight actually contained tubercle bacilli which were alive and virulent before the rays of the sun killed them.

SUMMARY.

(1) The conduct of tubercle bacilli in milk is to move both upward with the cream and downward with the sediment and thus, in both directions, away from the intermediate layer of skim milk. The downward movement is due to their high specific gravity and the upward movement to the tenacity with which they adhere to the comparatively large cream globules. Hence when cream is separated from infected milk it will contain, volume for volume, more tubercle bacilli than the milk.

(2) The frequency with which tubercle bacilli occur in sediment from milk is a fair measure of the frequency with which they occur in cream. What this means for the infection of commercial cream may be judged from the following paragraph quoted verbatim from the last Annual Report of the Secretary of Agriculture:a

(3) When butter is prepared from infected cream tubercle bacilli are transferred to it in such numbers that they will be present in greater concentration than in the milk from which the cream was derived; hence, measure for measure, infected butter is a greater tuberculous danger than infected milk.

(4) Tubercle bacilli embedded in ordinary salted butter remain alive and virulent a long time; after ninety-nine days they show only a doubtful reduction of pathogenic virulence.

(5) Butter seemingly contains nothing excepting salt that acts against the life and virulence of tubercle bacilli. The germicidal value of salt, especially in the proportion in which it is used in commercial butter, is very low. Besides, the distribution of salt in butter is not homogeneous, and hence tubercle bacilli may be so embedded in butter that they are not exposed to the salt it contains.

a Report of the Secretary of Agriculture, Washington, D. C., 1907, p. 30.

The examination of sediment taken from cream separators of public creameries throughout the country has demonstrated the presence of tubercle bacilli in about one-fourth of the samples.

(6) Sunlight is the most potent, natural agent for the sterilization of tubercle bacilli; it kills them in less than one hour when they are exposed to the direct rays of the sun in translucent layers of infectious pus, and in less than five hours when they are exposed in thick, opaque masses of such pus. Weinziri *a* asserts that tubercle bacilli, as well as other nonsporulating pathogenic bacteria, are destroyed in from two to ten minutes by direct sunlight, and Koch, *b* Jousett, *c* Flugge, *d* Heymann, *e* Di Donna, *f* Cadeac, *g* and others earlier called attention to the rapidity with which tubercle bacilli are destroyed by desiccation and exposure to light. Hence we may conclude that the conditions by which tubercle bacilli are surrounded in butter, the moist opaque character of which shields them against the germicidal action of light and drying, are ideal for their long preservation. As a matter of fact it is difficult to imagine a better environment for the conservation of the life and virulence of tubercle bacilli not actively associated with tuberculous lesions than butter affords.

(7) Unimpeachable evidence proves conclusively that tubercle bacilli of the bovine type, from bovine sources, must be classed as highly infectious for man; hence, tubercle bacilli in butter can not be ignored because they are usually derived from bovine sources.

(8) Since tubercle bacilli of the bovine type are certainly more virulent than those of the human type for all species of animals with which comparative tests have been made, it seems reasonable to ask, Why should they be regarded as less virulent for man?

(9) Tubercle bacilli of the bovine type are more frequently associated with the tuberculous lesions of children than with those of adults. Does this mean that children are oftener affected with tuberculosis from bovine sources than adults, or does it mean that mutations, shown to occur among tubercle bacilli, have had more time to pass through a complete transition from the bovine to the human type in tuberculous adults than in tuberculous children? This question is of special interest in connection with Von Behring's view—that tuberculosis at whatever age it occurs and wherever the lesions are located, arises from latent tubercle bacilli that entered the body through the intestinal canal during childhood.

The authority of Von Behring in the field of tuberculosis is so great that we could not afford to discard his view lightly even if it lacked the abundant support other investigators have given it. If it is true, we certainly have good reasons to believe that the mutations, which quite a number of investigators have recorded as occurring among tubercle bacilli, have had ample time in the lesions of adults to result in a complete adaptive transition from the bovine to the human type of bacillus. Tuberculosis is undoubtedly contracted from two great sources, namely,

a Dept. Agri. Expt. Sta. Rec., Vol. XIX, No. 3, 1907, p. 280. (Jour. Infect. Diseases, May, Sup. 3, pp. 128 to 153.)
b Cornet, Die Tuberkulose, Vienna, 1907, p. 41.
c Wiener Med. Wochens., 1901, No. 28, p. 1366.
d Zeitschrift fur Hygiene, Vol. 38.
e Editorial, Jour. Amer. Med. Asso., Oct. 12, 1901.
f Centralb, fur Bact. und Parasitenk., Vol. XLII, No. 7.
g Le Bulletin Medical, Sept. 5, 1906.

human tuberculous individuals and tuberculous cattle. When contracted by persons from a human source the bacilli should have the human type; when contracted from cattle we should find the bovine type common in the lesions of young children, less common in those of older children, and very rare in adults. The occurrence of the bovine type, or of transition forms, in the lesions of adults would signify an exception to the rule of infection through latent bacilli introduced into the body during childhood.

This conception of tuberculosis, like most other modern views of the disease, brings with it no encouragement to regard tuberculous dairy products with complacency; on the contrary, it stamps the tuberculous cow as one of the greatest dangers to which public health is exposed.

(10) The inhalation theory to account for the occurrence of pulmonary tuberculosis has been shown to be no longer tenable, because no substance can be carried into the finer bronchioles by the respiratory process, and because tuberculous lesions in the lung have been shown to spread from the vascular system, the finer capillaries, and not from the air passages. Dried and pulverized tuberculous material has been shown to lack infectiousness, and the infectious spray discharged from the mouths of tuberculous persons during speaking and coughing has been shown to be of importance only in their immediate environment, unless such persons are permitted to handle articles of food, to which the larger droplets of the spray may adhere. The introduction of bacilli into the body through the uninjured wall of the digestive tract, anywhere from the mouth downwards, has been shown to be the chief mode of infection with tuberculosis.

Consequently, fresh, virulent tubercle bacilli in articles of food must be regarded as the greatest of tuberculous dangers, and among these tubercle bacilli in butter, because of their frequent occurrence and their long-continued life and virulence, must rank very high as a danger of the utmost significance for public health.

(11) It is imperatively necessary for the protection of public health that all dairy herds should be cleaned of tuberculous animals. It makes no difference whether the milk obtained from a tuberculous herd, or a herd that contains one or more tuberculous animals, is sold as milk or cream or butter; in all forms it is equally objectionable and dangerous. It is not a question of the exposure of children alone, but also of adults; the former drink more milk, but the latter eat butter oftener and in larger quantities.

(12) Until we are certain that the milk delivered to us by dealers is obtained from healthy cows in every way protected from exposure to tuberculosis, we should not use it until it has been pasteurized or sterilized and all cream that is not above suspicion should at least be pasteurized before it is used in the preparation of butter.

While we are not special advocates of the pasteurization or sterilization of dairy products, we recognize that the public is forced to resort to some such expedient for its protection, not only against tuberculosis, but also against numerous other infections. Thoroughly clean dairy products require no pasteurization. While unclean, pasteurized milk is

fairly safe, unclean raw milk is today the most important cause tolerated by civilization for unnecessary disease, suffering and death.

NOTE.—Since the foregoing circular was written several additional guinea-pigs have died at the Experiment Station as the result of inoculation with tuberculous butter, as follows: One guinea-pig inoculated with butter 113 days old died sixty-six days after inoculation; one inoculated with butter 113 days old died eighty-two days after inoculation, and one inoculated with butter 133 days old died one hundred and eighteen days after inoculation. The cause of death in each case was uncomplicated, generalized tuberculosis. Another guinea-pig inoculated with butter 133 days old is now sick (March 19, 1908) and will probably die in a few days. This proves conclusively that tubercle bacilli may live and retain their virulence in ordinary salted butter practically four and one-half months or longer.

VENEREAL DISEASE.

BY B. L. EIKER, M. D.

We believe in educating the people. Ignorance and superstition is now and always has been a hinderance to progress. Education and enlightenment is our only safeguard. True modesty is an unexcelled virtue, but false modesty is the cloak of ignorance and depravity. Great natural laws control and govern all things; if you violate these laws you must certainly pay the penalty. In recognition of this great truth we have the laws of state and nation, which provide for teaching to mankind everything except a true knowledge of his own sexual nature. That he should possess this knowledge of himself is too self-evident to even admit of discussion. The medical profession, the clergy, the bar and even parents shun this subject as they would shun a viper. Consequently the young are left to gain this knowledge the best they can, and with human curiosity they very naturally turn to the most accessible channels to acquire this information, namely, newspaper advertisements, scarlet women and immoral companions. Newspaper advertisements relating to the "restoration of lost manhood" and scarlet women should be placed in the same class, because both ply their trade for money and both are equally disastrous to the morals and life of the young manhood and womanhood of our State.

With this brief preface the author feels justified in speaking a few words about venereal disease. In undertaking this delicate task we shall endeavor to make our language plain and easily understood. There are two primary forms of venereal disease upon which we believe the public should be properly informed, namely, Gonorrhea (commonly called Clapp), and Syphilis (commonly called Pox). Both of these diseases are equally prevalent in our midst and equally dangerous to both men and women. No one afflicted with either of these diseases may ever expect to be as good physically, mentally or morally as they would have been had they not been so contaminated. Proper treatment, skillfully administered, will in time render the individual comparatively safe to his family and community, but like Cain of old, he will carry some kind of a mark to his grave and probably transmit it to innocent posterity.

Either of these diseases may be transmitted through the use of the linen, clothing or bedding of the tainted individual, as well as lavatory fixtures, table, furniture and drinking cups. A kiss innocently received from infected lips has doomed the recipient to a life of untold misery. Hence many cases are recorded where innocent men, women and children have spent a lifetime of suffering because of the carelessness of their associates. If these two diseases could be confined to those who contract them the evil result would not be so great, but children of parents thus afflicted are liable to inherit some of the disastrous consequences. Our jails, our penitentiaries, our schools for the feeble-minded, our schools for the blind, our insane hospitals contain many dependents of the State today who are such because of more or less remote hereditary tendencies that have been directly or indirectly caused by one or the other of these diseases.

Both sex are equally responsible for the spread of Gonorrhea and Syphilis and their natural tendencies are such that one sex is no more virtuous than the other. The author has little patience with any writer or speaker who eulogizes the virtue of one sex at the expense of the other. We believe the same standard of morality and code of sexual ethics should obtain for both men and women. It not infrequently happens that boys and sometimes men feel that sexual intercourse is essential to the preservation of their strength and health. To gratify this fancied necessity they indulge, and thereby soon become victims of venereal disease. Such ideas as the one just given are false and should be treated as such wherever found. Having once been contaminated the victim frequently repents and seeks to avoid a second infection by getting married. This increases the grief by making two people miserable instead of one. How soon will it be safe for me to get married? This question is frequently asked by both men and women who have been infected. The only absolute safe time would be the day of judgment. Few there are who will wait this long, therefore the only thing their physician can do is to state the facts regarding their particular case and let them be their own judge.

Smallpox, tuberculosis and diphtheria are considered dangerous to life, but neither of the above diseases, either in their immediate or remote effect, are as much to be dreaded as Gonorrhea or Syphilis. For the former named diseases we spend both time and money in educating the people of the State along lines of prevention and cure. But upon the latter the State is as silent as the tombs of Egypt at the darkest hour of eternal night. If hospital walls could tell their tales of misery, if courts of justice could know the truth, if graves of suicides could speak, if broken hearts and aching heads dared talk, their statistics would show that Gonorrhea and Syphilis stand without a peer in the cause of misery, trouble, sickness and death. Then why do people hesitate to impart wholesome knowledge to the young? The young have been taught patriotism, music, literature and art and other sciences that make life worth the living, but they have heard nothing from proper sources about sex physiology and veneral diseases and remain ignorant until they become contaminated.

If the State of Iowa and the United States of America desire to build up a strong, noble race of people they must be educated in sexual hygiene and venereal disease and the result attendant thereon. "Be not deceived, God is not mocked; for whatsoever a man soweth, that shall he also reap."

SHOULD THE PUBLIC BE ENLIGHTENED AS TO VENEREAL DISEASES?

BY EGBERT H. GRANDIN, M. D., NEW YORK.

It is my conviction that the ravages of the venereal diseases are tolerated only because of the widespread ignorance which pervades all classes, except the medical, in regard to their consequences from the standpoint of radical integrity and from the standpoint of the physical and mental well being, in particular, of woman.

We are dealing with the solution of a problem where ignorance is not bliss, but is misfortune, and where, therefore, it is folly not to be wise. No evil ever flourished long in the world's history after the limelight of knowledge had uncovered it, and I am convinced that neither gonorrhea nor syphilis can thrive in any community where force of public opinion is exerted against them. We may meet, and we may discuss, and we may resolve and thereby educate ourselves a little better, but we shall accomplish naught until the fathers and mothers of the land, the educators and legislators and pastors, having instructed themselves, proceed to instruct others. In short, the social—the sexual diseases must be spoken of in the open and not with bated breath, they must be fought from the front and not from ambush.

Of necessity, owing to my opportunities for investigation and practice, I shall look upon this question from the standpoint of woman. Gonorrhea and syphilis rarely endanger the life of man in these days of enlightened treatment. It is on woman that the burden falls heavy and the heavier in that she too frequently receives in innocence diseases which render her sterile, which drive her to the operating room, which may kill her, and all the while the agent of her disaster leads her to think that she is blameworthy.

The sexual sense in most women, I believe, is a matter of education. Woman, except where she deliberately adopts prostitution as a trade, rarely seeks the man. He is the aggressor and she the recipient in ignorance of the danger she runs as regards health, and, when she so desires, as regards maternity. Therefore, it holds that education in matters venereal should be given to her as well as to the man, for it is not conceivable that with such knowledge any woman, the possessor of a fair amount of judgment, would permit the approaches of a tainted man. Life and health when placed in the balance against gratification of appetite will outweigh. I am told, when such views are ventilated, that knowledge of this nature imparted to the girl, would injure her modesty. Far better that some of the bloom should be lost to

the rose than that the woman of the future should be subjected to the venereal inoculations that they have received in the past. I believe, however, that the requisite information may be imparted to the girl as well as to the boy without in any sense offending that innate modesty which constitutes woman's greatest attraction.

I take it for granted that the reader is familiar with the statistical data which prove the deleterious effects of the venereal diseases on the race and I pass to the educational methods which are requisite. The first steps in knowledge are required in the home. When the girl reaches the pubescent period she should be told by her mother about her sexual system and of the risks she runs should she abuse it or allow it to be abused. She is warned against smallpox—why should she not, and can she not be similarly warned against great-pox? She is warned against mating with an alcoholic—why should she not, can she not be warned against mating with a gonorrhea? The seed thus sown should be watered in her next phase of life—the school. Here, a woman physician should impress on the pupils the lesson learned at mother's knee. When this girl reaches the nubile age she will demand a certificate of sexual cleanliness—and it is her right to have it—from the man who seeks to become her lord and master and too often today also becomes her inoculator with gonorrheal virus. Supposing the girl belongs to that class which from necessity seeks domestic service or which, when of tender years, must go to the department store or the factory to eke out a scant living (and I would state here that these places are too often the localities from which the sexual diseases are disseminated), the problem of education is somewhat different. Perhaps these girls have had no one to warn them either in the home circle or in the school. They prove a ready prey to the libertine who with oily tongue pictures to them the manner after which they may lead a life of greater luxury and who carefully conceals from them the diseases he or others like him is going to inoculate them with. Here is a field for good work. Interest employers of labor by educating them in matters venereal and endeavor to have attached to factories and similar places women physicians whose counsel along the right way may overcome the bad advice the girls otherwise will receive. Having the knowledge of social evils such girls, as well as their more favored sisters, will not yield so frequently to the voice of the sexual tempter. Thus, in course of time, we may hope to see the sexual diseases diminish for lack of soil upon which to develop, for meantime the boy has been instructed along similar lines, and except where innately bad at heart, he will think twice before he risks acquiring disease; and he will hesitate long before he inoculates others. The professional libertine, the prostitute by choice, whether male or female, the law will take charge of as soon as public opinion has been enlightened sufficiently to demand this of the law. And then our boards of health will be compelled to class gonorrhea and syphilis with diphtheria and typhoid and scarlet fever, and thus the so-called professional secret, under the protection of which hitherto the venereal diseases have hidden and have thriven, shall wither under the strong light of diffused knowledge and in the end the sexual diseases

may be controlled even as are yellow fever and smallpox—and this through the force of education. The object of the Society of Sanitary and Moral Prophylaxis being the extermination of the venereal diseases through the diffusion of knowledge, it becomes its duty to publish and to disseminate tracts (to use a missionary phrase), containing information such as appears proper to give the boy and the girl. Educate the parents and the teachers to cease blushing when such diseases are mentioned, and rather to consider it their duty to dwell upon them when opportunity offers. Nothing good ever came from throwing the cloak of modesty over a white sepulchre. Years ago scores of death certificates read "idopathic peritonitis." Now we know the casual factors and by timely eradication we forestall peritonitis and the death. Similarly, teach the people the exact meaning and intent of gonorrhea and syphilis and trust them to assist us in our crusade of eradication.

TEACHING SEX MATTERS IN PUBLC SCHOOLS.

BY MORRISON I. SWIFT.

Competent authority estimates that from a million to a million and a half of innocent wives now alive in this country are suffering from syphilis or gonorrhea imported to them in the marriage bed by their husbands. The estimate is that upwards of 75 per cent of the males of each generation contract one or other of these terrible venereal diseases at some times in their lives. The injury thus done to national vigor is beyond belief. Yet society is silent on the subject. Parents themselves are ignorant, because they were never taught; and most parents have a timidity about speaking to their children on matters of sex. In this field the physician has entirely neglected his duty, as he has in nearly every field.

So, not only do the sexual diseases flourish as if especially cultivated, but sexual excess in every form is indulged in. Masturbation is chronic among boys and young men, and widespread among girls; later it takes the form of over sexual gratification, either in the marriage state or illicitly. No one warns the youth while he is growing up; everyone is as silent about sex as if there were no sex; and the period of growth up is therefore a preparatory school for the brothel. Through ignorance gonorrhea is laughed off, although it is in reality a deadly pest.

It is time for society to come to its senses on these things. If a man does not care for himself he should think of his children. If he does not care for his children he is a criminal and society must take him in charge. But most men do care for their offsprings, and they do not breed them soaked with venereal poisons from malicious intent. They do it from ignorance, and the crime is on society for letting them grow up in ignorance.

The remedy is to be found in a campaign of education. Private societies, every community, and the State, should address themselves to a

crusade of education in the sexual field, and to the stamping out of venereal diseases. But no work will be adequate unless the principles of sex are thoroughly and insistently taught to children in the public schools. The teaching should begin with the very youngest children. It is not a subject that can be once started and then left, for the feelings and impulses of sex are ever present with the young. The instruction must begin with the earliest steps of education, and continue to the latest, unfolding with the growth of maturity.

But the objection is made that if young children go sexually astray they are abnormal, and that the majority have no sexual stirrings until a certain age. On the contrary, a child is never too young to be sexually curious. Left in ignorance this curiosity will develop into some form of sexual vice. The vice will settle into a physiological habit, and very likely teaching postponed until puberty will be unable to dislodge the habit. The critical years of sex come long before puberty. And, besides, there are many children mingling with the rest who have abnormally developed sexual propensities, and one such can vitiate an entire child community.

Another objection is that teaching would tend to suggest and prematurely arouse. Will you then leave your children to teach and arouse each other prematurely? That is what it comes to. Boys get their sexual schooling on the street, from the lips of profligate men, from their school companions. All this, while parents and trusted teachers are silent, is most inciting. But clear, cold scientific teaching would allay and protect, furnishing an arsenal of knowledge that would inhibit the passions. When parents compel the public schools to do their duty in the sexual field, the energy and intelligence of the American people will probably be doubled. An immediate educational crusade should be started by the public to bring them to do so.

CIRCULAR OF INFORMATION ADOPTED BY THE CONFERENCE OF STATE AND PROVINCIAL BOARDS OF HEALTH OF NORTH AMERICA.

ISSUED BY THE STATE BOARD OF HEALTH OF IOWA.

We hand you this leaflet, believing that you would not willingly communicate your disease to some innocent person.

Many fail to comprehend the exceedingly disastrous results that often follow these diseases. Many cases of blindness, complete disability and not infrequently death results from them. Gonorrhea is one of the most frequent causes of diseases peculiar to women. So serious a menace have these diseases become to the public health that the Medical Profession and Sanitarians in all countries have become alarmed and are advocating measures for their prevention.

Syphilis (or Pox) is especially a disease from which innocent persons may suffer, as it usually produces sores in the mouth or on the lips, hence

may be conveyed by kissing, drinking from the same cup or using anything which has been put to the lips or into the mouth of one affected by the disease.

These diseases are often communicated when the patient thinks he has recovered. Hence marriages contracted at this time of the disease result in much unhappiness, and often in the death of the wife. To protect yourself and others we earnestly advise the following:

IN THE INTEREST OF PREVENTION OF YOUR DISEASE.

What to do and what not to do, to get well and to prevent giving your disease to any other person.

Follow strictly the advice of your doctor; use no other treatment.

Remember that it takes a long time to entirely recover.

Carefully wash your hands with soap and hot water whenever you handle the private parts.

Do not have intercourse and avoid all sexual excitement until your physician says you are completely cured. Be especially careful not to rub your eyes with your fingers.

Do not allow any person to use any cup, glass, spoon, fork or anything that you have put in your mouth.

Do not kiss anyone or wipe the face of a child with a handkerchief you have used. Always use a separate towel. Burn all cloths or cotton soiled by discharges.

HYGIENE OF YOUNG GIRLS.

BY J. H. CARSTENS, M. D.

The hygiene of young girls has been discussed and written about so much that it is impossible to say anything new or even present the subject at a different angle than you have looked at it before.

When I speak of young girls I naturally mean during the age of puberty. We can divide the subject into mental and physical. The hygiene of the body is comparatively easy if the young girls are raised in a primitive state of civilization. Still, again, here there is a great difference. In some of the primitive races, as with certain tribes of Indians, girls have to do hard work, and do not grow up unrestrained as they do among some other primitive people. In the South Pacific islands, for instance, where they grow up without care and restraint, romping, playing, swimming, there they develop even muscular figures and healthy bodies.

This we can not do in civilized communities. As they grow up some of the children in Europe, for instance, are obliged to carry heavy burdens and do hard work, with poor food. They may be muscular, strong and have large bones, but they do not have handsome and graceful figures nor the intellectual training which we desire.

You take, however, our so-called better class, who have chances for physical development. In New England, where everything is esthetic

and where the mental training is beyond the brain capacity, we find just as lamentable a state of affairs in another direction; yes, even worse than we do with the overworked peasantry of Europe.

What modern civilization desires is an even development of the body and mind. This is a very difficult problem, as we have to contend with a long train of ancestors and their hereditary defects in one direction or another. It is not necessary for me to go into the old question of hereditary in its relation to rheumatism, gout, tumors, tuberculosis and so on. I want especially to dwell upon the hereditary predisposition of the nervous system. Insanity, alcoholism, epilepsy, and the like, I need hardly dwell on them, as they are so well known. When, however, we have to deal with that condition we call neurasthenia and hysteria, it is very difficult. Naturally, as a rule, it is the mother who transmits this, and by her lack of mental balance strengthens and intensifies this condition in her daughter, and if the father is also weak and soft, and permits and encourages this state of affairs, it is a very difficult thing indeed for us to manage such cases.

The constant suggestion of the mother has its effect on the daughter, and she is finally imbued with the thought that she is nervous and can not help it. All our efforts to improve the condition are negatived by the mother with the statement, "Oh, she can not do that, I never could either when I was her age. She is too weak, my nerves were too weak also," and so on. We might just as well give up unless we can get the young girl away from home and put her under different surroundings. She must be entirely taken away from the influence of the mother and have care of a trained nurse, who will teach her and who, by constant suggestion in another direction, can show that she is not nervous, not so weak and delicate as her mother thinks. And in the course of a few years a wonderful change can take place. Again, there is the mother who constantly suggests, month after month, that there must be something the matter with her daughter, with her menstrual function, until it is impressed on the young girl's mind that there really is some trouble, and she will always think in the future that her pelvic organs are weak. So I could go on with numerous other points.

If we now turn and go to the opposite extreme, among the poor and poverty stricken, we find that children are made to work very hard, to carry burdens, to lift their little brothers and sisters, perhaps have improper food and thus often produce injuries of all kinds, rupture, curvatures, chlorosis, etc.

Ignorance on the part of the mother is very frequently the trouble. In all these cases it is the mother that must be treated. We must get her to understand that we must reform her, and show her how to properly treat, manage and train the daughter so she will grow up strong and healthy. And in nearly all cases with the right kind of argument the teaching we can get the mother's mind so stirred up that we will have comparatively little trouble in managing these cases properly.

This class of young girls must often work at quite an early age, and we should regulate the kind of work that each one is capable of doing. Fortunately a great deal is being done by the State in the enactment of

laws regulating the lines of work. These kind of laws should be encouraged, as they tend to improve the health of the young girls. First, in regulating the hours of labor. Secondly, proper ventilation. Thirdly, in proper toilet facilities. Fourth, in the opportunity of getting food at proper intervals.

This brings us to the question of physiology. In all these cases, rich or poor, we must regulate diet above all other things. Medication also sometimes will be required, but comparatively little. The various gymnastic sports should be encouraged, but regulated by the physician. This is the only way we are able to reach some people and make them take the necessary exercises. The one trouble with most of these are that they are lopsided, will develop only certain parts of certain muscles and parts of the body, while it is so essential to have a systematic and symmetrical development of the body. We are not always able to reach our ideals with stubborn and selfish patients, but we must do the best we can and always strive for it.

Trying, therefore, to guide the young girl to strong and vigorous motherhood it is not necessary to pay any attention to the menstrual function. That will come without trouble unless there are organic defects and changes which will have to be looked after and remedied, but that does not concern us here.

If we now consider the mental development we have the greatest difficulty. If their physical weaknesses are marked, the mental training should cease or be checked. In this we will have comparatively little trouble. The rich will be willing to do so because they seem nearly always anxious to stop their studies or postpone them on the slightest provocation. This holds good especially with the so-called shoddy. With the poor and the middle classes we shall have our greatest trouble. If the young girl has been animated by ambition to be something in the future, to be able to support herself, and perhaps often to assist her parents and younger brothers or sisters, we will have a very difficult task if such a person is physically weak. If we allow her to go on with her mental work her physical condition will probably become still worse. She is liable to have an undeveloped uterus and conditions of the system produced by it; poorly developed lungs, weak heart and arteries, flabby muscles, feeble digestion, malnutrition of the nervous system and final collapse. The latter sometimes they will become when the goal is reached for which they struggle; the diploma, the teacher's certificate or whatever it may be. She has a mind educated for requirements of that position, and a body feeble and weak, and if she marries she will be a burden to the poor husband, in fact, ultimately will probably be divorced or a subject to a series of operations, which will be done to remedy her defects.

One of the greatest difficulties is that these people learn with difficulty. They have not the right kind of brains; they have to study hard until late at night to get their lessons. This intensifies and hastens the physical downfall. Such persons should stop mental work for a year or two and do some other kind of work. When the body is more developed they can resume their mental efforts. They often object to this, but we

can manage them all right if we insist on it. People with the right kind of brains and quick perception can continue studies and with a proper amount of physical training they will get along all right.

The question of age in all these cases cuts no figure in my opinion. Either mentally or physically some girls are further advanced at 12 than others at 18.

In conclusion, let me say that hygiene of young girls is one of the most difficult problems to solve. There are no mathematical problems, no rule that is even elastic within a certain limit, but every case almost is absolutely distinct and requires to be studied by itself. The hereditary predisposition, the surroundings, the future course, the position in life, the means at their disposition, the development of the different parts of the body, or the lack of development of certain parts, the assimilation and elimination of the various organs, the brain and the kind of brain, how it should be developed in one direction or another, and a thousand and one things must be considered in each individual case. Added to this there must be that fine tact and that absolute control over individuals so that we can not only manage the young patient, but also those around her, be it the mother, father, sister, cousin or aunt.

RESULTS OF VACCINATION.

The Pennsylvania Board of Health puts it succinctly thus: "Smallpox per million of inhabitants, 1905—Vaccination compulsory: Germany, 1.1 cases; Denmark, 0.5 cases; Sweden, 2.1 cases; Norway, 0.6 cases. Voluntary—Belgium, 99.9; Russia, 46.32; Spain, 56.3; Hungary, 134.3." One would suppose that facts like these could be understood by all men, but they appear incomprehensible to most of mankind.

Some are inclined to criticise statistics concerning the protective effects of vaccination, and believe that these can be so manipulated that anything desired can be proven by them.

When there is a death from smallpox there can be little doubt as to the cause of death, so if the deaths from smallpox be taken, a charge of manipulating statistics to suit the purpose would rest upon a slender foundation. The number of deaths caused by this disease, taken per million inhabitants, will, therefore, convey a very clear idea as to the rate among a population. London has records reaching as far back as 1629, and Geneva from 1850. In other countries, while the records are not so remote, they are sufficient to give an idea of the prevalence of smallpox before vaccination. In England before vaccination the rate was above 3,000 per million; in London it was over 4,000 per million. Now the rate is less than 20. In Prussia the rate before vaccination was slightly over 4,000, but on the adoption of vaccination it began to suddenly decline, and continued to do so until the vaccination law of 1874 was enforced, when the cases became fewer and fewer until now the rate is less than two per million. Sweden had a death rate from smallpox for sixteen years prior to 1800 of 2,019 per million, while the rate from 1802

to 1811 fell to 623. In 1816 compulsory vaccination was enforced and for the next ten years the rate was 133. From 1890 to 1899, 100 years after the vaccination began to be practiced, the death rate fell from 2,049 to 1.

Compulsory vaccination has been in force in France only since 1902, the rate of smallpox among the army being now four per 100,000 as compared with the experiences of 1870-71. Vaccination was introduced in Austria in 1808, and was optional until 1900, when all school children were required to be vaccinated before entering. Vaccination and revaccination are compulsory for the army and navy. Denmark, since 1810, requires all children to be vaccinated before the seventh year. Revaccination is compulsory for the soldier and inmates of public institutions. Italy has had compulsory vaccination since 1888. All children are required to be vaccinated within the first six months, and, if this is unsuccessful, to be revaccinated before they are a year old. Before the law was in effect the death rate for smallpox was 610 per million; in 1902, 9.7 per million. In Belgium and Holland it is not compulsory, although all public officials and the army are required to be vaccinated. In the latter, while not obligatory, all children must go to school and no child can attend without being vaccinated. The teachers also must be vaccinated. India prohibited smallpox inoculation in 1880, and made vaccination compulsory. Similar laws are in effect in Austria, New Zealand and Cape Colony. Vaccination is only optional in Russia, except in the army and the public service. The great majority of the people do not avail themselves of vaccination, so epidemics are not uncommon. In Persia, Siam and China little vaccination is done; therefore, smallpox is endemic. Japan has enforced compulsory vaccination since 1886, whereby the greater portion of the population has been vaccinated and revaccinated. Especially is this true of the populations of large cities and on the seacoast. No provisions are made in any of the cities for smallpox hospitals proper. When a case develops it is usually allowed to remain at home, or taken to a general hospital for treatment. No quarantine measures of any kind are enforced. Notwithstanding this fact, smallpox has never been known to spread from any such cases. The same also may be said with regard to the German Empire, where no precautions are taken in the strict sense of the word against the spread of smallpox, the whole reliance being upon vaccination. It has been stated by those who opposed vaccination that the reason why the German Empire was so free from smallpox was the superior facilities for the isolation and treatment of cases and not vaccination. This was investigated by the local Government Board to ascertain just what methods were employed by the government and municipalities for the prevention of smallpox. Accordingly, an agent was sent to make this investigation. He encountered serious difficulties from the very first. In Berlin he was informed by the Central Health Officer that so far as it was known there were no smallpox cases in Germany. The principal cities of the four chief states of Prussia, Bavaria, Saxony and Wurtemburg, were visited. In ten cities of these states, containing a population of over five million, or one-tenth of the population of the German Empire, he did not find a single case. As a matter of history he ascertained

that there had been 70 cases in 7 years, 1895 to 1901, inclusive; in Cologne, 1 case in 10 years; in Frankfort, 9 cases in 10 years; in Wiesbaden, 12 cases 11 years ago, but none since then; in Mainz, none during 11 years; in Munich, 7 cases in 8 years; in Nuremburg, none for about 11 years; in Dresden, no deaths for the past 10 years; in Leipsic, 8 cases in 8 years, and in Stuttgart, none in 6 years.

Vaccination in the United States is not compulsory. It is, however, made obligatory in many of the States and municipalities, and applies only to school children. Children are debarred from attending school unless they are vaccinated. While vaccination is generally practiced, there are many of the population, particularly in our Southern States, among the negroes, who do not vaccinate. Among these smallpox is not an uncommon occurrence.

The United States Government now requires that all alien immigrants shall be vaccinated before being allowed to land. This has been the means of reducing the danger from this source almost to a minimum, for smallpox has not developed among this class.

CHRONIC RUNNING EARS.

BY H. G. L., M. D.

Long continued discharge of foul-smelling pus from the ears must be considered one of the most important diseases of that organ requiring treatment; first, because of its frequency; second, as regards the loss of hearing; third, in respect to a general disturbance in nutrition sometimes following; and, fourth, serious complications arising from extension of the infection to the mastoid bone and inward to the brain, often causing death when least expected.

The condition called "running ears" has come to be looked upon by the public as something to which children under fifteen years of age are especially liable. When well started it is regarded as little more than an inconvenience and a source of perhaps slight discomfort. The fact that discharging ears so frequently follow an attack of measles or scarlet fever has served to make parents a trifle careless. This, coupled with lack of intelligent home treatment, often fails to cure a discharging ear of some weeks or months duration and has led to the erroneous idea that the child might possibly outgrow it or that it was desirable to be rid of matter in the head. In such instances parents have not realized that the discharge was gradually destroying the intricate mechanism of hearing besides subjecting the patient to the chance of an acute exacerbation and death from brain involvement.

A discharge from the ear which has extended over a period of several months is said to be chronic. Almost always this suppuration began first as an acute abscess with pain and fever. The pain and tenderness soon subsided, but the ear without treatment continued to discharge. The inflammation was due to an infecting bacteria extending from the throat along the Eustachian tube to the ear. Growths in the throat, the

so-called adenoid vegetations of childhood, cause ear troubles by mechanically closing the opening of this tube, preventing the proper ventilation and drainage of the middle ear. Sometimes the removal of growths is necessary before an attempt be made to cure the ear itself. Running ears are most common as a complication of the contagious diseases of children, such as measles, scarlet fever and diphtheria. Indeed, cases of suppurating ears arising during these diseases are the ones most likely to pass into the chronic form. Plain neglect is more often the reason for their continuance. Experience has demonstrated that a large number of the discharging ears in adults date from childhood. The fact that the discharge continued for a long time without pain of any sort or fever should not allow one to under-estimate the seriousness of the condition. A feeling of pressure or heaviness in the head, headache, giddiness, etc., are warnings that some treatment is required before it is too late. Occasionally the discharge, after persisting for years, ceases spontaneously for a time, only to return. These relapses are most frequently caused by colds, entrance of water into ear, nasal catarrh and fever.

The complications setting in during the course of chronic running ears are many and varied. In reality we find most of the source of discomfort, as well as the conditions which menace life, in the complications. Besides the minor results, such as loss of hearing, the formation of dead bone, polypi, facial paralysis, enlarged glands in the neck, come the real dangers to life from sudden lighting up of an old process and extension into the brain and nearest blood vessels. Brain abscess is one of the gravest complications to be met with, and the number of brain abscesses due to middle ear coppuration has been estimated by competent observers as fairly high.

A few years ago an important question raised by life insurance companies was, "What proportion of patients with chronic discharging ears have their lives shortened thereby?" The best answer to such a question is to point out that it is now the practice of life insurance companies to either absolutely reject applicants suffering from a discharge of this kind or demand unusually high rates for a limited number of years only. Evidently they have been convinced in the matter of dollars and cents that such a condition is a menace to life. When we reflect that in no other part of the body is an abscess allowed to discharge without treatment, how foolish it seems to view lightly an abscess deep within the temporal bone.

The treatment of chronic running ears includes first of all prophylaxis. Nowhere is prevention so necessary as here. Prevention is possible many, many times when a cure is possible but once. If a child develops an acute abscess in the ear it should be seen by the family physician or specialist and carefully treated. In no case should an ear be allowed to discharge continuously for months without medical advice. The longer the ear discharges the more difficult it is to establish a permanent cure. The discharge is due to a very definite cause, namely infection of the middle ear by pus producing bacteria. The point to be attained is a cessation of discharge and an absolutely dry ear. As the ear is filled with foul material, cleanliness is the first essential in any treatment. The ear should be syringed out with warm water two or three times a day and the canal dried with a bit of cotton. Cotton should also be kept in the canal to drain and absorb the pus and should be changed as frequently as it becomes well soaked. The combination of cleaning the ear and syringing and drying with cotton will accomplish much. Finally one with chronic discharging ears will do well to consult his physician, who, having the interest of the patient at heart, will direct him to a competent specialist.

SANITARY PLUMBING.

Plumbing is a modern necessity not only for comfort and convenience but for cleanliness and health. The following extracts from an article written by Elmina T. Wilson, C. E., formerly Assistant Professor of Civil Engineering at Iowa State College, published in Bulletin No. 370 of the United States Department of Agriculture, will prove interesting and instructive to many of our readers. Those desiring the entire article may obtain it upon application to the above department at Washington, D. C.

IMPORTANT POINTS TO BE KEPT IN MIND.

There is a great difference of opinion among those who have made special study of sanitary plumbing concerning many of the details of construction and design, but the vital things to be kept in mind when laying out the system are to use the best material, isolate all plumbing and concentrate as much as possible. By "best material" is not meant the most expensive, but the most durable. Secure simplicity in all needed fixtures. Avoid complications in waste pipes. Select sinks without grease traps, bath tubs without inaccessible overflows, wash basins free as possible from fouling places, and water-closets without valves, connecting rods, or machinery.

The drainage system must be so constructed as to carry away completely, automatically and immediately everything that may be delivered into it. It should be constantly and generally vented, frequently and thoroughly flushed, and have each of its openings into the house securely guarded from the entrance of air from the interior of the drain or pipe into the room. All drains, soil pipe and waste pipe should be absolutely tight against the leakage of water or air.

The main line of the house drainage system begins at the sewer, flush tank, or septic tank, as the case may be, passes through the house by such a course as may be indicated by a judicious compromise between directness and convenience, past the location of the highest fixture that is to discharge, into, and then out through the roof for free ventilation. If possible, have the fixtures which are located on different floors in a direct line one above the other to avoid any considerable horizontal run. If bathrooms or water-closets are required in different parts of the house, let each have its own vertical line of soil pipe. All plumbing fixtures on bedroom floors should be confined to bathrooms, and under

no circumstance should there be a wash basin or any other opening into any channel which is connected with the drainage system in a sleeping room or in a closet opening into a sleeping room. Each bathroom should have exterior location and at least one window for light and ventilation, but pipes should not be placed against outer walls unless adequately protected against frost. Never have plumbing out of sight; let each pipe be in full view, and each closet, bath or basin be unhidden by any sort of inclosing woodwork. There is quite as much danger from the dirt which is apt to gather around concealed pipes and beneath inclosed sinks, bowls or closets as there is from the admission of sewer gas. The simplest way to prevent the accumulation of dirt is to make it easier to be clean than to be dirty. Therefore, keep the plumbing fixtures where there is plenty of light.

Improvements for the kitchen.—The kitchen is the most important part of the house. On it depends the physical life, and to a large degree the spiritual life, of the family. Realizing its importance, sufficient time and thought should be given to it to secure the best results possible from the material at hand.

Ventilation, walls and floors.—Perfect ventilation is the first requirement of a kitchen, light comes next, and in turn the possibilities of perfect cleanliness. The walls should be painted so that they may be wiped off with a damp cloth, making cleanliness possible without great demand on strength, and without the disarrangement caused by whitewashing and kalsomining. In these days of enameled paint the walls and shelves of all kitchen closets should be painted. Painted shelves can be wiped off with a damp cloth every day if need be. Paper in kitchen closets is always a bid for dust and vermin.

Hard wood makes the best kitchen floors. Linoleum or oilcloth are labor-saving, and, if cut to exactly fit the floor and all joints cemented, are perfectly sanitary. Intelligence does not countenance a carpet on the kitchen floor.

The range.—Whatever fuel is used, let the range be one of the best in the market. This is true economy. Near the range and under the same ventilating hood should stand the oil or gasoline stove. There is an infinite variety of these stoves, all economical, cleanly and safe if managed with care.

A hood suspended over the kitchen range and connected to a flue in the chimney will gather all the steam and odors and carry them away.

The kitchen sink.—The kitchen sink should be of cast iron, plain, galvanized or enameled, broad, and of a generous size, preferably with a high back to protect the wall from the water which is certain to splash when drawn rapidly from the pipes. The faucets should be set well up and back to avoid the breakage of dishes by striking them against the faucets. The waste pipe should be covered with a fairly fine brass strainer, which should be held securely in place by screws. At one end should be placed a long draining shelf. The shelf should be well grooved and inclined slightly toward the sink. Both tubs and sink should be well trapped, but as grease traps when neglected are filthy things, and as proper care of the pipes renders them unnecessary in an ordinary kitchen, they should

be avoided. Kitchen and pantry sink drains should be treated frequently to a wash of hot water and ammonia or soda to keep them clear from deposits of grease. Kitchen sinks are used for the discharge of liquids which in their original condition are not offensive, but which after a little retention begin to putrefy, and it is very important to secure the complete removal of all such matter well beyond the limits of the house before putrefaction begins.

Refrigerator drains should never connect directly with the drainage system.

INSTALLATION OF THE BATHROOM.

Walls and floors.—The bathroom should be a light, well-ventilated room with every facility for cleanliness. Floors and wainscoting of tile or composite material are most desirable, but painted walls are much less expensive and give excellent results. Tile is undoubtedly the most satisfactory material which can be used for the covering of the floors and walls where it can be afforded. Tile floor with covered base and walls finished with cement or hard plaster, painted with enamel paint, are much cheaper. When a tile floor cannot be had, linoleum is an excellent substitute, as it is practically impervious to water. It should be laid before the fixtures are set, in order that there may be no joints. Cement mixed with small chips of marble well rubbed down after setting makes an excellent floor, one that washes as clean as a porcelain plate and has no cracks to harbor dirt; the cost is only about twice that of a double wood floor, or 50 cents per square foot, including the necessary cement bed on which it is laid. When it is desired to lay a cement, composition or tile floor upon wooden floor joists, proceed as follows: Nail a 2 by 4 to the side of each of the floor joists flush with the bottom. Upon the top of these stretch wire lath, after the joists have first been covered with tarred paper to prevent them absorbing moisture; and upon this lay cinder concrete, made of 1 part Portland cement, 3 parts loose sand, 6 to 8 parts crushed and screened furnace clinkers, filling in to a level at least 2 inches above the tops of the joists. Upon this is placed the floor finishing. Cinder concrete is used because it is so much lighter than that made of stone. When a tile or cement wainscot is too expensive the walls should be painted. Wall paper is not desirable in a bathroom, nor is wood paneling.

Bath tub and lavatory.—A porcelain-lined or enameled-iron bath tub is the best medium priced tub. For supplying the tub with water a combination cock is best, allowing hot or cold water to enter the tub separately or the temperature to be regulated to suit the bather. The cocks should be placed high, so as to allow of water being drawn into pitchers.

The best lavatories are those of porcelain or enameled iron, with back and overflow all formed as integral parts of the fixture. The basin cocks through which the hot and cold water come are of various shapes, the simplest being the best.

The closet.—The water-closet is the most important plumbing fixture in the house, and should be selected and put up with particular care. A good closet should be simple, neat and strong, of a smooth material with ample water in the bowl. Among the modern closets there is none more satisfactory than the flushing rim, siphon jet closet, which can be had, including the trap, in a single piece of porcelain. Porcelain is used because no other material can be kept so clean and sanitary. But even this is an imperfect protection from dirt and disease unless the bowl is flushed so as to clean it completely and absolutely. The water should be poured from the rim of the bowl, so that every part of it is perfectly cleaned. The wash-down and wash-out closets are similar in make, but are not so thorough in their action. In the wash-out closet the basin acts as a receiver, a small quantity of water being retained in it, and into this the deposit is made, to be washed out afterward into the trap by the flush. The water in the basin is prevented from leaking into the trap by a raised ridge which is apt to break the force of the flush so that its whole force is not directed into the trap, which is objectionable. The wash-down closet receives the deposit directly into the water held in the bowl by the trap. It has a straight back and a much smaller fouling surface. There is no open vent. The outlet is entirely covered with water, so that the water does not throw the soil against the side. The only advantage the siphon-closet has over it is the greater force of discharge given by the siphon.

The siphon-closet, like the wash-down closet, retains a certain amount of water into which the filth is discharged. In addition there is a siphon trap provided with a long ascending arm, so that the water in the trap is at lower level than the water in the bowl. The water from the flushing cistern is directed not only into the bowl, but downward into the trap itself. As a result of this discharge into the trap a siphon action is produced whereby the contents of the bowl are sucked through the trap into the soil pipe without soiling the bowl. The seal—that is, the body of water which prevents the sewer gas from escaping into the house—is deep, broad and always in plain sight.

Flushing apparatus.—The flushing cistern or tank for a water closet is always distinct from the main water supply. As a rule, a plain hardwood box, copper-lined, is supported by brackets from the wall about 7 feet above and communicating with the closet by a pipe. This pipe is usually about 1½ inches in diameter and should have as few bends and angles about it as possible. The cistern should hold 2 or 3 gallons of water, all of which should be discharged at one time into the closet. The flush of the closet should be quick, powerful and noiseless, thoroughly scouring all parts exposed to fouling.

The flow into the cistern is regulated by a float which allows the tank to fill, the float rising with the water; when it reaches the proper level the float is entirely raised and the supply shut off. When the tank is emptied by opening the flush valve, which is lifted by pulling a chain attached to it, the process is repeated. The cistern is usually provided with an overflow connected with the flush pipe, so that if the ball cock fails to act properly in shutting off the water the surplus will escape through the water closet to the drain instead of overflowing.

Soil pipe connections.—The best closets are provided with a brass screw soil pipe connection, calked with lead and cemented into the base of the closet. The corresponding threaded brass coupling is soldered into the end of the lead bend which connects with the soil pipe. The closet is then screwed into the threaded coupling until the base rests on the floor. The closet may be removed at any time by simply unscrewing it. No bolts are necessary through the base flanges. In setting a water closet a neater finish can be obtained if a porcelain floor slab is put in with the finished floor.

General suggestions.—The important need of the work is simplicity, not only in detail, but in general scheme. Construct the water closet to be used as a urinal and slop sink and arrange to draw water through the bath cocks placed at the top of the tub. It not only saves cost, but is a great advantage to have the fewest possible points requiring inspection and care and to secure the most frequent possible use of every inlet into the drainage system. Great care must be taken not to throw into the water closet hair, matches, strips of cloth, or anything which is insoluble and liable to clog the trap and soil pipe. A burnt match seems small in itself, but if lodged in the trap will collect other things and cause a serious obstruction of the outlet. Tissue toilet paper should be used. Its cost would be exceeded many times if a part of the system needed to be taken out to free it from newspaper obstruction. It is often found more convenient to have the water closet with a separate entrance from the hall and entirely independent from the bathroom.

TRAPS AND VENTS.

Every plumbing fixture must have a trap to prevent the foul air from coming back from the drain through the waste pipe. In its simplest form a trap is a downward bend in a pipe, so deep that the upper wall of the pipe dips into the water held in the bend, the extent to which it dips being known as the depth of the seal. With slight modifications this is the trap most commonly used for wash basins, laundry tubs, etc. Its greatest fault is the danger from siphonage; that is, the water seal may be carried out of the trap into the soil pipe by the rush of water when the fitting itself is emptied, by the flow of water from another fixture on the same branch waste pipe, or by the discharge of water from a fixture higher up but connected to the same soil pipe. This danger is much lessened by the introduction of a system of ventilation pipes extending upward either from the trap itself or from the outlet near the trap To avoid this extra expense of a third system of pipes, it is better to supply each fixture with one of the patent non-syphonage traps, which should also be self-cleansing. There are several good ones on the market. It is a good habit, after emptying the wash basin, bath tub or kitchen sink, to allow some clean water from the faucet to run into the fixture in order to have clean water in the traps. All traps should be provided with trap screws placed below the water line, and arranged so as to be accessible for cleaning.

Nothing short of continuous use will prevent the evaporation of the water in the traps. One with a large dip is best, but at the same time the trap must be so formed that at each use of the fixture all the filth that

is delivered shall be carried away, the trap being immediately refilled with fresh water. Hair and fibers from cloth sometimes carry the water out of traps by capillary attraction, and care should be taken not to allow such things to enter the pipes.

THE SOIL PIPE.

The soil pipe should extend from cellar to roof in a straight line, if possible, as each offset or bend forms an obstruction to its proper flushing with both water and air. Use only "extra heavy" soil pipe of uniform thickness throughout, as the hubs stand the calking better.

Avoid if possible plumbing fixtures in the cellar if the drain must go under the floor. If it is necessary to make connections with a fixture in the cellar it is better that the main channel should run under the floor to or near the location of such fixtures that all or nearly all of its length should constitute a part of the main drain thoroughly flushed and ventilated like the rest of the system. The pipe should be laid in an open trench and so thoroughly calked that under a pressure equal to one story in height not a drop of water should escape at any point, and then it should be enclosed in good concrete, after which the trench should be filled. The soil pipe should pass through the foundation by means of an arch, and the cast iron pipe should extend at least 5 feet outside the foundation; from thereon, a carefully laid and rigidly inspected vitrified pipe drain is to be preferred. The joint between the iron pipe and the vitrified sewer pipe should be made with neat Portland cement mortar. If there are no fixtures in the cellar carry the drain in full sight along the face of the cellar wall, or suspended from the floor beams, so the joints may be inspected. At the point where it is to turn up as a vertical soil pipe support it by a post or brick pier. Use no short turns in the soil pipe, like "tees" and "quarter bends." Two one-eighth bends or a Y branch and a single one-eighth bend give a more gradual and therefore a better change of direction. Water closets should connect to the soil pipe with a Y branch. The soil pipe should be secured along its entire length at distances not over 5 feet with hangers and clamps or hooks, so that it will be rigidly held in position. The joints in the cast iron soil pipe should be made by first inserting a little picked oakum into the socket, allowing none to enter the pipe; it is better formed into a sort of a rope. The oakum prevents the lead from running into the pipe to form an obstruction to the flow. Enough molten lead is then poured into the hub to fill it. After the lead has cooled it is carefully hammered with a special calking tool until the space between the spigot and hub is perfectly gas and water tight. Every joint should be made with a view to being tested with hydraulic pressure.

In making this test the simplest way is to close all openings into the pipes with wooden plugs or disks of India rubber compressed between two plates of iron forced together with a screw. There is no special advantage in applying a great head of water, for if a joint is not tight it will leak under a head of a few inches. It is generally most convenient to test the vertical pipes story by story, the plugs being inserted through the water closet branches. There is probably no occasion to fear that work once made tight will develop leaks for many years. The tendency to rust after a time, even with tar-coated or enamel pipe, being rather to close such slight leaks as may exist.

Four inches in diameter is sufficient for soil pipe, and the best results are obtained by running it full size straight above the roof and covering the top with a wire basket such as is used to keep leaves out of gutters.

There should always be a trap between the house and the sewage disposal plant, and there must also be on the house side of it an inlet for fresh air. There can be no real ventilation of the system if it is open only at the top, but a generous inlet for fresh air on the drain outside the house, in connection with the opening at the top of the soil pipe, will insure a free movement throughout the whole system. The fresh-air inlet must be guarded from obstruction. It may be brought out close to the foundation walls, but not too near windows and doors. If the trap is formed by the submerging of the inlet pipe in the settling chamber of the disposal system the fresh air inlet should be placed close to this.

THE WASTE PIPES.

For all minor waste pipes lead pipe is used, as it may be bent and cut to suit all possible positions and requires but few joints. Only "heavy" lead pipes should be used. As lead is quite a soft material it would not be practical to use thread joints on it, so the joints are made by the use of solder. Where lead pipe joins to cast iron pipe the connection should be made by means of a brass ferrule of the same bore as the lead pipe, and soldered to it. The ferrule is introduced into the hub of the cast iron pipe and calked tight with oakum and lead as described for cast iron pipe joints.

VENTILATION OF BUILDINGS.

BY CHARLES FRANCIS, C. E., MEMBER OF STATE BOARD OF HEALTH.

The subject of ventilation seems to have been sadly left behind in the great march forward in building construction.

At the present time in business blocks and office buildings the first question is how to get the greatest area of available rent paying floor space; next, how to give it sufficient strength and stability at the sacrifice of the smallest amount of this paying area; and last how shall the building be heated. Very little, if any, study is given in the large majority of cases to the problem of the removal of vitiated air. Considerable attention is given in many cases to the introduction of fresh air, usually in connection with the heating plant, and the prevailing idea seems to be that by forcing in plenty of fresh air the bad air will be driven out.

In the design of school buildings, perhaps the farthest advanced of all architectural studies—the convenient arrangement of the rooms and halls—the sanitary appliances—the study of the comfort and health of the scholars—all these are most carefully planned—every point, in fact,

is most thoroughly considered and worked out except the most vital one—the forcible removal of the vitiated air.

We give ourselves great concern in the removal of animal wastes, collectively known as domestic sewage, which our large office and public buildings and schools furnish in great abundance.

This is removed in a highly scientific manner and with the greatest care. Modern plumbing is almost beyond criticism. But the animal wastes in the form of exudations from the skin and expirations from the lungs, receive very little attention, although this form is just as dangerous to health as the other.

Dr. Evans, The Health Commissioner at Chicago, stated, at the Convention of Plumbing Inspectors and Sanitary Engineers, held at Chicago in February last, that ten thousand people died in Chicago in 1907 of bad air. We cannot afford to ignore such facts as this.

The systems of heating known as the hot air furnace—steam heat with indirect radiation—unquestionably the best under proper condition—have only to do with bringing heated fresh air into a building or house or room, and this appears to be the generally accepted idea of ventilation. We naturally say, when a room has become stuffy and close, "Open the windows and let in some fresh air." That is, dilute the bad air, and make it a little less intolerable. As has been suggested before, the essential factor in proper systems of ventilation—that is to say, the first thing to be done—is the complete removal of the vitiated air; a factor which is generally neglected or overlooked.

Legislation relating to the ventilation of schools, for example, should require that every scholar shall have four hundred cubic feet of air space at least. Further than this, the law should require that the air of the school rooms shall be completely changed four times each hour at least. With such a law enacted we shall have made a most commendable beginning.

We may go into the mechanical part of this problem and see what we have to do. Take one room in a school building intended for thirty children. One law requires that this room shall have at least 12,000 cubic feet of space. The dimensions then should be 32 ft. by 30 ft. and twelve and a half feet high. We are required to change the air of this room four times an hour at least, giving us 48,000 cubic feet of air to remove each hour, and we should lift it at least one hundred feet into the air by means of a stack or chimney. If we have twenty such rooms in the building, with the halls and other adjuncts, we may say that we shall have, say, 42,000 pounds to raise 1 foot high every second, which is equivalent to say 6 K. W. or electrical horsepower, which should cost about $270 per school year. This 6 K. W. motor should be provided, as it is of sufficient size to furnish margin enough to cover contingencies, but the full power of the motor would not be required, as that would mean the complete changing of the air of all the rooms and all the halls and other adjuncts at the same time, which would not be called for. With sufficient number of openings in the base boards of the rooms and halls, connected by flues to the central stack, and regulated by dampers, and with the upward draft in the stack under complete regulation and control, this end

of the scheme of ventilation is provided for, and this is the end that should be attacked and thoroughly worked out first. The question of getting fresh air into the room is a very simple one and need not be discussed here.

Take the bad air out first, and do it thoroughly, and incidentally do not stand in such mortal fear of drafts. Bad air is infinitely more dangerous than drafts.

SCIENTIFIC EMBALMING AND ITS RELATION TO PUBLIC HEALTH.

The term "embalming" has been so misused and abused in the past few years, that the question ought to be considered from its scientific standpoint at this time. Any effort at preserving the dead body, preventing decomposition only temporarily, has in so many cases been called "embalming," that the idea has become prevalent that it is only a mere mechanical process, and has in many instances made people who have been in charge of such bodies, careless, so that they may have been the cause of the spread of communicable diseases. The intelligent embalmer of the present time will not use methods of this kind, even if the body has died from disease that is not communicable.

While perfection in the science may not have been attained, the fact remains, that the protection afforded against the spread of disease by the methods in use at the present time, have been proven time and again. An embalmer has a general knowledge of the body, he understands the circulation of the blood, he studies the causes of decomposition, he knows the cause of communicable diseases, and has studied the method of the destruction of the germs that cause these diseases. He knows something of the post-mortem conditions. He knows the danger of transmitting infectious and contagious diseases, and has learned how to combat them. He understands the effect of chemicals introduced into the body, and has ideas as to how to best introduce them without mutilation or disfigurement.

Health boards have come to a realization of the fact that there is a time between the death and burial of the body that has died of a communicable disease, that is dangerous to those who may be about it, and have authorized embalmers who have proved their qualifications to prepare such bodies, so that they may not be dangerous to public health. They prepare the dead by embalming, and they understand by the term embalming the disinfection of the dead human body. This disinfection must be complete, and as a result of disinfection, we also have preservation, for the chemical that will destory the organisms of disease, will also destroy the organisms of decomposition. In order to be effective, this disinfection must be complete, and not partial. In addition to this, it must be understood that this does not remove all danger of the spread of disease, and the scientific embalmer gives his attention to the disinfection of the discharges of the body, both faeces and blood, as well as the apartments, and every thing that may have been in any way exposed to the danger of

infection. While he may not be required to do this personally, he can give intelligent advice on the subject, and suggest the way in which this may be done effectually.

Embalming, as practiced at the present time, must be done with an intelligent idea of the post-mortem conditions of the body, and while in some cases it may be possible that an arterial injection would disinfect thoroughly, still unknown conditions might present themselves, that might make this method, when used alone doubtful. There must be no doubt in the treatment of dangerous communicable diseases, and then the method of treating the local sites, where the germs of the disease may have developed or where they may have been carried, must receive direct treatment of the disinfectants. The surfaces of the body and all orifices should receive careful attention, and to add to the thoroughness of the work, so as to be absolutely safe, some cases are wrapped in cotton, and then placed in hermetically sealed cases or caskets. There is absolutely no doubt but what a body can be thoroughly disinfected, so that there would be absolutely no danger from any case, still there are persons who may doubt the efficiency of the methods, and there may be those who would be careless in the perfect treatment of the case, that these precautions are wisely taken in addition to all the other work.

Within the past few years, in recognition of the fact that embalming had been brought to a state of perfection, the transportation companies, with the consent of the health authorities, have allowed the shipment of bodies that have died from any of the dangerous communicable diseases, with the exception of smallpox and bubonic plague. That this concession was a wise one is borne out from the fact, that up to this time, there has not been a single case of infection reported from the shipment of any of these cases. There are cases on record where cases have been shipped, with only partial disinfection, from the fact that the true cause of death had not been reported, that infection did take place. In three states, the shipment of smallpox is permitted, when the body has been prepared by a licensed embalmer, and then closed in a hermetically sealed case. One of these states is Michigan, and at Grand Rapids, within the past five years, they had an epidemic of smallpox. There were over thirty deaths from the disease, and of these, twenty-one were shipped to points outside of the city, within the state. In order to prove that it was safe to transport these by railway, in baggage cars, these cases were carefully watched, and not a single case of infection was traced to any of these shipments. This is certainly a practical demonstration of the fact that embalming does disinfect, and that contagious bodies can be made reasonably safe.

For sanitary purposes, an embalming fluid should be a perfect disinfectant and a good deodorant. It should kill all germs and their spores, and it should hide or destroy all bad odors arising from the body. For this purpose, chemical substances of the highest efficiency for these purposes are distributed throughout the body, and they have added to them chemicals that produce a good cosmetic effect, so as to preserve the natural and lifelike appearance of the body. With the body treated in this manner, free from germs and offensive odors, it would be absolutely

safe for friends to be present at a house funeral, provided the surroundings had been taken care of, and such bodies could safely be taken into public buildings. It is doubtful if the embalming of the present day is fully understood or appreciated by the public. They do not realize how thoroughly the germs of disease in and on the dead body are absolutely destroyed, but the fact that there is rarely an infection among embalmers from the cases that they are handling, should be some evidence that the work is effective. Scientific embalming makes it safe to come into the presence of the dead, and with an intelligent knowledge of the means of the spread of disease, the embalmer who is thorough in his work, knows what other precautions besides embalming, to take to guard against any possible danger. He knows what funerals should be private, he will advise under what conditions and circumstances bodies should be exposed to view in public places and under any circumstance, this should be done only in rare and exceptional cases.

The transportation rules that have been in effect during the past few years, have made it necessary that embalmers should prove their qualifications for preparing bodies safely, and this made it necessary that there should be some recognition. Through the efforts of the Licensed Embalmers of Iowa, suitable laws were passed, and placed under the direction of the State Board of Health, which have now been in effect over a year. The educational requirements are high, and the fact that there are in the neighborhood of a thousand licensed embalmers in the state, is evidence of the fact that they have anticipated these regulations, and have prepared themselves for them. Their work has been of the highest standard, for no charges have been preferred against any of them. They are rightly recognized as professional men, and with the interest they have shown in their work, they will be a strong adjunct to the Board of Health in aiding in stamping out communicable diseases. The Board of Health has handled the matter of examinations in an excellent manner, satisfying themselves of the qualifications of each candidate, and their methods of handling this part of their work has met with the hearty approval of the profession all over the state. The fact that a leading university of the west has added a department of embalming to its courses of instruction, gives recognition to the efficiency of modern embalming. May the day be not far distant when Iowa can have such a department in her University.

MEDICAL INSPECTION OF SCHOOL CHILDREN.

BY G. E. DECKER.

The question of whether or not some system of medical inspection of schools and school children is necessary seems a very vital one at present. In many of the larger eastern cities, notably New York, Boston, Philadelphia and Chicago, a fairly complete system is now in operation, but the movement has been slow to spread to smaller centers. Almost without exception physicians or medical organizations have been foremost in agitating the matter, but in spite of the fact that every advance in preventive medicine limits the physician's opportunity of earning a livelihood his efforts are regarded with little interest or perchance with suspicion. In many cities medical inspection of schools has first been carried on by volunteer medical men until its value has been sufficiently demonstrated to arouse public interest. In other cities these volunteers have been refused permission to inaugurate the work, though for what reason it is hard to imagine.

Possibly the following extract from an address delivered by a well known educator, Mr. H. E. Downer of Davenport, Iowa, to the Iowa State Teachers Association at Des Moines, Iowa, January 2, 1908, may serve to show the utter misunderstanding of the question under which our best teachers labor.

"The latest demand upon the schools is for systematic medical inspection. Because a partial examination of the children of New York City showed cases of malnutrition and instances of disease from dirt and neglect, Des Moines, with her brood of medical students anxious for lawful enlargement of observation follows suit. Later Burlington, Britt, Lost Nation and Soap Creek will wheel into line and physicians all over the state will consume school taxes and more valuable school time hunting malnutrition among the corn fields of Iowa. The teacher will add to his present valuable and voluminous equipment the ability to prognosticate from culture tubes and diagnose infantile disorders. Then one more responsibility, the health of the children, will be taken from the home and laid upon the school. This may be all right from a socialistic point of view, but from the standpoint of the teacher it is a distinct infringement upon the proper field of the school. In case of emergency, contagion, or serious accident a visit of a physician or surgeon to the school is warranted. Under other conditions he is as much out of place there in a professional capacity as a lightning rod peddler or a sand digger. The diagnosis of disease and the care of sick children should take place in the sympathetic atmosphere of the home."

It is in the hope of correcting to some extent this misunderstanding that this paper has been undertaken.

The development of the public school system has brought with it certain dangers which to a still unrecognized degree detract from its usefulness. One great evil which seems unavoidable is the daily confinement within doors of growing children whose greatest needs are fresh air, sunshine and exercise. It is a most unnatural thing for these little growing bodies to be required to sit still for hours when every inclination is toward activity and play. Moreover these children, gathered as they are from all parts of the community and from all sorts of homes, are, through their enforced association, given every opportunity for spreading any disease or vermin with which they may be afflicted. Added to all this is the fact that in most school rooms the ventilation is so woefully deficient that the child's natural resistance is lowered and he is ready for any disease prevalent at the time.

Granted that the confinement is necessary under even the best system of education it is nevertheless the duty of the school authorities to mitigate the evils of the system wherever possible and reduce the risks of damage to our future citizens during their period of development.

The existence of certain diseases of childhood has been recognized for centuries and so common have these diseases always been that they are accepted with singular patience by the majority of the people. Little effort is made to protect the children from measles, mumps and whooping cough and only the greater severity of scarlet fever and diphtheria has kept them out of the same category

But perhaps a little information and some clear thinking may put a different phase on the matter. These diseases are diseases of childhood for several reasons. In the first place the child's tissues, especially the lymphatic or absorbing tissues, are extremely active and receptive but this characteristic is gradually lost as age advances and the tissues become firmer and tougher. Thus the susceptibility to diseases is greatest in early life. Secondly this special group of diseases are infections, depending upon the introduction of a germ into the system and the subsequent development of vast numbers of germs to cause the disease. The germs in these particular diseases are unusually active and resistant and this gives the contagious character to them. Here are two conditions, great susceptibility on the part of the child and great activity on the part of the germ the combination being ideal for spreading disease and so it is rare indeed for a person to escape this combination for many years and achieve adult age without having "caught" some or all of them. Add to this the enforced association of children in the school room for hours every day and there seems to be little escape when once a focus of infection is established. The positive assertion that these diseases of childhood are not necessary concomitants of development but are accidents which are absolutely avoidable is fully warranted. Every child who escapes them is fortunate and is physically better and stronger for it and the complacency with which these epidemics are viewed is no credit to our boasted civilization.

The danger of these infections is greatly underestimated. During the year 1907 in Chicago there were 290 deaths from diphtheria, 466 from scarlet fever, 190 from measles and 182 from whooping cough from which

it will be seen that the two latter diseases are by no means as harmless as they are often thought to be.

The recovery from an infectious disease is the result of a combat between the child's system and the army of germs and even when recovery ensues there is often a tissue or organ damaged in such a way that though it is overlooked at the time it generally becomes apparent in later life. The valves of the heart suffer most frequently and the vast majority of all cases of organic heart trouble originate during acute infections such as rheumatism, St. Vitus' Dance, scarlet fever, pneumonia, etc., etc.

The kidneys also suffer during acute infections and oftentimes in so obscure a manner that it escapes notice temporarily and when later in life kidney trouble appears the original cause has been forgotten.

There can be no question as to the advisability of limiting the spread of every infectious disease in a community and since the school offers the greatest opportunity for the spread of contagion it is there that the greatest precaution must be taken. During the fall term of 1907, in Chicago 212,842 children were examined and 4,490 were temporarily excluded from school. Of those excluded, 219 had diphtheria, 245 scarlet fever, 108 whooping cough, 118 measles, 147 mumps and 229 chicken pox. Had these children remained in school it is reasonable to suppose that many new school epidemics would have started and their exclusion was absolutely demanded by all the rules of hygiene. Without medical inspection there is little doubt that most of them would have continued in school long enough at least to spread the contagion to many of their little neighbors.

Perhaps the greatest danger is from the cases of acute infections which are so mild in certain individuals as to escape notice. Thus a child with mild diphtheria or scarlet fever may attend school every day and only after an epidemic has started is the original focus recognized. This may come about through ignorance of the parents and teacher or as frequently happens through the determination of parents to continue the child in school irrespective of the possible danger to others. It is well known that as a rule quarantine is regarded with complacency as long as it is applied to some one else. When it strikes home it becomes an invasion of the rights of the individual and is to be circumvented and frustrated by any means available. So the child is sent to school and nothing is said of his illness for fear of quarantine.

Proper systematic medical inspection of all schools in a community could easily prevent the development of most of these epidemics and instead of wasting valuable school time would greatly reduce the absences due to sickness.

Not only are the pupils dangerous to each other but the teachers also may be sources of danger. This is true in regard to tuberculosis rather than the acute infections and no doubt many young teachers are tubercular and menace the health of their pupils for years before the disease compels them to desist. The average person dying of consumption has been tubercular for from six to seven years and probably during half of this time the disease has been in the "open stage" and capable of transmission. So a tubercular teacher might be a source of great danger

for two or three years before failing health compelled a reluctant resignation. Competent inspection should eliminate this danger entirely.

Many children are heavily handicapped by defects in nose, throat or ear which prevents satisfactory breathing, hearing or thinking. Adenoid growths in the back of the throat reduce the acuteness of hearing and compel the child to breathe through the mouth giving him the stupid appearance so characteristic of the mouth-breather. Not only does he look stupid but he is stupid and the children with adenoids furnish a large proportion of the unruly and backward pupils.

The cure of this condition is easy and simple and the most surprising results are accomplished thereby. Given an opportunity to breathe properly the child's whole mentality changes and for the first time in his life he is on a par with his fellows.

Some system of detecting defects of vision has been adopted in many schools and has already done much good. The number of children with defective eyesight is greater than is generally supposed. In the report of the Superintendent of Schools of the City of New York for the year ending July 31, 1907, is found the following:

"*Problems of vision.* There are thousands of children in the schools who cannot profit by the school work because of defective eyesight. Reports from the Department of Health seem to indicate that six or seven per cent of the children who enter the lowest grade suffer from some kind of defective vision. As children progress from grade to grade the proportion of them who are so affected constantly increases until in the highest grade it is estimated that not less than forty per cent are afflicted with some form of eye trouble. Is this increase in the number of children with defective eyesight, as they advance through the grades, caused, even partially, by conditions of work in schools? If so—and it seems difficult to resist the conclusion—we need medical advice not only to determine the way in which individual defects should be corrected but also to improve the hygienic conditions of the school—lighting, color of walls, color of writing paper, and size and shape of print—which may or do accelerate diseases of the eye."

This awful increase in eye trouble seems a high price to pay for education but statistics from all over the civilized world agree pretty closely with the above figures. If any system of inspection can stop this waste of eyesight it certainly will be worth every dollar it costs the community. The inspection should include not only the detection of those eyes already impaired but should aim to correct bad lighting of rooms, bad printing in text-books and all the other causes of eye trouble. Suitable provision is now made in many cities for providing medical attention and the necessary glasses free to children whose circumstances might bar them from these benefits.

Every taxpayer has a right to expect that the schools shall be kept reasonably free from contagion and that his children may enjoy the benefits of education which his money has helped provide, without being in constant jeopardy from disease.

The only way to keep the schools clean is to have some competent person watch both school and pupils in order that disease or any physical defect may be detected early enough to prevent damage. To accomplish

this trained physicians must be employed by the Board of Education, this being for many reasons preferable to having the work under the charge of the local Board of Health. While this work has been offered and in some localities done gratuitously by volunteer physicians it should be no more expected of them than that architects should offer their services to plan hygienic school buildings without remuneration.

A chief medical inspector who has charge of the records and under whom a sufficient number of inspectors are enrolled should be appointed by the Board of Education. He, in conjunction with the Board should then arrange a system comprehensive enough for the locality in question and to him should be delegated the duty of seeing that it be properly carried out.

Under a complete system of medical inspection each child should be carefully examined upon entering school and annually at the beginning of the school year this examination should be repeated. Complete records of these examinations should be made and thus re-examination of defectives could be made with special reference to the particular deficiencies previously found. All pupils found to be defective in any way should be referred at once through the parents to their own physicians for treatment as it should be no part of the inspector's duties to treat the children but merely to examine them. Each inspector should be required to make regular inspections, at stated intervals, of all classes under his supervision and he should be ready to answer any emergency call from the principal whenever the latter deemed it necessary. Each child should be re-examined after an absence of four days or more. It is probable that the routine tests of vision and hearing could best be made by the teachers with the assistance of the medical inspector and only those children with marked defects of eyes or ears would need the personal attention of the inspector.

It has been found that such a system as the one outlined above is neither complicated nor difficult when once it is established and there seems to be no good reason why smaller localities cannot do the same kind of work on a smaller scale. Indeed the fewer schools the less complicated the system. On the other hand there is no reason to believe that smaller communities show a much lower per cent of eye or throat troubles or even of contagious diseases. The gross figures are smaller it is true but the proportions are much the same.

THE PREVALENCE OF DEFECTS OF HEARING AND SIGHT AMONG SCHOOL CHILDREN.

BY HENRY GLOVER LANGWORTHY, M. D., DUBUQUE, IOWA.

The systematic examination of school children for defects of hearing and sight is fast becoming recognized as a necessity in most of our large cities throughout the country. While this may not always be possible in smaller communities the instruction of teachers and mothers along these lines with practical hints as to the general symptoms and ulterior effects

of eye and ear trouble and the presence of adenoids in the throat is certainly imperative. It has not been uncommon in the past for children to be censured for such faults as inattention or restlessness and placed in the class of stupid children, when the fault was one of a defect of hearing or sight.

The term "Adenoids," with a fair understanding of the condition should be as familiar a word as that of physiology, geography or arithmetic. School superintendents have been quick to recognize the importance of instructing their teachers in hygiene in general but that deals inadequately with the special fields. Such a calamity as the deprivation of even a moderate portion of hearing or error of refraction uncorrected is productive of many and varied disadvantages. It not only occasions general muscular fatigue but also according to the severity of the individual case almost excludes the mind at its most impressionable age from external classification of ideas or associations. That such isolation gives rise to degrees of despondency and moroseness is natural. It is therefore not to be wondered at that pleasurable happenings impart little sense of either admiration or surprise.

One has but to examine the old portraits or scores of the young princes and princesses of Europe in order to observe the vacant faces, open mouths, thick lips, and in fact all the expressions of actual idiocy to be impressed with the result of large growths in the throat, our so-called adenoids vegetations of childhood. These growths at the back of the nose also cause deafness, by preventing the proper ventilation of the middle ear through a tiny tube leading into the throat. They are also an important factor in the general undevelopment and many deformities of the chest.

Not all cases of deafness are of course due to the presence of adenoids, as many follow in the train of certain general conditions acting on the nerve of hearing or more directly by inflammation, such as an abcess of the middle ear itself.

Adenoids are essentially a disease of childhood. Almost all children have a certain amount of this lymphoid tissue, which in reality is merely an extra tonsil situated high up in the vault and along the posterior wall of the throat. It is only when they are enlarged that so much trouble is caused. At puberty this extra tonsil tends to shrink in size, but this is long after the damage has been wrought. Frequent ear-aches in a child usually mean that this condition exists in the child's throat. The resulting disturbance being caused purely in a mechanical way the treatment of immediate removal is both safe and satisfactory.

Snoring or loud, stentorious breathing, is another accompaniment of nasal obstruction and in bad cases the child may spring up in alarm during a sound sleep from this impediment alone. The discovery of the growths by William Meyer in 1860, with a due appreciation of their harmful effects on hearing, mark an epoch in the history of medicine and a new era of hope dawned for the little mouth-breather. The removal of these growths in children is the most useful remedy to be employed in the catarrhal deafness of early life. With physical smallness and seclusion the moral nature may later be an easy prey for the furtherance of good or evil tendencies.

Hardness of hearing may be spoken of as a slight, moderate or marked. Deafmutism will of course not be considered. If a child is suspected of having some trouble with the ear inquiries should be made as to a possible cause, such as frequent ear-aches, running ears, etc. A following simple and accurate test may then be made by the teacher after school hours. The child is requested to stand with one side to the wall. The ear on that side is stopped up by the child plugging the opening with his finger, which insures hearing with the one ear only. Whispered voice is the most suitable test, much better than loud speaking. Words or better, numbers, such as sixty-six, seventy-eight, ninety-nine, etc., are then used. The teacher should begin the test some twenty or twenty-five feet distant, gradually approaching until the number is heard and repeated by the child. One should normally hear a whispered voice from twenty to twenty-five feet. If a slight degree of deafness is present, the numbers may only be heard from four to ten feet. Both ears can be tested in the same way. If the deafness is more marked a whisper is not heard at all and loud spoken voice must then be used. This test is all that is necessary and should be required of every teacher. The child's future good health is of more importance than mere knowledge of mathematics or history.

A word also about a running ear, either of short or long duration. A discharging ear is always a source of danger to life. The longer it runs to a certain degree the more dangerous it becomes. There is no more erroneous and misleading statement than the saying: "It is unwise to stop a running ear." As Wilde, one of our very early specialists in this field truly said years ago: "Where a discharge from the ear exists we can never tell how, when or where it will end, or to what it may lead." The brain and important blood vessels are separated in places by a layer of bone as thin as tissue paper, and the mother who allows the child's ear to constantly discharge without seeking medical advice exposes that child to the danger of the extension of the disease to these structures. Hardly any mother would allow her little infant to play long on the railroad track; that the danger is a hidden one in nowise mitigates that peril.

So much, then, for the defects of hearing. In a similar way few realize the intense strain and likewise actual muscular fatigue occasioned by a constant effort on the part of the child to see distinctly. If a child, through some error in refraction, such as near-sightedness, far-sightedness or combinations of both, can see only one-fourth as well as a normal child, in order to do the same work he must, every second of the day, constantly strain the tiny muscle of accommodation in his eye in order to keep the printed page or blackboard in focus. To do this under such conditions requires all that extra work. Imagine the wear and tear on the nervous system after a few weeks or months! Naturally the typical symptoms of eyestrain, namely headache after or during study, pains about the eyes, inability to hold the attention to any particular task and a general restlessness or nervousness soon follow. It is hardly an exaggeration to say that the relationship between the eye trouble in children as well as adenoids with associated deafness, to their standing in scholarship is a very close one. The majority of poor students probably belong in some one of the above classes. This statement is made with all due allowance for the individual variation of intelligence and industry. Unfortunately the general public is not educated to the fact that a considerable number of poor scholars may suffer from defective eyes though often having good distant vision. This is a matter of every-day occurrence to the specialist. Children frequently have this excellent vision but only through a constant effort on their part to bring a certain point normally out of range into view. Even adults often suffer from the most marked symptoms without realizing that their eyes are at fault.

Today we are hearing much about the advances in preventative medicine and surgery. The old adage, "An ounce of prevention is worth a pound of cure," is nowhere more applicable than here. Prevention is certainly possible a thousand times, when a cure is possible but once. Undoubtedly most children are brought into the world with a fairly good eyesight. Such conditions as near-sightedness, far-sightedness and various inflammatory conditions are usually not due to possible inheritance but are the result of neglect, excessive study under improper conditions and lack of proper assimilation of food.

Another of the pernicious statements handed down from an antediluvian ancestry is the advice sometimes heard with regard to cross-eyes in the young. "Let the child's eyes alone and he will outgrow it." This statement is on a par and about as correct a one as those found on the bottle of some much heralded cure-all of quackery for the extortion of money by advertising charlatins. If the child's eye begins to turn in, the teacher or parent should be the first to understand that a competent medical man had better be consulted. If allowed to go on it is a hundred to one that the trouble will progress and the sight in the squinting gradually go down and can never be regained. To allow a child to become partially blind in one eye, even through ignorance, is almost criminal. Nature needs assistance in these cases. It is not the custom for her to overcome such a defect alone. If the advice of the clerk at the jewelry store or itinerant quack, who knew of a case which got along all right is followed, the experiment usually proves a costly one. Parents, strange to say, are prone to overlook deformities, either mental or physical, in their children.

Let us follow for a moment one of those rather rare cases of congenital myopia, taking for example Francesque Sorcy, the well known French critic, who writes of his personal experience: "I was born near-sighted, dreadfully near-sighted. One day, prompted by a spirit of mischief, I got hold of the big silver spectacles which my father wore and clapped them on. Fifty years have passed since then, but the sensation I experienced is keen and thrilling to this day. I gave a cry of astonishment and joy. Up to that moment, I had seen the leafy dome above me only as a thick, green cloth, through which no ray of sunlight ever fell; now, oh, wonder and light! I saw that in this dome were many little brilliant chinks; that it was made of myriads of separate and distinct leaves, through whose interstices the sunshine sifted, imparting to their greenery a thousand forms of light and shade. But what amazed me most, what enchanted me so that I cannot speak of it to this day without emotion, was that I saw suddenly, between the leaves, and far, far away

beyond them, little glimpses of the bright blue sky. I clapped my hands in ecstacy, and was mad with astonishment and delight." This illustrates but one of the many remarkable ways in which a child with defective sight may be benefited by a proper recognition of this fact.

In Iowa no provision has as yet been made by Legislature for the systematic examination of school children. Local boards, however, would have authority for such inspection if they so desired. The Boards of schools have in many other states been among the first to give such a measure their hearty approval and support The employment of physicians for the work is impossible, involving too great an expense. The best plan for meeting this want because of its extreme simplicity and practicability is the one suggested by Dr. Frank Allport of Chicago in 1895. Dr. Allport has been constantly at work on such a movement ever since. He proposes that each fall, as for instance the month of September, such examinations as are necessary be systematically performed by school teachers and that any scholar found to be defective should be furnished with a "card of warning" which is handed to the parent. This card simply notifies the parent that his child is believed to have some eye or ear disease which impedes his progress in school and is urged to consult his family physician or some eye or ear surgeon.

In order that the presence of disease may be detected by the teacher Dr. Allport has further arranged a series of nine questions, absolutly plain and simple in their character, for which the teacher is to obtain answers. The questions are so primitive in their character that any teacher can easily furnish answers to them and yet so comprehensive that when answered they will disclose ninety per cent of serious eye, ear, nose or throat diseases.

The facts to be ascertained are as follows:

1. Does the pupil habitually suffer from inflamed lids or eyes?
2. Does the pupil fail to read a majority of the letters in the number XX (20) line of the Smellen's Test Type, with either eye?
3. Do the eyes and head habitually grow weary and painful after study?
4. Does the pupil appear to be "cross-eyed?"
5. Does the pupil complain of ear ache in either ear?
6. Does matter (pus) or foul odor proceed from either ear?
7. Does the pupil fail to hear an ordinary voice at twenty feet in a quiet room? Each ear should be tested by having the pupil hold his hand over first one ear and then the other. The pupil should close his eyes during the test.
8. Is the pupil frequently subject to "colds in the head" and discharges from the nose or throat?
9. Is the patient an habitual "mouth breather?"

If an affirmative answer is found to any of these questions the pupil may then be given a printed card of warning handed to the parent.

The number XX (20) line is the line thus marked on the school chart to be furnished the teacher. The vision is tested by having the child read the letters on this line twenty feet distant. On the chart below the testing letters will be found a detachable portion with the above

questions and containing the teachers' instructions as to the manner of making these simple tests.

Every school should have its charts as they consist of the ordinary large strips of white cardboard with black printed letters and cost but little. They may be obtained of Mr. Alner Coe, 74 State street, Chicago, Ill.

RABIES AND ITS INCREASING PREVALENCE.

By George H. Hart, V. M. D., Assistant in Pathology and Bacteriology, Pathological Division, U. S. Department of Agriculture, Bureau of Animal Industry.

Rabies, or hydrophobia, is known to be one of the most terrible diseases that afflict humanity. Wherever it is prevalent it causes constantly increasing anxiety, suffering, and death to man and beast, not to mention the financial loss, and these penalties are exacted notwithstanding the alleviation offered by the Pasteur treatment. The enormous value of this treatment as a preventive agent is unquestioned, and while its effectiveness is extremely high when taken in time, the actual figures from a number of Pasteur institutes in different parts of the world show that the failures have ranged from 0.18 to 1.58 per cent. It must be remembered also that for a number of reasons, not the least of which are the inconvenience and expense connected with it, a large proportion of the persons, and almost all the animals, that have received the virus through bites do not undergo the treatment. Thus so long as the present conditions exist this dreadful menace will continue among us.

Unfortunately, too, we have indubitable evidence that the disease is increasing in the United States, and although, as the author points out, rabies is theoretically one of the most easily eradicated of all contagious diseases, there are, nevertheless, well-nigh insurmountable difficulties to be contended with. All that is required to rid us of this scourge is the muzzling of all dogs for a few years. This has been amply proved by the experience of several European countries where the disease has been stamped out in this manner.

But the carrying out of such a measure in this country is not easy. The Federal Government can not act alone in the matter; it is necessary to secure the co-operation of the States and of the people at large. It seems, therefore, desirable that the information contained in the accompanying paper be given the widest publicity.

Respectfully,

A. D. Melvin,
Chief of Bureau.

History and prevalence of rabies in the district of columbia.

Although rabies has probably existed in this section of the country for an indefinite period of time, the attention of the medical and veterinary

professions was not called to it until 1892, when a resident of the District died of the disease and the diagnosis was confirmed by rabbit inoculations at the Bureau of Animal Industry. Following this case the Bureau, in conjunction with the local veterinarians, made a more careful examination of the dogs in the District, with the result that 11 cases were found during 1893. In 1895 a second human death occurred, and as a result of this the Pathological Division of the Bureau, in co-operation with the District health office, started a routine examination of all cases of suspected rabies in and about the District of Columbia. This work has been continued up to the present time, and the following number of cases have been diagnosed:

1895, 4 dogs, 2 foxes.
1896, 5 dogs.
1897, 2 dogs, 1 cow.
1898, 7 dogs.
1899, January to June, 4 cases.
For the fiscal year ending June 30th—
1900, 45 dogs, 4 cows, 1 cat, 1 horse.
1901, 15 dogs, 1 cat.
1902, 19 dogs, 3 cows, 1 horse, 1 hog, 1 woman.
1903, 28 dogs, 5 cows, 3 wolves, 1 fox, 1 horse.
1904, 19 dogs, 2 cows, 1 hog.
1905, 20 dogs, 1 cow, 1 cat.
1906, 15 dogs, 1 cow.
1907, 25 dogs, 1 sheep, 1 cat.
For the six months ending December 31, 1907, 19 dogs, 1 cow, 4 dingoes.
For the calendar year ending December 31, 1907, 37 dogs, 1 cow, 4 dingoes, 1 sheep, 1 cat.

While some of the above recorded cases have been forwarded to this laboratory from far distant parts of the country, at least 75 per cent of them have been from Washington and its immediate vicinity.

The figures show at a glance that during the last dozen years rabies has by no means been a rare disease in our capital city. And these statistics do not begin to cover all cases, as it is reasonably certain that a number of animals have been killed or have died without the disease being recognized. Furthermore, unless some persons or animals have been bitten, the carcasses are seldom forwarded to the laboratory, even though such cases were recognized as rabies by competent veterinarians. Only in atypical cases are carcasses examined for practicing veterinarians to confirm their diagnosis.

The alarming increase of the disease in the latter part of 1899 led to a proclamation by the District Commissioners providing for the muzzling of all dogs for a period of six months, from December 19, 1899, to June 18, 1900. This met with such determined opposition on the part of dog owners that it was never properly enforced by the police; and muzzling has therefore never received a fair trial in the District. At that time, however, the pound service was increased, and 3,598 dogs were impounded during the year, an increase of no less than 2,771 over the previous year. The income from the dog tax also increased from $210.14 to $2,030.83.

The impounding and taxing were important; and, as the muzzling was not generally adopted, to them alone can be ascribed the decrease in the disease during the following year.

The last human death from rabies in the District was that of a colored woman in 1902, a pathological report of which can be found in the Twentieth Annual Report of the Bureau of Animal Industry (1903).*a* In 1906, of the 16 cases received only 6 came from within the District; and it was thought that the careful quarantining or destruction of all animals bitten by rabid dogs, which had been conducted by the health department, was proving efficient in checking the advance of the disease. However, from January 1 to December 31, 1907, 44 positive cases have been examined in this laboratory. Of this number 33 were from the District or the immediately surrounding country. These 33 animals have, to our knowledge, bitten 16 persons, 46 dogs, 2 horses, and 2 cows. It therefore seems that the preventive measures at present being taken are entirely inadequate to cope with the disease, and its frequency during the last ten months has been alarming. The same condition of affairs unfortunately exists in many other cities of our country.

NATIONAL PREVALENCE OF THE DISEASE.

From the foregoing facts it may be inferred that rabies is one of the most important infectious diseases among domestic animals in the District. Since 1903 positive cases have also been forwarded to this laboratory for examination from Virginia, Maryland, Indian Territory, Indiana, North Carolina, South Carolina, West Virginia, Georgia, New Jersey, Maine, and Wisconsin.

In the State of Pennsylvania rabies has existed for years, and in 1905 Dr. C. J. Marshall reported in the "Proceedings of the American Veterinary Medical Association" that it was spreading more than in former years. In 1906 hardly a county was free from the disease, and, besides the cases in dogs, 47 cattle, 14 hogs, and 157 sheep died of the disease. An epidemic occurred in Chester County, Pa., in the past summer (1907) which necessitated the destruction of 154 dogs, 25 cows, and 10 horses.

During 1906 a severe outbreak occurred in Waterbury, Conn., 175 dogs being destroyed, and several persons bitten by rabid animals were obliged to take the Pasteur treatment. At Torrington, Conn., 7 dairy cows on one farm died of the disease. It also appeared in several other counties of the State.

In the autumn of 1905 and spring of 1906 a very severe outbreak of the disease occurred in Jacksonville, Fla., and was reported by Dr. J. G. Hill; 1,200 dogs were destroyed, and of 12 persons bitten by rabid animals 3 died of hydrophobia. The disease became so alarming that on August 1, 1906, a muzzling law was put into effect, which was very successful in stopping its ravages.

In Indiana Dr. J. H. Roberts reported that rabies was prevalent in the State and gave the State veterinarian more trouble than any other one infectious disease. The State secretaries of the American Veterinary Medical Association from Mississippi, New York, and New Jersey reported

a The report of this case is reprinted as Bureau of Animal Industry Circular 54.

the existence of the disease in their respective States during 1906. The Chicago Pasteur Institute since its foundation in 1890 has applied the preventive treatment to persons bitten by rabid animals from nearly every State west of the Mississippi River.

In Norfolk, Va., the disease has prevailed extensively during the past five years and many human beings have been bitten, one large hound having severely bitten 9 persons before he was finally destroyed. In Charleston, W. Va., the disease is very common at present, one veterinarian writing to this laboratory that 12 cows and 40 dogs affected with the disease had recently come under his observation.

The State live stock sanitary board of Minnesota, at St. Paul, is now making routine examinations for rabies, and a considerable number of cases are being found.

It will thus be seen that rabies is all too prevalent throughout our country. It is constantly spreading and causing increased financial loss, human suffering, and death year by year. There is abundant evidence to warrant the statement that not a single State is free from the disease.

IMPORTANCE OF THE DISEASE.

From an economic standpoint the losses from rabies are difficult to ascertain. While a great many cases have been included in the foregoing reports, it is well known that many isolated cases of the disease are never covered by health reports. The actual money loss, while considerable, is not nearly as great as that from many of the major infectious diseases of animals.

It is not from its financial side, however, that rabies deserves so much attention from sanitarians. There is no disease in the entire realm of medicine the suffering from which is any greater than from hydrophobia. The dread with which the people speak of the malady and the awful agony suffered by those who undergo the course of the disease render it of such importance that health authorities should use every means at their disposal to secure its eradication. The great anxiety occasioned yearly in several thousand persons who are bitten by rabid or supposedly rabid animals is intense. The cost of the Pasteur treatment is also to be considered and materially enhances the economic importance of the disease.

During the past year the 33 positive cases received in this one laboratory from the District of Columbia and vicinity were animals which had inflicted bites on 16 people, 46 dogs, 2 horses, and 2 cows. Eleven cases were also received from more distant parts of the country, and these animals bit 20 people, 1 horse, and many sheep. In connection with these cases 36 people have, therefore, been subjected to the worry, anxiety, and actual danger resulting from the bite of a rabid animal, and have been required to take the Pasteur treatment. This does not include the financial loss connected with the necessary destruction of valuable dogs and other domestic animals which have been either infected or exposed to infection. Other laboratories in various parts of the country could probably show equally if not more impressive statistics in regard to the importance which rabies is assuming at the present time.

POPULAR FALLACIES CONCERNING THE DISEASE.

In the category of infectious diseases rabies stands at the head of those about which the ideas of general public are most at variance with the actual facts. It is commonly believed that a person bitten by a dog in perfect health is liable to become infected with hydrophobia should the dog develop rabies at any subsequent period, however long afterwards. Consequently believers in this theory are particularly anxious to have the dog killed at once before he has had an opportunity to go mad. Nothing could be more fallacious and at variance with our knowledge of all infectious diseases, and the killing of the dog should always be discouraged.

Until recently it was considered that the dog's saliva became virulent only three days before the appearance of symptoms of rabies. According to some recent experiments by Nicolas it has been found that the saliva may become virulent six or even eight days before the symptoms develop. Therefore in case the animal remains healthy for ten days after it has bitten the person or animal, no danger need be apprehended from that bite even though the dog develop rabies within the next few weeks.

MADSTONE.

The curative value of the madstone is still devoutly believed in by a great many people in certain sections of the country. Within the last few years a madstone was forwarded to the Department, the owner stating that it had prevented several cases of rabies and he was anxious for it to be tried by the Bureau. Some of these madstones, properly called hairballs, are obtained from the stomachs of various wild and domestic animals. They are in some cases composed of matted hair which the animal has licked from its body and swallowed; but in the majority of cases they consist of masses of vegetable fiber, such as the awns of clover and beards of grain, which have gradually collected over a considerable period of time and are formed into a spherical shape by the contraction of the gastric walls. Gallstones, intestinal calculi, and in fact any porous stones may be used as madstones.

After a person has been bitten the madstone is applied to the wound and it is believed that the longer it adheres the more sure it is of preventing the disease. Whether it will stick or not depends entirely on the amount of hemorrhage or discharge from the wound. Where this is profuse the blood infiltrates the meshes of the madstone, soon coagulates or dries, and tends to hold it in place, and it adheres for a considerable time under such circumstances. In these cases the virus is supposed to be removed and the treatment is heralded a success. On the other hand, where the wound is small and the discharge slight there is nothing to hold the stone in place and it immediately falls off. Certain of these madstones have been held in families for three or four generations and are guarded as carefully as any heirloom. Cases have been known where people have made long journeys and paid large sums of money to have a madstone applied. Its specific value against rabies is no greater than that of a piece of blotting paper

applied in the same manner. The application of madstones gives the unenlightened public a false sense of security, and their use should be discouraged by all possible means.

RABID DOGS AND WATER.

It is commonly believed that mad dogs will not go near water, and in case such an animal is seen to ford a creek or lake it is taken as proof that he did not have rabies. This fear of water is a symptom usually marked in human cases, but is never present in the dog at any stage of the disease. Animals in the early stages when running about the country will cross bodies of water without the slightest fear. Even after the throat becomes completely paralyzed the animal will often constantly attempt to drink water from a pail or bucket if placed within its reach, but, owing to the paralysis of the throat muscles, swallowing is impossible.

DOG DAYS.

The idea is prevalent with many people that dogs are particularly liable to go mad during the so-called "dog days," which extend from the first of July to the middle of August. These days are called "dog days" because they cover the period of time when the dog star Sirius is above the horizon with the sun; they have no connection with the dog. On account of the clemency of the weather dogs probably travel about during this season more than in winter, and hence are slightly more liable to infection. Statistics, however, as well as our own experience about this section of the country, show that the disease is present throughout the year, and seasons have very little if any influence.

COLOR OF THE ANIMAL'S MOUTH.

It frequently occurs after a person is bitten by a dog that some friend will immediately look into the mouth of the animal. In case the mucous membrane is black, he will at once conclude that the bite is dangerous, even though the dog appears perfectly normal; but, if the mouth happens to be red, he thinks there is no danger from the bite. This is entirely erroneous. The black color is due to a normal deposit of pigment in the mucous membrane of the mouth. It is present in a certain percentage of all dogs and has no connection with rabies. In this paragraph the writer is not referring to the so-called "black tongue" of dogs in the South, which is the vernacular name for dumb rabies; resulting from the swollen, darkened appearance of the tongue following its extrusion from paralysis of the lower jaw. This will be referred to in the section on symptoms (page 14.)

LYSSOPHOBIA.

Many educated men, including some physicians, claim that all cases of hydrophobia in the human family are the result of wroughtup nervous excitement due to fear on the part of the patient. While at times these symptoms, termed lyssophobia, do occur in neurotic individuals who have been bitten by healthy dogs, they are always hysterical

in nature, cause no organic lesions, and universally terminate in recovery. Thus lyssophobia is entirely distinct from the real disease, which is universally fatal to the human being.

SPONTANEOUS RABIES.

In many instances the origin of an outbreak of rabies is difficult to trace. This has given rise to the opinion that the disease may appear in the dog spontaneously, that it is an intrinsic part of his being which may crop out at any time under various extraneous conditions. This is as impossible as it would be for typhoid fever, tuberculosis, or any other infectious disease to develop spontaneously. Rabies is an infectious disease and can be produced only by inoculation with the specific virus which causes it. This specific virus is present in the saliva of animals affected with the disease and is transmitted to other animals and persons by the saliva on the teeth of such animals.

SKEPTICISM AS TO EXISTENCE OF RABIES.

In spite of all the work that has been done on rabies there are still many persons, including some medical men, who are skeptical regarding or absolutely disbelieve the existence of this disease. Some physicians say that they have been practicing fifteen, twenty, or thirty years and have never seen a case; but this proves nothing. During the past fifteen years but three cases of the disease have occurred in human beings in Washington, D. C. It can be readily seen, therefore, that only a small percentage of the medical practitioners would see them.

Others have advanced the statement that in Constantinople, where there are more dogs than in any other place of equal area in the world, rabies is unknown. This statement has been disproved by Remlinger, director of the Imperial Bacteriological Institute in that city, who reports many cases of the disease in Constantinople and adjoining provinces. But even if it were a fact, it is no more remarkable than the fact that in London, where there are more people than in any other place of equal area in the world, bubonic plague is unknown, which fact, however, is not remarkable at all. It simply means that the specific cause of the disease is not present in that particular locality.

Any person in the United States can see cases of rabies in one or more species of domestic animals if he will get in communication with veterinarians, health officers, or laboratories where the disease is constantly being found. With the increasing frequency of the disease in the United States and the characteristic microscopic changes which can be constantly demonstrated, together with the fact that many prominent investigators have been writing on the subject lately, especially in reference to the Negri bodies, there appears to be less skepticism in regard to the disease.

PERIOD OF INCUBATION.

The period of incubation of rabies varies within wide limits, being more or less different in the various species of animals. It also differs in the same species, depending on several important factors, as the location of the bite, the character of the bite, and the amount of the

virus injected. Bites about the head, face, and hands in human beings are the most serious because these parts are the most exposed. The clothing on other parts of the body tends to wipe the saliva from the teeth, and thus prevents it from inoculating the wound. Bites about the face and head are also more dangerous than on other parts because they are so thickly supplied with nerves and the distance the virus has to travel to reach the central nervous system is short. Through experimentations it has been pretty definitely proved that the virus travels along the course of the nerves rather than by means of the blood current. Deep, penetrating or lacerating bites are obviously of greater import than superficial scratches, as more virus enters the former wounds and they are difficult or impossible to cauterize completely. Severe hemorrhage from the wound is favorable, as there is a possibility of part or all of the virus being thus mechanically removed. Infection and suppuration of the wound may also destroy the virus. None of these conditions, however, can be depended upon, but they account for the fact that a considerable proportion of persons and animals bitten do not contract the disease even when no treatment is given.

The shortest period of incubation is six days in the rabbit. This short period can only be obtained with what is known as "fixed virus" obtained in the laboratory by repeated passage of the ordinary virus through a long series of (50) rabbits. The disease as contracted from the bite of a rabid dog requires an incubation period of from fifteen to ninety days. At times this incubation has been prolonged greatly in excess of the above figures. In one case which came under the observation of this laboratory a dog belonging to one of the District fire companies was bitten by a rabid dog which was examined by the Bureau. The animal, being a great pet, was not killed and remained normal for exactly one year, when it came down with a typical case of rabies which was proved by microscopic examination and rabbit inoculations. Such a long incubation period, however, is so extremely rare that it is usually not considered in formulating quarantine laws for the prevention of the disease. Shorter periods of incubation than fifteen days have been reported, but they are very unusual.

SYMPTOMS OF RABIES IN THE DOG.

The symptomatology of rabies is of primary importance, since a knowledge of the manifestations is the only ante-mortem method of recognizing the disease, thereby allowing measures to be taken to control the animal, and thus prevent its doing any serious damage. The symptoms are generally described under two types, the furious or irritable and the dumb or paralytic. The latter type is always seen in the terminal stages of the former; and, when the cases are of the dumb form from the outset, it is probable that the toxemia is overwhelming, and such cases usually run a more rapidly fatal course.

THE FURIOUS TYPE.

In the furious type, following the variable period of incubation, there is first noticed a change in the disposition of the animal, which should at once excite suspicion. Playful animals become morose, and quiet, reserved dogs may become unusually affectionate. The animal is nervous and easily excited, but obeys any command of its owner. In the course of a day of two the nervous condition increases and the animal becomes irritable and may snap if approached suddenly or startled. The bark becomes changed to a long drawn out combination of a whine and a howl, impossible to describe but never forgotten when once heard. Some dog owners speak of it as being somewhat of the nature of the bark of a foxhound while in the hunt, but this does not properly describe it. The animal if loose may pick up and swallow straw, sticks, stones, leather, and other foreign bodies. In some cases there is a tendency to bite parts of the skin, usually at the point where the animal was bitten, and in one case under the writer's observation the animal chewed the skin over the os-calcis until the entire head of the bone was exposed to view. This tendency to bite the skin is probably due to an intense localized pruritis.

There is a marked tendency in these early stages for the animal to seek quiet spots and to hide in corners or dark places. If an attempt is made to remove the animal, the person is in great danger of being bitten. The restlessness of the animal becomes more marked. He may stand looking intently into space as if at an imaginary object. There is difficulty in swallowing, and saliva may dribble from the mouth. The irritability increases until the animal becomes furious, biting at a stick or other object thrust toward him. At this stage if the animal is not secured he may leave home and travel for miles. During the long journey he will fight with dogs and attack other animals in his path, but never barks or makes any outcry during these attacks. The animal may go 20 or 25 miles from home, but always returns, if not prevented, in an exhausted condition, covered with wounds and dirt and greatly emaciated. Signs of commencing paralysis now appear, with dropping of the lower jaw, inability to swallow, and irregularity in the pupils. The legs finally become paralyzed and the animal pases into the dumb form of the disease.

DUMB RABIES.

This form of the disease occurs in only a small percentage of the cases. The symptoms are somewhat similar to those of furious rabies except the marked irritability is absent and there is an early appearance of paralysis. This form of the disease, therefore, renders the dog less dangerous than the furious type. The animal lies quietly in some secluded place and appears to be stupid. The paralysis of the jaw comes on early, the tongue protrudes and becomes congested and covered with dirt, giving rise to the term "black tongue," which is a bad synonym used in some localities, especially in the South, for this form of the disease. The use of this term to designate dumb rabies should be discouraged as it tends to confound the disease with dog

distemper. The hind legs, trunk, and forelegs become paralyzed, and death usually ensues in about three days, while the furious type lasts from six to eight days.

Recovery from rabies in the dog after well-marked symptoms have developed is possible, and authentic cases have been reported by Pasteur, Roux, Babes, Courmont, and Remlinger. This is so rare, however, that it is of little importance except in cases where a person has been bitten by a dog showing all the symptoms of rabies and the animal afterwards recovered. The saliva in such cases remains virulent for several days or a week after the subsidence of symptoms, and a diagnosis can be made by inoculating rabbits with some of the salivary secretion.

SUMMARY OF SYMPTOMS.

The important symptoms, any one of which when well marked should render the dog suspicious and lead to its being confined, are: (1) Change in disposition; (2) alteration of voice; (3) inability to swallow; (4) leaving home and returning in an exhausted and emaciated condition; (5) paralysis of the jaw; (6) swallowing abnormal substances, as wood, stones, etc.

PROPER DISPOSAL OF DOGS AFTER BITING PERSONS.

In many cases in which a person is bitten by a dog there is immediately a great popular clamor to have the animal at once destroyed. This should always be discouraged. The mere fact that a dog inflicts a bite on a human being does not by any means prove that he has rabies. This is the dog's only means of defense and he bites instinctively when harmed. When the dog has been killed at once and sent to the laboratory, an examination is made for the microscopic evidence of rabies, which often is not found, as in many such cases the dog is not affected with rabies. In order to be on the absolutely safe side, however, the laboratory is then required to inoculate rabbits with the brain tissue. The incubation in rabbits requires at least two weeks, during all of which time the person bitten is kept in suspense. On the other hand, if the animal were left to live it could be examined by a competent veterinarian for evidences of rabies, and if it remained normal for ten days the bite would be harmless.

Therefore, after a person has been bitten, do not kill the dog unless a competent veterinarian has pronounced the disease rabies or the dog is showing well-marked symptoms. Instead, when practicable, the animal should be tied up securely and watched carefully for a week or ten days. In case suspicious symptoms do develop the dog should be examined by a veterinarian familiar with the disease, and if he pronounces the case rabies the animal may be killed and the laboratory will be able to find the pathognomonic microscopic evidences. At the end of ten days the dog may be killed, if so desired, but if the animal is valuable and shows no symptoms of rabies there is no reason for destroying it. In this way valuable dogs can often be saved to their owners.

POST-MORTEM EXAMINATION.

When a dog is suspected of having rabies has died or been killed a post-mortem examination should be made. In rabies there are no absolutely characteristic post-mortem findings. Particular attention should be paid to the stomach. The mucous membrane of this organ is frequently congested, and in some cases a marked hemorrhagic inflammation is present. Foreign bodies, as sticks, straw, stones, coal, dirt, etc., and an absence of food in the stomach are very suspicious indications of rabies. The absence of these conditions, however, does not by any means exclude rabies. Undoubted cases of the disease have frequently been received at this laboratory where a considerable quantity of food was present in the stomach and the mucous membrane was in a normal condition. Redness and congestion of the pharynx and larynx with cerebral and meningeal congestion are also to be found in some cases. A negative post-mortem examination when the animal has died naturally also tends to suggest rabies as the cause of death. From the fact that the pathological alterations are not constant they are not relied upon to any extent in this laboratory. There are cases, however, in which, the microscopic changes being indefinite, we are forced to get all possible information, including history and post-mortem findings, if we are to draw conclusions without waiting for rabbit inoculations to decide definitely the diagnosis.

METHOD OF PREPARING PARTS TO BE FORWARDED TO LABORATORY.

It is only necessary to forward the head to the laboratory after the post-mortem examination has been made. This is removed with the skin intact by cutting through the middle of the cervical vertebræ. It should then be wrapped in dry cheese cloth or other material and forwarded by express. During very warm weather the head, after being wrapped should be placed in a tin receptacle and packed in a wooden box containing chopped ice. By removing the head at the middle of the cervical vertebræ the plexiform ganglia are left intact, and upon arrival at the laboratory they can be removed and examined microscopically for the lesions described by Van Gehuchten and Nelis, and a diagnosis can be made within twenty-four hours.

This plan is not practicable in summer when several days are required for the head to reach the laboratory, as the brain undergoes softening, becomes invaded with bacteria, and the experimental rabbits inoculated are liable to death from septicemia. Putrefactive changes are also liable to occur in the ganglia, and thus render the conclusions from their examination indefinite. In case the time required to reach the laboratory is considerable and the weather warm, the brain, including the medulla oblongata, should be removed as carefully as possible in one piece, immersed in two to three times its volume of pure neutral glycerin, and sent in this manner. In large animals one cerebral hemisphere and the medulla are sufficient. In some cases even with this method the Negri bodies can be demonstrated in the large nerve cells of the hippocampus major, and thus a diagnosis can be made in a few hours without waiting for the rabbits to develop the disease, which requires from two to three weeks.

It must be remembered, however, that to get the best results with the rapid methods of diagnosis it is essential that the animal be allowed to die naturally from the disease or that it be destroyed only after symptoms are well advanced. When the animal is killed in the early stages the changes in the nervous system have frequently not developed sufficiently to be recognized.

DIAGNOSIS OF THE DISEASE BY LABORATORY METHODS.

Until within comparatively recent years the only method of diagnosis of the disease after death was by inoculation of rabbits with an emulsion of the brain of the suspected rabid animal. This required an incubation period of at least fourteen days, and it was not an uncommon occurrence for the rabbits and the person bitten to develop simultaneously symptoms of the disease.

The examination of the nervous system for microscopic changes was begun as early as 1875. No diagnostic changes were known until 1886 and later in 1892, when Babes carefully described the histological lesions which he constantly found in rabies. The most important change which he found consisted in a degeneration of the nerve cells in the medulla and an invasion by embryonal cells of the space normally occupied by the nerve cells. These collections of cells were called by Babes rabic tubercles, and have since been named after their discoverer Babes tubercles. They are easily found in the majority of cases by making cross sections of the medulla and examining about the region of the central canal.

In 1900 Van Gehuchten and Nelis published the result of their work on the microscopic changes in this disease, which gave to the world a valuable addition to the methods of rapid diagnosis. The changes consisted mainly in a proliferation of the endothelial cells lining the capsule of the ganglionic cells and infiltration of the ganglia with leuncocytes. These changes are easily found and are most marked in the plexiform ganglia.

In 1903 Negri, of the University of Pavia, Italy, published the results of his researches and claimed to have found the causative agent of the disease, which consisted of cell inclusions, now universally known as Negri bodies, in the large nerve cells. (See fig. 1.) The relation which these bodies bear to rabies has since been confirmed by many investigators, and they are at present considered pathognomonic of the disease. Whether or not they are the real etiological factor in the production or rabies still remains to be proved.

Within the past year Porcher has laid great stress on the presence of sugar in the urine in cases of rabies. He says it is equally as valuable from a diagnostic standpoint as the Negri bodies or the changes of Van Gehuchten and Nelis, but his work requires confirmation. We have recently subjected the urine of two positive cases to Fehling's test for sugar, with negative result in both cases.

METHOD IN LABORATORY OF BUREAU OF ANIMAL INDUSTRY.

In the pathological laboratory of this Bureau when a suspected rabid dog is received a post-mortem examination is made. The plexiform ganglia are removed and placed in 95 per cent alcohol. The skull is then opened and the hippocampus major and a small piece of the medulla are removed. The latter is placed in neutral glycerin and laid aside until the microscopic examination is completed. The Negri bodies being most numerous in the hippocampus major, this is placed in acetone and then in paraffin, by which method sections can be cut in three hours. The sections are stained with Mann's stain and examined. The Negri bodies, if present, are found in the protoplasm of the large pyramidal cells and stain a bright pink color, while the cell takes a purplish tint. Frothingham's stain is also valuable. It consists in applying a saturated alcoholic eosin solution for fifteen minutes, followed by Loeffler's methylene blue, and decolorizing in 70 per cent alcohol, using the microscope to determine when decolorization is sufficient. With this method the nerve cell stains blue, while the Negri bodies appear yellowish pink and their granules stand out prominently, being stained very dark blue. Such an examination can be made in three or four hours, and when Negri bodies are found the diagnosis of rabies is made at once.

The touch preparation method of Frothingham is much more rapid than the preceding, but is not quite as reliable. It consists in making cross sections of the hippocampus and touching them to the slide. The thin film of nerve tissue adhering to the slide is then fixed in Zenker's fluid and stained with the eosin and methylene blue solutions.

When the Negri bodies can not be found the ganglia are examined. They are usually left in 95 per cent alcohol over night, transferred to absolute alcohol in the morning for an hour, and then placed in warm cedar oil in the paraffin oven for another hour. This clears the nerve fibers rapidly, leaving the opaque ganglia clearly outlined. One of the ganglia is then trimmed down with a sharp knife so that nothing but the ganglion remains, as in this condition the sections cut much easier. After trimming it is left one-half hour longer in the oil and then transferred to paraffin for one to two hours. It is then embedded, sectioned, and stained with hematoxylin and eosin. When Negri bodies are found the changes are always present in the ganglia. Where no Negri bodies are found and the changes are present in the ganglia, which rarely happens, the case is considered suspicious and rabbits are inoculated. These ganglionic changes may not be marked when the animal is killed early, and they may also be present in other diseases. In one case the ganglion of a horse which had died of cerebro-spinal meningitis at the Arlington Experimental Farm was examined and lesions similar to those of rabies were found. These changes may also rarely be present in dogs with distemper, especially when showing nervous manifestations. When Negri bodies are found, rabbits are not inoculated.

THE PASTEUR TREATMENT AND ITS RESULTS.

The preventive treatment of rabies devised and perfected by Pasteur has done much to strip this dread disease of its mortality among human beings. It was first advocated by Pasteur in 1885 after throrough experimentation on the lower animals.

In 1886 the original Pasteur Institute was opened in Paris. From that time until 1905, inclusive, 29,201 persons had been treated at this institute, with a mortality ranging from 0.94 per cent the first year to 0.18 per cent in 1902. During the four years from 1902 to 1905, inclusive, it averaged 0.32 per cent. The first Pasteur Institute in the United States was opened in New York City in 1890, and was followed by a similar institution in Chicago in July of the same year. During the first eleven years of its establishment the New York Pasteur Institute treated 1,608 persons, with a mortality of 0.68 per cent. The Chicago institute has recently issued a summary of its results from the time of its foundation to October, 1907. During this time 3,010 persons received the treatment and only 7 subsequent deaths from the disease resulted, making the very low mortality of 0.23 per cent. Eleven persons, however, died of the disease at the institute while under treatment. Ten dogs have also been treated and all of them were successfully immunized.

Recently N. G. Keirle, director of the Baltimore Pasteur Institute, connected with the College of Physicians and Surgeons, has published a report of the first 1,000 cases treated. Two deaths occurred, one of which was doubtful, as the man had chronic Bright's disease, although if this is included the percentage of failures is only 0.2 per cent. Eight other deaths occurred under his observation in persons who were either not treated or in whom the disease developed during or shortly after treatment.

Through the courtesy of Dr. A. G. Hoen, director of the Pasteur department of the University College of Medicine at Richmond, Va., we have received a report of the first 208 cases treated there without a single failure. Two persons who had received bites about the face died, one during and the second immediately after treatment, and are correctly not considered as failures by the institute. One dog was also successfully treated.

J. N. Brawner, in charge of the Pasteur Institute at Atlanta, Ga., has kindly reported that up to the present time they have treated 670 patients with only two deaths, one of these occurring in a victim of the morphine habit, the percentage of failures being only 0.33. Three other cases developed the disease during treatment. Doctor Brawner during the past seven years has also kept a careful record of all reported cases of persons bitten by rabid animals in Georgia who did not take the treatment, and of 120 such persons 29 died of the disease. This observation is of great importance and represents the signal value of the preventive inoculations which in this one instance showed a decrease in the mortality from 24 per cent without treatment to 0.33 per cent with treatment. The bites of rabid animals in Georgia, therefore, have proved 72 times as fatal without treatment as with it. This institute has also treated 12 dogs and 5 horses, with no deaths.

The frequency of the disease throughout the country and the number of people consequently applying for treatment has led to the foundation of a number of Pasteur institutes. Besides those already mentioned there are others at Pittsburg, Ann Arbor, St. Paul, New Orleans, St. Louis, and Houston.

METHOD OF THE PASTEUR TREATMENT.

The principle on which the treatment is based consists in the production of an active immunity by means of repeated injections with an emulsion of spinal cords of rabbits dead from inoculation with fixed virus, which cords have been attenuated to various degrees by drying.

Rabbits inoculated with fixed virus die in from six to seven days. Their spinal cords are removed aseptically and dried in bell jars over sodium hydrate. Fifteen days of such drying renders the cord harmless, and such a cord is emulsified with normal salt and solution and 2 or 3 c.c. of the emulsion is injected beneath the skin, constituting the first inoculation. Cords dried fourteen, thirteen, twelve, eleven, ten days, etc., are used for the subsequent injections, until finally an emulsion of a cord dried only three days, which contains practically all its virulence, is injected. The injections are made daily for a period covering fifteen to twenty-one days. The cost of the treatment is from $100 to $150 including board and room at the institute. The New York board of health has on several occasions prepared the material and sent the requisite dose each day by mail to physicians and veterinarians in other cities at the rate of $25 for each course of treatment.

The treatment is not harmful except for the slight pain caused by the hypodermic injections. Patients are not required to remain in the institute constantly during the treatment, it only being necessary for them to present themselves each morning to have the injections made.

VALUE OF THE TREATMENT.

The value of the Pasteur treatment can not be overestimated. In 1896, nine years after the parent institution in Paris was founded, there were still many who doubted its value. In this year a commission was appointed by the House of Commons of England, consisting of Paget, Brunton, Fleming, Lister, Quain, Roscoe, Sanderson, and Horsley, to ascertain the value of the treatment. After exhaustive investigation this commission reported that Pasteur's inoculations were as valuable against rabies as Jenner's vaccination was against smallpox. The statistics of the large number of Pasteur institutes during the past ten years are alone sufficient to prove that this was one of the greatest of Pasteur's discoveries. Without the treatment the mortality ranges from 10 to 80 per cent of the persons bitten. With the treatment the mortality statistics covering thousands of cases is always less than 1 per cent, and during recent years has been reduced to from 0.3 to 0.5 per cent. The observations of Brawner, of Georgia, noted above, are very convincing in this connection.

Although in the past the treatment has been principally confined to human beings, its equal value in the domestic animals has long been established. Its cost is too great for it to be used as a routine procedure on all

animals exposed to the infection. There are, however, many valuable horses, cattle and dogs succumbing annually to the disease, practically all of which could be saved by the preventive treatment. The Bureau of Animal Industry is consequently contemplating the routine preparation of this virus to be shipped by mail at nominal cost to veterinarians having exposed valuable animals under their care.

THE HOGYES METHOD OF PREVENTION.

In Hungary the Hogyes method of preventive inoculation is used exclusively. It consists in diluting the spinal cord of rabbits dead from fixed-virus inoculation with physiological salt solution. The dilutions made are 1:10,000, 1:8,000, 1:5,000, 1:2,000, 1:1,000, 1:500, 1:200, 1:100. The cord diluted 10,000 times with the salt solution is harmless and constitutes the first injection, 2 or 3 c.c. being injected. Then the stronger solutions are gradually injected until 1:100 is reached. With the stronger solutions only 1 to 2 c. c. are injected. Hogyes claims that this method is far superior to that of Pasteur, and his statistics seem to prove his claim.

Since 1890 the Budapest Pasteur Institute, of which Professor Hogyes is director, has treated 22,558 persons with 108 deaths, or a mortality of 0.47 per cent. Of this number, 3,410 were treated with Pasteur's method, of which 54 died, a mortality of 1.58 per cent. The remaining 19,148 were treated with the dilution method, of which number 54 died, or a mortality of only 0.28 per cent. While other institutes using the Pasteur method have had a much lower mortality than 1.58 per cent, the Budapest statistics amply prove the value of the dilution method. It is not being used, however, in any of the institutes in this country at the present time.

THE SERUM THERAPY TREATMENT AGAINST RABIES.

A great deal of work along the line of serum therapy has been done by Babes, Tizzoni, Centanni, and others, and some brillant results have been obtained. The latter two investigators after exhaustive experimentation produced absolute protection against the disease in experimental animals by what they termed the Italian method of vaccination against rabies. It consists in the immunization of sheep by inoculations with rabic virus which has been attenuated by means of being digested with gastric juice. In order to keep the serum potent the sheep has to be revaccinated at intervals of from 2 to 5 months. The serum from such an animal when used in doses of 20 c. c. in the liquid or 2 to 5 grams in the dried condition is claimed to contain absolutely protective qualities against rabies in the human subject. It is even claimed to have curative effects after symptoms of the disease develop. Tizzoni and Centanni claimed that its greater efficiency and convenience would cause it to be completely substituted for the Pasteur vaccination. This claim, however, has never been realized, and its value on the human subject has not been satisfactorily demonstrated. The excessively elaborate technique required in its preparation will probably prevent its ever coming into general use.

ERADICATION OF THE DISEASE IN THE UNITED STATES.

If eradication were once accomplished all that has been said about treatment would be rendered unnecessary. Furthermore, rabies is one of the most easily eradicated of all infectious diseases.

The factor of success in the undertaking can be summed up in three words, namely, muzzling all dogs. Could this be efficiently carried out in the United States for a few years rabies would be entirely eradicated, as has been demonstrated by the experience of other countries. Other domestic animals have the disease, it is true, but its transmission by these animals are rare and need not be considered. Wild animals as a factor in its spread may require consideration in a few localized sections of the country.

When the muzzling of dogs is suggested, however, the sanitarian meets with many obstacles. Many dog lovers can not appreciate, or are indifferent to, the anxiety, mental terror, and suffering of several thousand human beings in our country yearly, and the actual death of from 100 to 300 yearly, not to mention the suffering and death of countless dumb brutes. But once a dog-muzzling law is passed dog owners are up in arms, using their time, influence, and money to secure its repeal or prevent its enforcement on the ground of alleged cruelty. In reality there is no cruelty whatever inflicted on a dog by causing it to wear a muzzle when in public places or running at large. The animals soon become used to it and manifest not the slightest inconvenience.

In the absence of muzzling the disease will continue year by year, causing constantly increasing suffering, financial loss, and death. The greater freedom of movement which the dog enjoys over all other domestic animals, except possibly the cat, makes it difficult or impracticable to control the disease by any other means than general muzzling. How is this to be accomplished? This question seems to be almost insurmountable. A national dog-muzzling law is sometimes proposed as a solution, but the power of the Federal Government in dog muzzling, as in other matters, would be confined to those cases where the interstate dissemination of the disease is involved. The Secretary of Agriculture under present law could quarantine States where the disease exists, but it can readily be seen that it would be impracticable to enforce such a quarantine further than to require that all dogs transported interstate by common carriers should be muzzled. This, however, would have no material influence in the eradication of the disease. Practically all the States are infected, and the great majority of the serious outbreaks of rabies are entirely within the confines of particular States.

It is necessary, therefore, for the States and municipalities to take action and for the public to be educated to the importance of the disease and the value of dog muzzling. Dog-pound service should be increased in all the large cities. This results in the destruction of a large percentage of homeless and ownerless dogs, which class of animals are mainly responsible for keeping the infection of rabies alive. The importance of this service is shown by the effect which it had in Washington in 1900, when 2,771 more dogs were impounded than during the previous year, with an immediate and marked decrease in the frequency of the disease during the following year.

To secure individual State legislation in regard to dog muzzling, Federal co-operation and the equally important education of the public will require concerted and unceasing action on the part of professional men and sanitarians, with the co-operation of the general public and the press. With such State legislation, the Bureau of Animal Industry could co-operate with the State authorities by placing officers within the confines of a State in case of an outbreak where the disease was spreading beyond the control of the State authorities. A large percentage of homeless and ownerless dogs could be impounded and humanely destroyed. No dog would be seen on the streets of cities or loose in the country without a muzzle. Animals developing the disease would be unable to transmit it, because they would be either muzzled or confined. Financial loss, suffering, and death due to this disease would rapidly decrease from the beginning, and in a few years' time rabies would be unknown in this country.

Once our country becomes free from the disease, we could easily prevent its reappearance by enforcing a prolonged quarantine of all dogs coming into the United States from foreign countries where the disease prevails.

RESULTS OF MUZZLING DOGS IN OTHER COUNTRIES.

To prove the practical value of these repressive measures we have only to observe the results obtained in foreign countries. Prior to 1875 rabies had been prevalent in Berlin for many years. In that year a law was enacted, including the whole of Prussia, which provided for the killing of dogs suspected of having rabies, and the muzzling and leading of all dogs when in public places. This led to the complete eradication of the disease, and no case has occurred in Berlin since 1883.

In Holland in 1875, rabies being quite prevalent, dog muzzling was established. The disease immediately began to disappear, and in 1879 only 3 cases were reported, since which time the country has been free from the disease, except along the Belgian border.

In Great Britain the value of muzzling, which was enforced in spite of great public opposition, has been admirably demonstrated. In 1889 it was first adopted, and the disease had almost disappeared by 1892, when the muzzling was stopped on account of the determined opposition. The disease immediately began to increase, and in 1895 muzzling was again enforced. The decrease in rabies was immediate and marked, and since November, 1899, the country has been entirely free from the disease.

In Sweden the value of muzzling has also been demonstrated. In fact, in all cases where this measure has been effectually carried out the disease has been completely controlled.

The disease has never been known in Australia. This is due to the fact that the infectious agent never gained a foothold in that country, and for a number of years the government has wisely prevented such an unfortunate occurrence by laws which absolutely exclude the importation of dogs into that country.

In countries where steps have been taken to exterminate rabid dogs—Holland, Sweden, Norway and Germany—rabies in man has almost disappeared. In England, where the disease in dogs has been eradicated, and in Australia, where the affection has not been allowed to enter, the disease among the residents is unknown.

THE IOWA MEDICAL LAWS AND THEIR ENFORCEMENT.

BY LOUIS A. THOMAS, SECRETARY STATE BOARD OF MEDICAL EXAMINERS.

Legislation is the crystallization of public sentiment and forms the concrete expression of the people as formulated by their representatives in the General Assembly.

The fundamental principle of legislation is the protection of the people as opposed to individual or sectional interests. It therefore follows that laws enacted by the General Assembly are placed upon the statute books to be equitably and systematically enforced, regardless of personal or sectional interests.

The laws specially relating to the practice of medicine in Iowa are contained in Chapter XVII, of Title XII of the Code and Code Supplement, and form part of the police powers of the State. In enacting these statutes the legislature intended to safeguard and improve the general hygenic condition of the commonwealth, and to attain this object it adopted a broad and concise definition as to what constitutes the practice of medicine, and also demanded that such as sought to engage in this vocation possess certain reasonable qualifications.

The State Board of Medical Examiners is an administrative body and its functions are specifically laid down by the statute. It is authorized to determine the standing of Medical Colleges, examine applicants as to their professional fitness, and issue certificates to such persons as demonstrate their proficiency in the sciences pertaining to the practice of medicine.

"It may refuse to grant a certificate to any person otherwise qualified and shall revoke any certificate issued by it to a physician who is not of good moral character, or who solicits professional patronage by agents, or who profits by the acts of those representing themselves to be his agents, or who is guilty of gross unprofessional conduct, or for incompetency, or for habitual intoxication or drug habit, or for fraudulent statements as to qualifications."

Enforcement of the medical laws as applying to unqualified persons is not within the special jurisdiction of the State Board of Medical Examiners.

The statutes provide ample penalties, by fine and imprisonment, for persons found guilty of practicing or attempting to practice medicine without first having obtained a certificate from the State Board of Medical Examiners; but the law does not authorize the Board or any of its officials to commence legal proceedings, neither does it specially impose that duty upon any person.

Under the general statute the County Attorney is required to conduct prosecutions in the name of the State, provided information is filed and sufficient evidence produced to warrant a conviction.

In some instances County Attorneys proceed promptly upon receiving the necessary information but it is seldom any of them take the initiative, many preferring to avoid the responsibility altogether.

Occasionally we hear from those within our borders severe criticisms of the Iowa Medical Laws; some designating them as ineffectual and farcical. Such denunciations are entirely unwarranted, and emanate from those who have failed to analyze and appreciate the spirit and intent of the law and the extent of its possibilities.

In the course of my official duties, it has been necessary to investigate the medical laws and regulations of the various States and compare them with those in force in Iowa. In this case comparisons have not been odious—to Iowa.

While the phraseology of laws differs in most of the States, the main features of the medical laws are similar in construction but vary in detail as to administration and enforcement.

It is unnecessary at this time to enter upon a lengthy discussion of the Iowa law as it applies to Medical education; however, it can safely be said that the standard of requirements prescribed and enforced by the Board of Medical Examiners is considerably in advance of many of the other States and as high and exacting as any in the Union.

After the physician has been admitted to practice by the Board of Medical Examiners, he is required to record his certificate in the office of the County Recorder of the county wherein he resides, and also in any county to which he should subsequently move. A failure to comply with this requirement is a legal obstacle to the collection of fees for service, and lays the delinquent liable to the same penalty as though he were practicing without having obtained a certificate.

ITINERANT PHYSICIANS.

Section 2581 of the Code provides for the licensing of Itinerant Physicians, but gives the Board authority to refuse such license for "satisfactory reasons" and to cancel the same upon "satisfactory evidence of incompetency or gross immorality." The fee for an itinerant license is Two Hundred and Fifty Dollars per year, which sum must be paid to the Treasurer of State for the use of the State. Practicing medicine as an Itinerant Physician without such license is a misdemeanor punishable by a fine of not less than $300 and not more than $500 and costs, or commitment to jail until such fine is paid.

These provisions, as well as others of like character, found in this chapter, were not enacted by the Legislature simply for the purpose of increasing the revenues of the State, but rather to protect the people from the ignorance and incompetency of the quack doctor who is without permanent location, but wanders from place to place, leaving behind him a trail of deception and fraud. There are now but four licensed Itinerant Physicians in Iowa. During the past year a number of applications have been rejected and others held over for further investigation.

The people of Iowa may rest assured that the Board of Medical Examiners will take the necessary time and pains to investigate the record of every applicant for itinerant license, and upon evidence of fraud or incompetency, will refuse to issue a license. As an aid to these investigations we keep an information record of every complaint made against a physician, and file such particulars concerning traveling fakirs as will assist in convicting them should they venture into this state.

The Osteopathic Law provides for the licensing of Itinerant Osteopaths in the same manner as Itinerant Physicians, but the legislature, for reasons unknown, omitted to prescribe a penalty for violation; consequently the law, in this instance, cannot be enforced. We can say to our Osteopathic friends "be good," but they may use their own discretion as to heeding the admonition.

OSTEOPATHS.

The superiority of the Iowa Medical law as compared with that of many other States is especially marked by its strong definition of the practice of medicine; and the validity of the law is sustained by rulings of the Supreme Court covering almost every feature of the subject.

This State recognizes but one "side issue" to the practice of medicine: viz., Osteopathy, while a number of other States, notably Illinois, recognize and license all manner of cults and isms.

Osteopaths are examined in Anatomy, Chemistry, Physiology, Obstetrics, and Pathology. The certificate issued to them does not authorize the holder "to prescribe or use drugs in his practice, nor to perform major or operative surgery," neither is he classed or recognized as a physician. It is probable that some practitioners of Osteopathy confine their activities strictly within the privileges accorded them by law, but we have good reason to believe that many of them overstep these limitations and assume all the prerogatives of a qualified physician. Within the past few months several complaints of this character have been filed in the office of the Board of Medical Examiners, and are now in the hands of the proper County Attorneys. The course of study required of Osteopaths covers a period of twenty (20) months. The standing of their schools is by law determined by the State Osteopathic Association; consequently the State Board of Medical Examiners has no jurisdiction to inspect these schools nor to prescribe their equipment, preliminary requirements or course of instruction, but is obliged to admit their graduates to examination.

If Osteopaths are a real necessity to the people of Iowa, there should be no objection to admitting them to practice, provided, the legislature demands of them the same preliminary education and the same scientific training it requires of other practitioners. Since the State has recognized the necessity for high educational attainments prior to entrance upon the practice of medicine and other sciences, there can be no reasonable objection to applying the same requirements to Osteopathy, and the schools of this persuasion should be required to conform to the standard schedule and be subject to supervision by the same administrative body. This is a matter of serious importance to the commonwealth of Iowa, for the benefits to be derived by the public through higher education of the physician, will be reduced in proportion to the standard required of other

practitioners. The legitimate Osteopath could not reasonably object to such requirements, and the public has the right to demand a high standard of proficiency in all that pertains to the science of healing.

SPECIALISTS AND NOSTRUM VENDORS.

In addition to the control of itinerants, the Board should be given close supervision over the legally qualified advertising Specialists and Nostrum Vendors who permanently infest the cities and larger towns of the State. Many of these lack even ordinary qualifications and obtained registration under the five years' practice clause, but their ranks are being continually augmented by the more modern grafter.

Before an applicant is admitted to examination, every care is taken to verify his credentials both as to educational requirements and moral standing, and when the Board issues him a certificate, it is with the understanding that he will conduct himself as an honorable practitioner. Unfortunately some fall far below this expectation and adopt the tactics of the charlatan. As the patrons of these braggarts usually come from the poorer and illiterate classes, they are easily victimized, and the shrewd specialist (?) is sharp enough to keep just within the bounds of the law, so as not to place his certificate in jeopardy. If provision were made for a special license in addition to the physician's certificate, this evil could be quickly eliminated, for the necessity of procuring an annual license would subject the applicant to periodical investigation, and few could show a clean enough record to warrant the Board issuing the license. An annual license, discretionary with the Board, affords the only means of protecting the public against the gross and extensive frauds perpetrated by this class of professional parasites.

ILLEGAL PRACTITIONERS.

In almost every County of the State there are persons practicing medicine, in some of its branches, in direct and open violation of law. Some few of these perhaps have the necessary qualifications to admit them to State Examination, but they have made no attempt to prove their proficiency or comply with the legal requirements. Others, and by far the larger proportion, are entirely devoid of qualifications, and systematically defy the law. All of these have friends and sympathizers and rely on social and political influence for protection against prosecution.

Whenever an attempt is made to enforce the law by prosecuting one of these pretenders, the culprit assumes the role of martyr and marshals his sympathizers to raise the cry of persecution, and through their local influence the manipulation of political wires effectually blocks further proceedings. If a local Physician avails himself of a citizen's prerogative and files information against one of these pretenders, he is at once credited with jealousy and usually incurs the censure and ill-will of the community. As the dupes of the charlatan are loath to voluntarily exhibit the evidence of their credulity in court, the culprit generally escapes conviction.

If the Iowa Medical law is to be enforced against incompetent and illegal practitioners, the responsibility for this duty must be centralized and placed beyond the reach of local influence.

The systematic enforcement of a law depends upon two essentials; first, it must have an adequate penalty clause, and second, the responsibility for its enforcement must be specifically placed. The first of these essentials is amply provided for in the Iowa Statute, but the latter has been entirely omitted.

It is generally believed that the functions of the Board of Medical Examiners includes the suppression of disreputable and illegal practitioners, and judging by the contents of numerous letters received, anonymous and otherwise, it is apparent many have the impression that a detective bureau is maintained for this purpose. While the Board has the sole authority to determine the standing of Medical Colleges and pass upon the competency of applicants for admission to practice, neither it nor its officials have immediate jurisdiction over illegal practitioners, and when complaints are filed it can go no further than to lay the facts before the proper County Attorney.

In the matter of revocation of certificates of disreputable but otherwise legally qualified physicians, the Board is bound to follow the procedure prescribed by the statutes, but before such action can be commenced, satisfactory evidence in the form of affidavits must be filed with the Secretary. As complaints usually come from persons desirous of concealing their identity, it is often impossible for the Board to take action, as there is no authority to subpoena witnesses.

Under the provisions of the Iowa Medical law it is possible to convict every illegal practitioner in the State, provided, the offender is brought to trial and prosecuted with the ordinary vigor employed against other criminals.

In some States the Secretary of the Board of Medical Examiners is given general supervision over the enforcement of the medical laws pertaining to illegal practitioners, and the Board is empowered to employ competent legal counsel to prosecute, part of the fines imposed and collected being paid into a special fund for this purpose. Such a provision added to the Iowa law would make it effective and insure prompt and strict enforcement. It would in a great measure overcome the effect of local indolence and sympathy, and avoid the principal obstacle to the proper enforcement of the law, viz.: personal animosity against the local informant.

RESOLUTIONS ADOPTED BY THE IOWA STATE MEDICAL ASSOCIATION.

WHEREAS, The members of this Society are in favor of the impartial and systematic enforcement of all laws pertaining to the public welfare, and,

WHEREAS, The Iowa legislature has enacted certain laws governing the practice of medicine for the sole purpose of protecting the general public from incompetent and unscrupulous practitioners and the gross and extensive frauds perpetrated by these pretenders, and,

WHEREAS, The laws of this character cannot be successfully enforced unless made the special duty of the State Department charged with the administration of medical laws,

Be it resolved by the Iowa State Medical Association, That its committee on legislation be instructed to use every honorable means at its command to insure the enactment of an amendment providing for the centralization of authority in the enforcement of medical and sanitary laws, and that the State Board of Medical Examiners be authorized to employ competent counsel to assist the various County Attorneys in prosecuting illegal and incompetent practitioners.

Be it further resolved, That the advertising specialist and nostrum vendor holding a State certificate as a physician should be subject to the same requirements provided in the case of itinerant physicians, and that such persons be required to apply for and obtain an annual license from the State Board of Medical Examiners, and that evidence of misrepresentation, fraud or immorality shall be sufficient grounds for the refusal of such license.

Dickinson County—Dr. W. Esparanto, fined $300 and costs. Charge: Practicing medicine without a certificate.

Jefferson County—John H. Baldridge, fined $300 and costs. Charge: Practicing medicine without a certificate.

Marion County—C. S. Tandy, fined $300 and costs. Charge: Practicing medicine, surgery and obstetrics without a certificate.

Marshall County—Phenominal Kraus and the Great Anselme, each fined $75. Charge: Practicing as itinerant physician without license.

Phenominal Kraus and the Great Anselme, each fined $75. Charge; practicing medicine and surgery without a license.

Plymouth County—George A. Ricard fined $300. Charge: practicing medicine without a license.

Pottawattamie County—Emily W. Bresee, fined $300. Charge: practicing medicine without lawful authority.

The foregoing is from the reports of the Clerks of the District Courts to the Secretary of State of the Criminal Convictions in their counties for the year beginning October 1, 1906, and ending September 30, 1907.

LIST OF BLANK FORMS PRESCRIBED BY THE STATE BOARD OF HEALTH FOR USE OF LOCAL BOARDS.

Notice of Quarantine (City).
Release of Quarantine (City).
Notice of Quarantine (Township).
Release of Quarantine (Township).
Order to Abate Nuisance (City).
Order to Abate Nuisance (Township).
Physician's Report of Infectious or Contagious Diseases.
Physician's Report of Recovery from Infectious or Contagious Diseases.
Mayor's and Township Clerk's Report of Infectious Diseases. Post Cards.
Mayor's and Township Clerk's Report of Recovery. Post Cards.
Quarantine Sign for Smallpox, Diphtheria, Scarlet Fever, Cerebrospinal Meningitis.
Danger Signs for Chickenpox, Measles, Mumps, Whooping Cough.

Record Books for Township Boards of Health, containing 50 pages for recording meetings and 50 pages ruled for record of contagious and infectious diseases.

Record Books for City Boards of Health.

NOTE.—The State Board of Health does not furnish blanks or other supplies. Sample forms will be supplied upon application, and Local Boards are required to provide themselves with a supply.

THE NECESSITY OF A SANITARY MILK SUPPLY.

L. ENOS DAY, WASHINGTON, D. C.

In regulating the milk supply we not only lessen infantile sickness and lower their mortality rate but also guard against certain infectious diseases in children and adults. It has often been said that the food of a child determines the future of the citizen and the physical condition of the potential fathers and mothers of a commonwealth thereby determining the future of the race.

About fifty years ago Kleb pointed out the danger of contracting intestinal tuberculosis in children through the milk supply. More recent investigations along this line, of which we will speak later, have led the medical world to confirm his theory. Nor is this all, outbreaks of typhoid fever, scarlet fever and diphtheria have been traced to an unsanitary milk supply.

Reynolds (1) states that during the past twenty-five years one hundred and ninety-five typhoid fever epidemics, ninety-nine epidemics of scarlet fever and thirty-six of diphtheria have been recorded which were traced to the milk supply. (2) During a recent investigation by the Bureau of Public Health and Marine Hospital Service towards solving the problem of typhoid fever in the District of Columbia, it was found that 10 per cent of such cases were traced directly to the milk supply. This, together with the fact that milk, with the possible exception of wheat, is the food most universally used and that it is practically subject to contamination—it being a culture medium of such high order—necessitates the closest scrutiny and supervision to guard against the possibility of infection.

There are many experiments on record which show that bacteria grow very vigorously in milk, especially if the temperature is above 50 degrees F., which is about 15 degrees lower than ordinary room temperature.

It has been found that milk containing about 300 bacteria per c. c. at time drawn may contain as many as 10,000,000 after twenty-four hours standing at room temperature. While it is almost impossible to procure bacteria-free milk owing to the presence of a few bacteria in the external lacteal ducts of most cows even after the greatest care has been exercised in drawing it, the possibilities of contamination after it has been drawn are so great that it must be handled with the greatest skill and care in order to prevent any undue contamination.

The greatest source of infection, providing the udder be perfectly normal, is from dust and dirt falling into the milk or by placing milk in

unclean containers. There are always dust particles loaded with various bacteria floating around in the air of dairy stables and barn-yards. In order to show the number of bacteria floating around in the atmosphere of dairy stables, barn-yards and fields, some very interesting experiments were carried out at the Illinois Experiment Station (Bulletin 91). A large number of agar petri dishes were exposed in an open field and forty-three exposures gave an average of but 9-10 of one colony per plate although about 50 per cent of the plates remained sterile. There were 51 exposures made in a barn-yard and an average of 13 colonies per plate were procured, only twelve plates remaining sterile. Exposures made in the stables under varied conditions ran as high as 858 colonies per plate and as low as two, depending on the dust and degree of disturbance of the atmosphere at the time the exposures were made. In one experiment comparison was made between the bacterial condition of the air when the barn had been emptied with doors and windows closed for three hours and conditions in the same stable after the cows were placed in the stalls and feeding and sweeping had been performed. Under the former conditions no air currents were present to carry the dust about and six exposures gave but one-half colony per plate, and under the latter condition where feeding and sweeping had been done exposures gave an average of 51 colonies per plate. Several very interesting experiments showing the conditions which modify contamination of milk by dust laden with bacteria floating in the air of dairy stables, were conducted at the Experiment Station, Stockton, Conn. In one experiment it was found that the disturbance of the air caused by feeding dry hay and grain just before milking increased the count of bacteria in milk 1400 per c. c. or 71 per cent. In a similar experiment it was found that by feeding dry corn stover before milking there was an increase of 2433 or about 200 per cent. In these experiments ten cows were used which were divided into two groups, one being milked before and the other after feeding.

In the above experiments the Stadmueller covered pail was used and of course the amount of dust and number of germs getting into the milk from the atmosphere was very much less than had the ordinary open pails been used. All of the feed was of good quality and handled in such a way as to cause as little disturbance in the air as possible. Another very interesting experiment was conducted at this station. In this experiment ten cows were used as before, the udders of five of the cows were wiped with a clean damp cloth before being milked, in the other five no such precaution was used. It was found that the average bacterial count in milk drawn from the first five was 716, while that from the last was 7058. The wiping of the udders decreased the bacterial count 6343 c. c. or about 6,342,000 per gallon.

Further experiments were performed in order to secure information concerning the effect of brushing cows at milking time. A study of the results of these experiments shows that there was a greater number of bacteria per c. c. in the milk from cows which had recently been brushed than from those which had not been so treated. It is a custom quite generally practiced by many of the dairymen who pride themselves upon the care and attention given their cattle, to groom them well just before or about milking time. While such brushing and grooming is advantageous to the general appearance of the individual cow, the above experiments show this is a somewhat dangerous procedure, because it loosens many particles of dust, hair, etc., and allows them to float freely in the air. A large percentage of these dust particles in dairy stables must be considered as filth or dried particles of feces rather than ordinary dust. Marshall (3) estimates the dust usually found upon a cow or about the stall or even on the dirty clothing of a milker may contain upwards of 80,000,000 bacteria per gram of dirt and that 50 per cent of the dirt that falls into the milk is soluble and of course cannot be strained out or removed under ordinary conditions. Such milk has been strained as many as twenty times and then placed in the centrifuge for thirty minutes, after which a considerable quantity of fine particles of dirt would be found in the bottom of the tubes. This goes to show that only a very small percentage of the dirt can be removed by straining and possibly 80 per cent of the dirt which falls into the milk goes into solution, or is broken into such small particles that it is not removed by the closest mesh strainers in use. Bachaus is quoted as estimating that the people of Berlin swallow 300 lbs. of this filth per day or about 54½ tons per year, quite enough to fertilize a small field. According to this statement the amount swallowed by us might be a subject for some very unpleasant reflection.

But the dust and small particles of feces laden with bacteria, floating in the air is not the only source of contamination. Marshall also states that dirty pails and other containers are dangerous sources of infection. He estimates that there were from 500,000 to 50,000,000 bacteria per gram of dirt taken from the creases and corners, and many thousand bacteria from each square inch of the inner surface of such containers.

It is quite reasonable to suppose that all of the bacteria were not disease producing organisms or even capable of producing objectionable changes in milk, but some were capable of causing the milk to become sour; some produced various pigments as red, green or blue; others were pathogenic, causing various gastro-intestinal disorders or tuberculosis.

In an address before the Milk and Cream Exhibit and Contest in Cleveland, O., on March 16, 1907, Dr. H. G. Sherman (4) Chairman of Committee on Municipal Sanitation, said: "It is no longer a matter of theory but it has been clearly proven that a good milk supply is of the greatest importance to the city dwellers. A large proportion of diseases come through improper food, and milk is one of the important elements of our food, especially is this true of infants and young children, those least able to resist disease. With these it may constitute almost the whole article of food. Epidemics costing thousands of lives have been traced to tainted or unclean milk. Deaths from typhoid, diphtheria and scarlet fever are often caused by infection carried in the milk. In large cities nearly half the children born die before they are four years old, but where all the milk has been carefully inspected this rate has been greatly diminished."

As proof that much can be done towards lowering the mortality rate of children under five years of age by the improvement of the sanitary condition of the milk supply is well shown by (5) Biehn, director of the Department of Health Laboratories, Chicago, Ill. He states that during the five years previous to 1892, when the first milk ordinance was passed

in Chicago, the mortality rate in children under five years was 50,154, an average of 96 in every 10,000 of the city's population. During the five years ending January 1, 1904, there were only 40,549 deaths of children under five years of age, an annual average of 45 in every 10,000 of a total population averaging 630,000 more than in the early period. It will be readily seen from the above statistics that after the milk ordinance was passed and a sufficient period had elapsed to show results, the death rate was reduced 52 per cent.

We have shown by experiments above mentioned that milk contains a large number of various micro-organisms, many of which are pathogenic. A series of specific diseases are common to cattle and man, of these tuberculosis is the most common.

There are no available figures in the United States which give the percentage of cows used for dairy purposes that are affected with tuberculosis. However, Russell and Hastings of the Wisconsin Agricultural Experiment Station, have formulated a few statistics relating to various tuberculin tests which have been made in dairy herds in several states. According to these statistics we find the following percentage of cattle tested give positive results: Vermont 3.9; Mass. (suspected herds) 50 per cent; Mass. (entire herds) 26.4 per cent; Conn., 14.2 per cent; N. Y., 18.4 per cent; Penn., 14.1 per cent; N. J., 21.4 per cent; Ill., 15.32 per cent; Mich., 13 per cent; Minn., 11.1 per cent; Iowa, 13.8 per cent; Wis. (suspected herds), 35.6 per cent; Wis. (nonsuspected herds), 9 per cent. The explanation of the high percentages which have been given is found in the fact that for the most part suspected herds only have been tested. Admitting that the greater part of these percentages is too high, they are still sufficient to demonstrate the wide distribution and frequency of tuberculosis in cattle in the United States.

That milk coming from tuberculous udders is capable of transmitting infection to experimental animals is conceded by all who have given the subject any consideration. It has also been established that in advanced generalized tuberculosis, tubercle bacilli may be expelled with the milk although the udder be not affected.

Mohler (6) has compiled some very interesting and positive experiments of several of the earlier investigators which establish the above statements. A few of these it might be well to mention in this connection. Zurn (1872) fed milk from cows affected with tuberculosis to swine, with positive results. Klebs (1873) obtained positive results in guineapigs, a dog and a goat, by feeding them milk which had been drawn from a tuberculous cow. Bollinger (1880) infected one out of three hogs which he fed on the milk from a tuberculous cow. The milk of another cow was fed to five hogs with the result that they all died of tuberculosis. Neither of these cows showed tuberculosis of the udder.

H. Martin (1884) made a study of the milk sold in Paris dairies. In thirteen samples which were examined, three were found to contain virulent turbucle bacilli. This was proven by the inoculation of guinea-pigs.

In 1885 Bang, in his experiments with milk from cows with tuberculous udders, produced the disease in five pigs and three rabbits by feeding. Four rabbits were inoculated with skimmed milk from these cows and they all became infected. Microscopic examination of the sediment showed many tubercle bacilli, while a few were also observed in the cream and milk. In 1899 he tested the milk of 21 tuberculous cows with normal udders by inoculating 48 rabbits Two of these cows transmitted the disease.

In 1893 Smith and Schroeder produced tuberculosis in 41 per cent of guinea pigs inoculated intra-abdominally with the milk from six cows affected with generalized tuberculosis.

Kudinow (1898) in a study of the micro-organisms present in the market milk of Dorpat found by intraperitoneal inoculations of guinea pigs that 25 per cent of the samples contained tubercle bacilli, and concluded that the percentage was even greater since many of the animals died as a result of other pathogenic bacteria in the milk, before the tubercle bacilli had an opportunity to produce extensive lesions.

Roger and Garnier (1899) injected the milk of a tuberculous cow without udder lesions into the peritoneal cavity of two guinea pigs. They both contracted tuberculosis. The calf of this cow was allowed to suckle for only two days, but six weeks afterwards it died of tuberculous lesions of the mesenteric lymph glands, liver, spleen and kidneys.

Gehrman and Evans (1900) found tubercle bacilli in the milk of 15 out of 41 cows with sound udders, or 36.6 per cent. Guinea pigs inoculated with milk from 10 of these cows died of tuberculosis.

In 1895 Gehrman demonstrated by a microscopic examination of the milk of 38 cows with normal udders that 10.5 per cent contained tubercle bacilli. Guina pig inoculation established the virulence of the tubercle bacilli in the milk of six of these cows.

From these experiments it is clearly shown that in a large percentage of tuberculous cows, tubercle bacilli are expelled in varying quantities, although the udder be not affected. Schroeder (7) has shown that the lacteal ducts are not the only source by which tubercle bacilli are expelled from tuberculous cows, but that large numbers of these organisms are passed with the feces. Schroeder used seven cattle that were affected with tuberculosis, five were found, on microscopic examination, to be passing tubercle bacilli in their feces. The feces of four of these were used in inoculation tests and were found to be infectious to either guinea pigs or swine. In this connection Schroeder made some very delicate experiments in order to determine the number of tubercle bacilli that an infected cow of average size would expel with her feces. He found that about 37,800,000 would be passed in 24 hours. With such a large number of these organisms in the feces and the liability of such contaminated feces getting into the milk either as dried particles flying in the air or by falling directly from the cow into the milk pails, it will be readily seen that feces from tuberculous cows is probably the most dangerous factor in the dissemination of tubercle bacilli by cattle affected with tuberculosis. In this respect one must regard such feces as having a place similar to that commonly accorded sputa with tuberculous persons.

Schroeder (8) recently collected 26 samples of milk from various dealers in Washington. The milk was tested at the Experiment Station by guinea pigs inoculation and 7.7 per cent of the samples of milk produced generalized fatal tuberculosis. He also showed that butter prepared from the milk of a tuberculous cow contained large numbers of

tubercle bacilli. Fifty guinea pigs were inoculated in the peritoneal cavity with one gram of this butter which had been melted. Forty-four of the fifty succumbed to generalized tuberculosis, the time varying from forty-four to one hundred and twenty-four days. The age of the butter was from one to ninety-nine days. From these experiments he concludes that when butter is prepared from infected cream tubercle bacilli are transferred to it in such numbers that they will be present in greater concentration than in the milk from which the butter was derived; hence, measure for measure, infected butter is a greater source of infection by tubercle bacilli than infected milk, also that tubercle bacilli embedded in ordinary salted butter remain alive and virulent for a long time. After ninety-nine days they showed only a doubtful reduction of pathogenic virulence.

After reading these convincing experiments showing the large percentage of tuberculous cows that expel myriads of tubercle bacilli daily, the question naturally arises: Is man susceptible to tuberculosis from a bovine source?. This question, since Koch made his historic address before the British Congress for tuberculosis in 1901, has attracted the attention of the medical profession throughout the world, and as a result has aroused the widest interest and has bred countless controversies. At this congress Koch denied the transmissibility of tuberculosis from man to cow and vice versa. He was the first to state authoritatively that tuberculous cattle were not a source of infection to human beings. In a more recent paper he states very positively that human tuberculosis differs from bovine tuberculosis and cannot be communicated to cattle, also that mankind is nearly if not absolutely insusceptible to bovine tuberculosis. He based his opinion on the fact that there are two distinct types of tubercle bacilli; that they are distinct in cultural characteristics, virulence and morphology. He also claimed that he was unable to produce tuberculosis in cattle with tubercle bacilli of the human type.

Since Koch took this position several investigators have succeeded in producing tuberculosis in cattle with tubercle bacilli of the human type.

Salmon (9) cites several convincing experiments which were conducted by reputable investigators.

Chauveau fed two heifers and a bull with emulsions made from tuberculous human lungs, two doses were given to each animal. The bull was destroyed on the thirty-fourth day, one heifer on the fifty-fourth day and the other on the fifty-ninth day after feeding. All showed tuberculous lesions on post-mortem. He also made comparative experiments and intravenous injections, and subcutaneous inoculations; from all of these he concluded that the human tuberculous virus acts on the bovine species exactly like the tuberculous virus which comes from the bovine species itself.

Mohler (10) made cultures from a caseous, mesenteric lymph gland of a boy four years old who had died of tuberculosis. The fourteenth generation of a twenty-four days' growth on dog serum was injected into a heifer, five weeks after a firm tumor had developed at the point of inoculation. The animal was chloroformed 127 days after inoculation and at the autopsy it was found that the animal had generalized tuberculosis. After this culture had been grown for three years on artificial medium

and had been transplanted 31 times, he found it had not lost its virulence for cattle, but retained sufficient power to destroy a calf in fifty-five days.

de Schweinitz and Dorset (11) were able to produce tuberculosis in cattle by injections of human sputum. From the experiments just mentioned there is no doubt that tuberculosis from a human source can be produced in cattle. There are several observations on record which are quite convincing that tuberculosis from a bovine source may be transmitted to man. Kraus reports a case of a butcher whose duty it was to remove the diseased parts of cattle that were slaughtered for food. This man was infected in the right arm. Pieces of gland and skin from the arm proved to be tuberculous. Spronck and Hoefnagel report a case where a veterinarian wounded the finger of a butcher with a knife, who was assisting him in inspecting the tuberculous organs of a cow. Ten months later, after the finger had become thickened, tubercle bacilli were recognized with the microscope and were verified by animal inoculation. Ravenel in his address to the British Congress on tuberculosis stated that his assistant scratched his knuckle on the broken end of a rib in performing a post-mortem on a goat which had succumbed to an experimental inoculation with bovine tubercle bacilli. The wound healed promptly; about three weeks after it became reddened, swollen and sensitive, it grew worse and was finally excised. Two guinea pigs were inoculated subcutaneously with a portion of the nodule from the finger, both developed generalized tuberculosis. Grothan reports that a girl six years old had suffered from an eruption on the leg supposed to be due to ivy poison. This was treated at home by the topical application of fresh cream, after which nodules developed varying in size from a hazel nut to a hickory nut containing masses of caseous material. Some of this material was injected into the peritoneum of a rabbit producing tubercular peritonitis and death in about three weeks. The cow was examined and the udder seemed normal yet inguinal and intra-peritoneal inoculation of two rabbits with a mixture of cream and milk gave positive results in both inguinal inoculation and one peritoneal. Mr. Howe, North Hadley, Mass., lost a son twenty months old from abdominal tuberculosis about three months after he had paid a week's visit to his uncle and had been fed with milk from the uncle's cow. The cow was killed soon afterwards and proved to have generalized tuberculosis. The child's sickness and wasting began a few weeks after he returned home. He had previously been vigorous and healthy, as were his parents.

A four-year-old son of Colonel Beecher, of Yonkers, N. Y., and grandson of Henry Ward Beecher, died March 4, 1894, of tubercular meningitis, and the two Alderney cows which supplied him with milk were proven to be tuberculous by the tuberculin test and post-mortem examination. There was no hereditary taint. Law reports a Scotch family strong and healthy who had a herd of cows which contracted tuberculosis. Two young daughters brought up on the milk died of tuberculosis, while two older brothers using little or no milk remained well and hearty.

Bemme, chief physician of children's hospital, Berne, records the case of four children born of healthy parents and without tuberculous ancestors either on the paternal or the maternal side, who died of intestinal and mesenteric tuberculosis, having consumed for some time milk furnished by tuberculous cows.

The above cases were compiled by Salmon (12).

From the experiments and observations before mentioned, sufficient evidence has been brought forward to show that milk is one of the most dangerous articles of food in dissiminating disease, especially tuberculosis.

In order to render milk a less potent factor in the transmission of disease it must either be obtained from a pathogenic bacteria-free source and placed in sterile containers and kept at a temperature low enough to inhibit the growth of various micro-organisms, or pasteurized.

While pasteurization destroys a large number of the bacteria in milk it does not destroy all. Pasteurization changes the milk in such a manner that it is much harder to digest, also destroys enzymes which appear to be necessary in the metabolism of infants. For this reason many specialists in the diseases of children much prefer raw milk, provided it is obtained from a safe source.

As most milk commissions limit the bacterial count to 10,000 bacteria per c. c., it requires much care and labor on the part of the dairymen to be able to produce milk which meets these requirements.

Probably the most important factor in producing sanitary milk depends upon the cow from which the milk is drawn. All cows should be subjected to the tuberculin test to determine if tuberculosis be present. They should be free from disease and should have perfectly sound udders. Each cow should be examined frequently by a competent veterinarian and subjected to the tuberculin test at least once a year during the period which she is used for dairy purposes.

The milk house should be detached from the dwelling, also from the dairy barn. It should be supplied with plenty of pure cold water and sufficient ice boxes for refrigerator purposes. The floors and walls should be constructed of cement or some other hard material so that it can be thoroughly washed daily.

The barn should be well lighted and thoroughly ventilated. The floors should be constructed of some firm material so that a smooth surface can be obtained. Ample drainage should be placed in such a manner that the moisture on the floor would be reduced to a minimum. The barn should be kept perfectly clean and whitewashed as often as the occasion demands. Wash bowls, soap and towels should be placed at convenient intervals behind the cows for the use of the milkers. The stalls should be sufficiently long to prevent the cows from coming in contact with the walls behind them.

The cows should be thoroughly groomed daily, which should be done after milking. Their udders should be wiped with a clean moist towel just before milking. They should be given plenty of fresh air and exercise in an open lot in winter, as well as summer. Their food and water should be of good quality.

All containers and utensils should be thoroughly sterilized in a steam sterilizer each time before being used. As soon as the milk is drawn it should be cooled down to 50 degrees F. at once and then bottled. It should remain at this temperature and in the original bottle until delivered. Milk should not be delivered or sold in bulk.

The milkers and others engaged in the handling of the milk or the care of the cows should be provided at least twice a week with clean overalls, jackets and caps. No person who is affected with or has recently been in contact with any contagious or infectious disease should be allowed to handle or assist in the handling of milk or any of the utensils used in preparing the milk for the market. Utensils used in marketing or storing milk should not be washed in water from shallow wells which contain surface water. Typhoid fever has been spread by water from such source.

BIBLIOGRAPHY.

1 Proceeding of A. V. M. A., 1907, p. 338.
2 Magruger, Journal A. M. A., September 28, 1907.
3 Marshall, Michigan Experiment Station, Bulletin, 221.
4 Lane, B. A. I., Circular 117, p. 20.
5 Biehn, Ill. Med. Jour., December, 1907, p. 624.
6 Moehler, B. A. I. Bulletin 44, p. 4.
7 Schroeder, B. A. I. Bulletin 99.
8 Schroeder, B. A. I. Circular 127.
9 Salmon, B. A. I. Bulletin 53, p. 10.
10 Mohler, B. A. I. Bulletin 96.
11 de Schweinitz and Dorset, B. A. I. Bulletin 52, p. 2.
12 Salmon, B. A. I. Bulletin 53.

DR. EIKER.—We would like very much to discuss these papers that have been read, but our time is already more than used.

The convention thereupon adjourned to 9:30 a. m. Thursday.

THE CONDITIONS INFLUENCING THE PRODUCTION OF SANITARY MILK.

J. H. M'NEIL, AMES.

Much work has been done to influence the production of pure milk, and yet we have accomplished but a mere beginning, and a faultless system remains yet to be perfected. Progressive physicians, organized as "The American Association of Medical Milk Commissions," who met for their first annual meeting last year, at Atlantic City, have taken a step in the right direction. At that meeting committees were appointed on Medical Examination of Employees, Chemical Standards, Bacteriological Standards, Veterinary Inspections and Protection Against Tuberculosis. The members of the conference all agreed that the cause could be best advanced by the establishment of a Medical Milk Commission, appointed by the County Medical Societies. These organizations have extended to other cities and towns and it is evident that a great deal of good will come from this work along the lines of milk hygiene. Veterinarians have also taken an active part in the effort to bring about reforms, and progressive dairymen have seized the opportunity and materially aided in the movement, and by the co-operation of all these forces it has been made possible to obtain pure milk in many cities and towns.

Infected or contaminated milk is to a great extent the direct cause of disease. Dr. Koch's statement, made in 1901, to the effect that "Though the important question, whether man is susceptible to bovine tuberculosis at all, is not yet absolutely decided, and will not admit of absolute

decision today or tomorrow, one is nevertheless already at liberty to say that, if such a susceptibility really existed, the infection of human beings is but a rare occurrence. I should estimate the extent of infection by the milk and flesh of tubercular cattle, and by the butter made from their milk, as hardly greater than that of hereditary transmission, and I therefore do not deem it advisable to take any measure against it." This assertion was made before the British Congress on Tuberculosis, and had not a little influence in checking the movement that had been started for the eradication of tuberculosis, but it also stimulated original research to disapprove the statement, which, emanating from one so high in authority had the immediate effect of turning many against the theory that milk serves as a medium for the conveyance of tubercular bacilli to the human being. While this ground had been gone over before by Pearson, McFadyean, Ravenel, Gilliland, Calmette and Von Behring, it was necessary to carry on careful additional research in order to prove that Koch's statement was not absolutely true, and as most of you know, it has been done to the almost complete satisfaction of medical men and veterinarians.

Other germs than the tubercle bacilli may enter the milk, either directly through the udder or through contamination of the milk after it is drawn, but this is the one organism that should receive especial attention in discussing the problems relating to the production of sanitary milk.

The most important factors in the production of pure milk are: first, healthy cows; second, hygienic conditions of their surroundings; and third, the cleanliness observed in obtaining the milk from the cows, bottling it and conveying it to the consumer. It is impossible, under ordinary circumstances, to obtain milk from a cow without its containing many organisms, as the small cavity in the teat always contains milk which becomes infected from the exterior. The first portion of the milk, therefore, contains a greater number of organisms, the number decreasing as the milking progresses, and if the last milk obtained is drawn under aseptic precautions and placed in sterilized bottles, it will remain sweet for quite a long while. The amount of sediment contained in milk is usually an index of its purity, and depends upon the cleanliness observed in milking and the amount of straining it gets afterwards. Straining, however, is never sufficient to remove all the sediment from the milk, as evidenced by the slime that accumulates around the shafts of the ordinary farm separator.

It is important that we arrive at some understanding as to how bovine tuberculosis is transmitted to man, and whether or not we are getting at the seat of infection when we insist upon the production of sanitary milk. We are often accused of exaggerating the real condition, and this is probably true on the part of some individuals, but it has certainly been underestimated by others. Ravenel, at one time Bacteriologist for the State Live Stock Sanitary Board of Pennsylvania, records three cases of veterinarians who were accidentally inoculated while making post-mortem examinations. In all three cases tubercle bacilli were satisfactorily demonstrated in the preparations. The last case being examined by Dr. John Guiteras, the Pathologist of the University

Medical Department. Pfifer, Hartsell and Naughton have reported similar cases. There is another series of cases from which we get second-class evidence from the clinical observation of individuals infected by ingestion of milk. Olliver reported to the Paris Academy of Medicine an instance where girls contracted tuberculosis while attending a young ladies boarding school, five dying from the disease. The diseased girls were descendants of healthy ancestors, coming from different families. Autopsy revealed intestinal tuberculosis, confirming the suspicion that infection had taken place through milk. The cow, which for a year had served as a source of milk supply for the school, was slaughtered and presented, upon post-mortem examination, extensive tuberculosis of the intestinal glands and udder. Similar cases have been reported by Kirkpatrick, Rotch from the Childrens' Hospital in Boston, Lyiden, and the case so often quoted where the four-year-old son of Colonel Beecher, of Yonkers N. Y., died of tubercular meningitis, the case being traced to the two Alderney cows, the milk from which he had been fed, and which were found to be tubercular by the application of the tuberculin test, which was verified by a post-mortem examination.

Still reported the results of 769 autopsies on children under twelve years of age at the Ormanode Street Hospital in London, and states that 269 showed lesions of tuberculosis. Those having intestinal infection were to the others as one to two and one-tenth. Carr, of Victoria Hospital, gives the relation of one to two. Shennon, of Edinburgh, states that 28 per cent of the cases he examined were alimentary, or one to two and three-tenths. Dr. Mayo, of Rochester, Minn., states "that he cannot help believing that much of the extra pulmonary tuberculosis has to do with uncooked milk, which is so common as an article of diet in this country." Heller made 714 post-mortem examinations of victims of diphtheria, and found that nineteen and six-tenths had tuberculosis in various organs. These reports I conclude correctly represent the conditions as they exist in England and Scotland, and may be given due consideration in studying the subject in the United States.

Tuberculosis exists to an alarming extent in dairy cattle, even in those kept under the best sanitary conditions. In a tabulated list of the animals infected of those belonging to eighteen different colleges and experiment stations, the precentage ranges from 15 to 100 per cent, or an average of about 55 per cent. Bad sanitary conditions favor the spread of the disease, but it is not always the under-fed, emaciated dairy cow that is affected with tuberculosis. Pearson, of the Pennsylvania State Live Stock Sanitary Board, estimates that 13 per cent of all the herds tested with tuberculin reacted to the test. In England, out of fifteen thousand tests, 26 per cent reacted. The herds of Great Britain are very generally affected, as 14½ per cent of all those animals intended for exportation into the United States during the years 1901 to 1905, inclusive, reacted.

The lack of enforcement of the federal law relating to the inter-state shipment of live stock is a very potent factor in the distribution of dairy cows that are tubercular. For instance, some unscrupulous cattle owner may have his cows tested with tuberculin by a competent veterinarian, or if he prefers, he can procure the tuberculin, test the cattle himself,

and those that react he can ship to any market where the local dairymen and farmers may purchase them, place them in their dairies and produce a portion of the milk, and milk products, that are used for human consumption.

The rapid spread of tuberculosis in hogs in the dairy districts of Iowa presents more evidence of the dangers that exist in using milk from cows that have open tuberculosis. Dr. Mohler has shown that the slime which collects around the shaft of the separator contains virulent tubercle bacilli, the quantity varying according to the district from which the samples were procured. There is always a greater number of tubercle germs in butter than in milk. Skim milk, buttermilk, cream and sediment from infected milk contain tubercle bacilli.

Milk to be free from tubercle bacilli must be drawn from cows that are not suffering from mammary tuberculosis, and are not being kept in a tubercular environment; but this is almost impossible under the conditions in which our dairy herds are kept.

Milk becomes contaminated with tubercle bacilli: first, through the udder of the cow with mammary tuberculosis; second, after it has been drawn, by excreta which adheres to the udder and flanks of the cow and drops off into the milk pail during the process of milking.

The greatest danger of infection comes from a dissemination of tubercle bacilli with the feces of cattle that are suffering from open tuberculosis. Reynolds conducted a series of experiments wherein he demonstrated that virulent tubercle bacilli pass through the entire alimentary canal and remain virulent. Mohler, Schroeder and Cotton, working in the Experiment Station Pathological Laboratory, demonstrated beyond all doubt that the feces will and does carry large quantities of virulent tubercle bacilli. During the past year an experiment was conducted at the Iowa State College in which twenty-eight hogs were kept in the feed lot with cows that had responded to the tuberculin test. They were allowed to run with these cows, and feed upon the excreta. They did not have access to milk, nor any other source of infection. At the end of about 100 days they were slaughtered and 22 out of the 28, or 80 per cent, showed unmistakable lesions of tuberculosis. In another experiment 25 hogs that had been sleeping in manure piles, occasionally fed on milk, and which were allowed to run after tubercular cattle, were slaughtered, and 10 of the 25, or 40 per cent, were found to be tubercular, one, an old brood sow, had tuberculosis of the mammary gland. Dr. Rosenberger, of Philadelphia, has demonstrated tubercle bacilli in the feces of recognized cases of human pulmonary tuberculosis, and also of patients who at the time of examination were not known or suspected to have had tuberculosis in any form.

Although the experiments conducted by Mohler seem conclusive, there is a great difference of opinion as to the proportion of affected cows that produce milk containing tubercle bacilli. The number suffering from tuberculosis and having tubercular udders vary, indicating that in some countries the disease exists extensively and in a more virulent form. In England and Germany the percentage varies from 1 to 6 per cent, and in the United States it is placed at 2 per cent.

Assuming that it is correctly estimated that 25 per cent of the dairy cows are tubercular, and that 2 per cent of the tubercular cows have mammary tuberculosis, we would have one cow out of every two hundred thus affected. Milk drawn from an udder free from tuberculosis may on inspection contain virulent tubercle bacilli. Strenstrom, Schroeder and Cotton believe that such contamination usually takes place during or after milking, the infectious material being derived from the cow's own tuberculous discharges, her affected neighbor or other extraneous sources, and thus a cow with open tuberculosis is not only a menance to her stable mates, but may be the means of adding tubercular material to otherwise pure milk. Until within recent years it has been very generally accepted that at least in aged animals the common method of infection was by the inhalation of bacilli in dust or dried discharges, and Cornet is the strongest advocate of this dust inhalation theory, but his views no longer seem tenable, as it has been shown that it is very hard to obtain dust that will float in the air which contains living, virulent tubercle bacilli, as sunlight will kill the germs in less than one hour, and within five hours when they are exposed in thick opaque masses of pus.

Schroeder and Cotton state that dried sputum and other dust are not the specific source of infection, but that the ingestion is the real method by which the tubercle bacilli reaches the lungs as well as other parts of the body. Cadeac and Ranenel have proven that tubercle bacilli may pass through the intestinal wall without producing any lesions, and that primary diseases of the lung may be set up in this way. They fed healthy dogs on tuberculous fluids and on examining the chyle in the thoracic ducts a few hours later found that it contained living tubercle bacilli. Valce introduced living tubercle bacilli into the rumen by means of a stomach tube, and afterwards demonstrated the presence of turbucle bacilli in the lung tissue, and concludes that the absorption through the digestive tract is extremely favorable to the production of pulmonary tuberculosis, and that the tubercle bacilli may pass through the intestinal wall without producing appreciable lesions in the mucous membranes of the intestines or mesenteric lymphatic glands.

Regarding pasteurization of milk as a means of rendering it pure, it should be remembered that toxins are not destroyed, and while these are not sufficiently harmful to be considered as a direct cause of disease, the experiments of Calmette and Breton go to prove that the use of the milk is harmful, and that where tuberculosis is already present the rapidity of the course is greatly increased by the feeding of milk containing the dead organisms and their products; furthermore, if tuberculosis is not present the slow and continuous ingestion of this material will cause digestive derangement, and result in lack of development of the growing young. The above mentioned gentleman further demonstrated that tuberculin is toxic when absorbed through the digestive tract, and for this reason milk should not be used from a cow that is reacting, as it is a well known fact that tuberculin is secreted in the milk.

In as much as the eradication of tuberculosis from dairy herds would be for the public benefit, and would be a direct loss to the stock owner, justice demands that he be compensated to a certain percentage for the loss, and the Government, State or City, should provide some indemnity

fund for this purpose. This would also prevent to a large extent the now existing practice among dairy men of hiding away suspected cows and selling them at first opportunity. In all cases the co-operation of the dairyman is an essential factor in gaining the desired end, and I can see no better way of gaining his confidence and support than by partially compensating him for his loss.

By the tuberculin reaction is generally understood a rise in bodily temperature amounting to fever, which rise is accomplished by more or less acceleration of the pulse, hurried breathing, loss of appetite, and less frequently by rigors and other visible signs of disturbance in the bodily functions. The first we consider a thermic reaction, the second an organic reaction. The local reaction will not occur if thorough antiseptic precautions are used, and therefore the only reliable indication of reaction is a distinct rise in bodily temperature.

Under ordinary conditions it is not best to test aged animals when the pre-injection temperature is above 103 degrees F., but there are exceptions to this rule, and in many cases cows will have a continued high temperature with a post-injection temperature not exceeding 104 degrees F., and upon post-mortem examination present evidence of tuberculosis. Such animals should be held for a second test; to be made within a period of three or four weeks. It is the experience of veterinarians that doubtful reactions will be rare the sooner temperature measurements are taken after the injection, and the first post-injection temperature should not be taken later than eight or nine hours after the injection of the tuberculin. The height of the temperature in the reacting cow is not always in direct proportion to the extent of the tubercular changes, as an animal may be in the last stages of the disease and fail to give a reaction, and on the other hand, an animal that gives a typical reaction may have a very slight affection. The doubtful or suspicious group of animals consists of both tuberculous and non-tuberculous individuals.

The temperature curve is characteristic—a gradual rise—a pause at the summit, and a gradual decline. DeSchweinitz calculated the average temperature of about 1,600 tuberculous cows, which were tested with tuberculin, and from this average it appears that after injection the rise in temperature begins in from 5½ to 6 hours, and reaches its greatest height at from 16 to 20 hours after, and then gradually declines, reaching normal again about the 28th hour. This gives us the so-called tuberculin curve. In studying the same temperatures he concludes that in order to diagnose tuberculosis safely there should be a rise of temperature of not less than two degrees F., and that the temperature should at its highest point reach 104 degrees F.

In making the tuberculin test at least four temperatures, at intervals of two hours, should be taken before injecting the tuberculin, and never less than six after the injection, beginning at the eighth hour and repeating every two hours up to the eighteenth, and longer if there is an upward tendency. In my experience I have found that the most convenient method is to inject the tuberculin at 10 p. m, and commence taking the post-injection temperatures at 6 a. m. the following day, feeding and watering the animals at their regular periods, and in all cases recording the fact on the chart. Any sudden change in the atmosphere

of the stable should also be recorded, and must be taken into consideration at the time of final interpretation.

Tuberculin has been condemned as being unreliable, but when used by experienced men, and sufficient search is made for the tuberculous lesions in the carcass of the slaughtered animal, it can be depended upon. If after testing a herd of cows there are a few that are suspected as being infected, but which show a very irregular temperature curve, they should be isolated and subjected to a critical clinical examination, and those that are emaciated, or whose lungs are affected, or suffer from mastitis, bloat, or are frequently in heat, should be considered as probably affected, and either condemned or subjected to a second test.

All new animals subsequently added to the herd should be kept in quarantine a sufficient length of time to demonstrate that they are not tubercular, and under present conditions, it is not always safe to purchase an animal from a tuberculous herd even if it fails to react to the tuberculin test, as it may have been previously injected with tuberculin for the purpose of putting it in a condition that will prevent its reacting when tested within a few weeks. McFadyean has demonstrated that an animal may have been infected several weeks previous to the application of the tuberculin test, and yet not react, nor be in a condition to react for a period of several weeks following the test. Thus in order to detect all the tubercular animals in a herd the following rules should be closely adhered to:

First. Test all animals, and eliminate all those that react.

Second. Repeat the test after one month in badly infected herds, and eliminate all those that react.

Third. Repeat the test after an interval of three months.

Fourth. Subsequently the test should be repeated half yearly if possible, if not, then at least yearly, and preferably in the fall.

Fifth. When fresh animals are introduced they ought to be tested a second time within the interval of thirty days if they fail to react to the first test.

Sixth. After each test carefully clean and disinfect the stable.

Tuberculin does not affect the flow of milk nor the percentage of fat in healthy cows, but there is always noted a decided decrease both in quantity and quality of those that react. We have to meet the argument that tuberculosis can be communicated to healthy cows by injecting them with tuberculin; this is impossible when the material is properly prepared, and in order to prevent fraud the Federal or State authorities should control its distribution. It would not be necessary for them to manufacture it, but they should see that the material comes from a reliable firm and is tested often enough to know that it is potent. It is recommended by some that stockmen and dairymen should be given instructions on tuberculin testing, and that they can do this work accurately. I am not in favor of this, as it is only a temporizing measure, and the best results will not be obtained. Lawyers are consulted on the problems of law, physicians on subjects pertaining to human diseases, so should veterinarians be consulted on such subjects as pertain to sanitary science, as they are the best equipped to give advice. The tuberculin

test, being a very delicate one, should be handled by men who are thoroughly acquainted with the same, both from a theoretical and practical standpoint, and who are endowed with judgment and discretion.

Typhoid fever, scarlet fever and diphtheria may be carried by milk, where some member of the family is suffering with the disease. Kober states that nearly half of all the deaths in children under one year of age are caused by gastro-enteric diseases, chiefly infantile diarrhoea, and this points with more than mere suspicion to the fact that the morbic agent is introduced into the body with the food. The most frightful mortality rates are everywhere furnished by the hand or bottle-fed children, indicating that impure cow's milk and improper care and feeding are the chief primary causes.

The veterinarian and the practitioner of human medicine must work in unison in solving this great problem of producing pure milk and when the co-operation of these forces has been accomplished we shall see the dawn of a bright future in sanitary medicine.

DR. EIKER.—Many of the physicians present this evening are health officers, or you are the advisers of your local board of health. There is nothing of more importance to that board than that the city or town wherein you reside shall be supplied with pure milk. The next paper will be delivered by a gentleman who represents the Department of Animal Industry at Washington, D. C.

EPIDEMIC CEREBRO-SPINAL MENINGITIS.

BY DR. A. M. LINN.

America seems peculiarly the home of epidemic cerebro-spinal meningitis. The first appearance of this disease was in America and it has occurred more frequently on this side of the Atlantic. Repeated epidemics have visited New York and Boston often attended by large fatality. Only two years since an outbreak in New York was attended with a mortality rate of 70 per cent and resulted in 5,000 deaths.

This disease like most epidemic affections is prevalent in large cities when the struggle for existence is keenest and the opportunities for relaxation are few, where want and misery are most frequently found and the poor in helpless fashion struggle for a meager sustenance.

Epidemic cerebro-spinal meningitis has rarely visited Iowa. Our favored commonwealth has been fortunately free from all forms of disease engendered by poverty. We have no congested centers of population and the conditions are not favorable to its development among our well fed, well housed, and industrious people.

At the date of the earlier outbreak of cerebro-spinal meningitis the State Board of Health was apprehensive of a general prevalence of the disease. It had appeared in epidemic form in varions localities in our neighboring States.

Its virulence was somewhat alarming and the repeated visitations on the borders of the State gave serious concern.

Several appearances of epidemic cerebro-spinal meningitis limited in extent occurred within the state during the last year. These invasions were endemic in character, and were attended with a high fatality and were the occasion of much concern to the Health Authorities of the State.

Sporadic cases of meningitis occur not infrequently giving no evidence of any infectious nature. It is known that the germ of this disease, the Diplococcus intercillularis, is possessed of little vitality. The disease usually is but feebly contagious and is not readily communicated to others save in favorable conditions. Occasionally the disease becomes epidemic in character, the germ becomes extremely virulent and a large mortality results from its prevalence.

Of the several appearances of epidemic cerebro-spinal meningitis occurring within the State two are worthy of special mention.

One near Ankeny, some twelve miles north of Des Moines, obtained in the practice of Dr. C. F. Patterson, a skilful physician of that prosperous village.

Three cases occurred in a family of six children in a country home. The three younger children, all boys aged 4, 5 and 7 years, were taken sick within 48 hours. The three elder children, girls aged 8, 10, and 12 years, were not affected. The boys were taken sick in the order of their ages, the youngest first. These children died on the 6th, 12th and 14th days after the inception of the malady.

They exhibited the characteristic symptoms of cerebro-spinal meningitis during the course of the disease. The temperature ranged high, going above 104 degrees, pain in occiput with opisthotonous, projectile vomiting, photo-phobia purpuris spots and muscular stiffness. The presence of Kernigs sign was noted, the skin was hyperestetic and opisthotonous was pronounced.

These three cases gradually passed into profound stupor, from which they could be but partially aroused with difficulty, and gradually grew worse to the fatal termination. Members of the State Board of Health together with the Secretary and the State Bacteriologist made a journey to this afflicted home to study these cases and to determine if possible the source of the contagion. After a most searching investigation the conclusion was reached that the germs came from a milk separator which was taken apart for cleansing while the older children were in school and was handled by these three children during the cleansing process.

Another epidemic of larger proportion occurred near Wapello under the observation of Health Officer Dr. W. J. Grimes, to whom the writer is under obligations for a detailed report. In this instance the disease made its appearance in mid-winter, most of the cases occurred during the month of January, the last as late as April. In one instance three cases occurred in one family, illy housed, poorly provided for, and uncleanly in habits. All other cases occurred in isolated families. Many of these cases exhibited the classical symptoms of the disease in violent form and the outbreak was attended by a mortality of more than 50 per cent.

Taking these two endemics the fatality was above 64 per cent and presents a fateful picture as indicated in the table below:

Female, aged 4 years, lived.
Female, aged 30 years, died 4 days.
Male, aged 23 years, died 8 days.
Male, aged ½ year, died 6 hours.
Male, aged 4 years, died 8 days.
Male, aged 5 years, died 10 days.
Male, aged 7 years, died 12 days.
Infant, aged 10 months, died 10 hours.
Male, aged 23 years, died.
Male, aged 40 years, lived.
Male, aged 30 years, lived.
Male, aged 38 years, died 2 days.
Female, aged 13 years, died 8 days.
Male aged 4 years, died ¾ day.
Male, aged 29, lived.
Female, aged 10 years, lived.
Female, aged 4 years, lived.
Male, aged 21 years, lived.

It was noted that all the adult cases in the endemic last mentioned gave a history of severe exposure prior to the outset of the disease. Such exposure and exhaustion only in a greater degree preceded many fatalities from this disease in the perilous search for gold in the Klondyke.

Dr. W. T. Garton, surgeon in chief of the battleship fleet now in the Pacific, stated to the writer that he had observed three separate outbreaks of epidemic cerebro-spinal meningitis in the Navy.

In these instances the fatalities were large regardless of the absolutely rigid quarantine maintained about infected quarters and the complete destruction of all effects of the sick.

It had been noted by French writers that this disease follows frequently in the wake of armies.

It has also been observed that epidemic cerebro-spinal meningitis is more likely to affect districts where large numbers of people are housed and where want and poverty obtain.

Epidemics sometime occur among persons exposed to extreme cold, particularly after severe exhaustion. At the present time an outbreak of this disease is prevailing at Iowa Falls in this state, attended with some fatalities. Under instructions of the State Board of Health, rigid quarantine is now maintained in all cases, with the result that the disease is limited to small areas and attended with a lesser number of fatalities.

Until recently the treatment of cerebro-spinal meningitis has not been attended with very satisfactory results. In truth, the expectant treatment with such external or adjuvant treatment as seemed indicated was relied upon to tide the patient over the crisis. In some epidemics it has been apparently proven that the use of hot applications along the spine, together with remedies to reduce the violence of the fibrile movement, have been very helpful.

Th average treatment has been attended with a mortality of something more than 50 per cent. A mortality rate of 70 per cent attended the severe epidemic which prevailed in New York City some two years ago.

It has been demonstrated that the Miningcocus obtains in the mucous secretions from the nasal cavities in 50 per cent of cases at least.

The Bacteriological Labratory demonstrated the presence of this germ in the cases near Ankeny, as well as in serum taken from the spinal canal. The classical symptoms were present, leaving no doubt of the nature of the affection. The serum treatment of cerebro-spinal meningitis has proven more successful than any other method, and should the present satisfactory results from this treatment continue, it is an earnest of better success in fighting this dread disease in the future. This vaccine is given in accord with the method of Sir. A. E. Wright of London, and thus far has demonstrated its superiority over the usual methods of combating this disease. It is certainly a much needed and very welcome addition to the physicians therapeutics in this field.

A large number of cases have already been collated in which the serum treatment has been used with the net result of a mortality rate of but 30 per cent. As this method of treatment is better understood the results obtained from its use will prove more satisfactory and epidemic cerebro-spinal meningitis will have less terror for communities which it invades.

INFORMATION UPON RECIPROCITY.

The Iowa State Board of Medical Examiners issues two forms of Reciprocal certificates. Reciprocity—A and Reciprocity—B.

RECIPROCITY—A.

Upon the basis of a written examination in all the subjects required by this Board by a state examining board having reciprocal relations with the Iowa Board; provided, the applicant was a graduate of a medical college recognized by the Iowa State Board of Medical Examiners as in good standing upon the date of said graduation, and that the general average attained by the applicant at said examination was not below 75 per cent.

The Iowa Board places no general limitation as to the date of examination, but if the state issuing the certificate upon which reciprocity is asked limits reciprocal agreements to certificates issued upon examination held subsequent to a specified date, the same limitations shall be imposed upon its licentiates applying for recognition by the Iowa Board.

The following states have been admitted under Reciprocity—A only: Colorado, Illinois, New Hampshire, New Jersey, Texas, Virginia, Wyoming.

RECIPROCITY—B.

Upon a certificate issued by another state holding reciprocal relations with Iowa upon the basis of a diploma without state examination; provided, that the diploma was issued prior to January 1st, 1899, by a medical college entitled to recognition by the Iowa Board of Medical Examiners on the date said diploma was issued.

The following states have been admitted under both Reciprocity —A and B: Georgia, Indiana, Kansas, Kentucky, Maine, Maryland, Michigan, Minnesota, Missouri, Nebraska, Nevada, North Carolina, Ohio, Utah, West Virginia, Wisconsin, South Carolina.

NOTICE.

It is a violation of the Iowa Statutes for any person to practice medicine or any of its branches in this state until granted a certificate by the Iowa State Board of Medical Examiners, and until the said certificate is properly recorded in the office of the County Recorder of the county wherein the said person resides.

RULES PERTAINING TO ADMISSION TO PRACTICE UNDER RECIPROCITY.

All applicants for admission to practice medicine in Iowa under reciprocal agreements with other states, shall conform to the following rules:

APPLICATION FORMS.

RULE 1. Application must be made upon the official forms issued by this Board.

DOCUMENTS TO BE FILED—FEES.

RULE 2. At least two (2) weeks prior to the date set for the meeting of the Board of Medical Examiners the applicant shall file with the Secretary thereof, a sworn statement of the credentials upon which his state certificate or license was obtained, together with the said certificate, college diploma and the fee of fifty dollars ($50); said statement shall be properly attested by the clerk of a court of record in the district where the applicant resides.

VERIFICATION OF CREDENTIALS.

RULE 3. The statements made in the application must be reviewed and verified by the Secretary of the State Examining Board issuing the original certificate, who will also certify under seal (if the application is made under Clause A), as to the schedule of subjects in which the applicant was examined, and the ratings given thereon and the general average attained.

If the examination failed to include one or more of the subjects required by the Iowa Board, the applicant shall be required to take a supplementary examination before this Board in the subjects omitted, and the ratings awarded thereon shall be added to those of his former examination in order to determine his general average. An additional fee of five dollars ($5) will be charged.

PRIOR EXAMINATIONS.

RULE 4. All applicants will be required to make a sworn statement of the number and date of each state examination taken by him prior to

his application to this Board, together with the ratings obtained thereon at each; also a statement as to all the places where he has practiced, the character of practice engaged in (general, special or itinerant), and the length of time so engaged in each, and whether or not any certificate issued to him has ever been suspended or revoked.

IDENTIFICATION OF APPLICANT.

RULE 5. A certificate of good moral character and professional standing signed by the president and secretary of the county, district, or state medical society, of the district wherein the applicant last resided, together with a recent photograph of the applicant, must be attached to the application.

RESIDENCE NOT REQUIRED IN ORDER TO OBTAIN RECIPROCAL RECOGNITION.

RULE 6. As a general condition to admission to practice in this State the Iowa State Board of Medical Examiners does not require a stated period of residence in the State where the applicant has been previously registered, but, when reciprocating with a state having such requirements, the same conditions and periods required by such state will be imposed upon the licentiates thereof, before admission to practice in this State.

APPLICANTS WHO HAVE FAILED BEFORE THIS BOARD.

RULE 7. An applicant who has taken two (2) or more examinations before this Board and failed to attain at either a general average of 75 per cent, and subsequently obtained a certificate from an examining board of another state, shall not be eligible to admission to this state under reciprocal agreements existing with such other state, until after one year from the date of his last examination by this Board, and in all such cases the Iowa Board reserves the right to review the examination papers and ratings upon which said certificate was granted, before accepting the same. The same privilege is hereby accorded to other state boards having reciprocal relations with this Board.

NON-RESIDENT PHYSICIANS AND AGENTS.

RULE 8. Physicians residing outside the borders of Iowa, but having a clientage in this state requiring their regular or periodical professional services; and every person advertising through the medium of agents, personal letters, circulars or newspapers or other periodicals published or circulated in Iowa, to examine or prescribe for patients or treat disease or ailment by any method, either by personal attendance or otherwise; and every person in this state acting as agent to secure patronage for a

resident or non-resident qualified or unqualified practitioner shall be required to apply for and obtain a certificate from this Board authorizing him to practice medicine in Iowa; provided, that this rule shall not apply to surgeons of the United States Army, Navy or Marine Hospital Service when acting in the line of duty, nor to qualified physicians or surgeons registered in another state, when incidentally called into this state in consultation with a legally qualified and resident practitioner.

EDUCATIONAL REQUIREMENTS.

RULE 9. The preliminary educational qualifications of the applicant and the college course attended must equal the minimum requirements prescribed by this Board according to the schedule in force upon the date of graduation.

ANNUAL INSPECTION OF COLLEGES.

RULE 10. This board will make an annual inspection of each medical college in the State of Iowa, and such additional inspections without previous warning to the faculty as the Board may from time to time deem necessary. Reciprocating boards are expected to pursue a similar policy concerning the colleges within their jurisdiction.

SCHEDULE OF MINIMUM REQUIREMENTS PRESCRIBED FOR MEDICAL COLLEGES.

RULE 11. All medical colleges in order to attain good standing with this Board must conform to the following schedule of requirements:

CONDITIONS FOR ADMISSION OF STUDENTS TO LECTURE COURSE.

Section 1. A creditable certificate of good moral character, signed by at least two physicians in good standing in the state from which the applicant comes.

Sec. 2. A diploma or certificate of graduation from a fully accredited* four year high school or college; evidence of having passed the matriculation examination of a recognized literary or scientific college; or a certificate of successful examination equivalent to the matriculation examination by the faculty of any reputable university or college, or by

*The word accredited is understood to mean such high schools, colleges and seminaries as have been inspected and fully accredited by the State Universities of the State from which the applicant for matriculation has graduated—the diploma from such an accredited high school, college, or seminary admitting the holder thereof to the College of Liberal Arts, University of Iowa, without examination. The matriculation examination for entrance upon the study of medicine must be made by one especially qualified, and must not be made or conducted by any member of the medical faculty. Any disputes arising as to an accredited school or as to the standard of examination for applicants for matriculation shall be referred for settlement to the Official State Inspector of Iowa for secondary schools and high schools.

the State Superintendent of Public Instruction. One year is allowable in which to cure defects in knowledge of Latin, but the student must be provided with a certificate of proficiency in Latin from the designated authorities before he can be accepted as a second course student.

Sec. 3. In the absence of a satisfactory high school diploma or certificate as prescribed in Section 2 of this Rule, the applicant must pass an equivalent examination before one of the special examiners, approved by this Board or by the State Board of Medical Examiners having jurisdiction, before such applicant is registered as a student in a medical college. Said examiner shall not be a member of the faculty of any medical college.

BRANCHES OF MEDICAL SCIENCE TO BE INCLUDED IN THE COURSE.

Sec. 4.

Branches.	Hours.
Anatomy	690
Anatomy (general)	450
Histology	120
Embryology	90
Osteology	30
Chemistry	340
Chemistry and Toxicology	300
Medical Jurisprudence	40
Materia Medica and Therapeutics	150
Pharmacology	60
Obstetrics	320
Obstetrics (general)	160
Gynecology	160
Pathology	470
Pathology (general)	240
Bacteriology	140
Clinical and Microscopy and Post Mortem	90
Physiology	375
Physiology (general)	300
Hygiene, Dietetics and Public Health	75
Theory and Practice of Medicine	995
Practice (general)	540
Nervous and Mental Diseases	120
Electrical Therapeutics	60
Physical Diagnosis	100
Pediatrics	100
Skin and Venereal	75
Surgery	780
General Surgery	540
Orthoepedic	60
Genito-Urinary	60
Laryngology and Rhinology	60
Opthalmology and Otology	60

Sec. 5. A passing grade of 75 per cent or its equivalent in any other marking system shall be required in every branch.

Sec. 6. Such medical schools as are in good standing with this Board whose medical curriculum does not conform to the above standard will be given a reasonable time to perfect their course.

Sec. 7. From and after January 1, 1899, all persons beginning the practice of medicine in the State of Iowa must submit to a written examination in the following subjects: anatomy, chemistry, materia medica, obstetrics and gynecology, pathology and histology, physiology, practice and surgery. And in addition thereto shall present diplomas from medical colleges recognized as in good standing by the Iowa State Board of Medical Examiners, and all persons receiving their diplomas subsequent to January 1, 1899, shall present evidence of having attended four full courses of study of not less than twenty-six weeks each, no two of which shall have been given in any one year.

NUMBER OF LECTURE COURSES REQUIRED.

Sec. 8. After July 1, 1906, no medical college will be regarded as in good standing with the Iowa State Board of Medical Examiners that does not require as a condition for graduation not less than four courses of lectures of not less than thirty teaching weeks each, no two of which shall begin or end in the same calendar year; or that grants any advanced standing because of the possession of a literary or scientific degree; nor will the graduates of such colleges, matriculating with advanced standing after the date above given, be admitted to examination.

ATTENDANCE, QUIZZES AND EXAMINATIONS.

Sec. 9. Regular attendance during the entire lecture courses shall be required, allowance being made only for absence occasioned by the student's sickness and such absence not to exceed twenty per centum of the course.

Sec. 10. Frequent examinations or quizzes shall be conducted by each lecturer or professor.

DISSECTION, CLINICS AND HOSPITAL ATTENDANCE.

Sec. 11. Each student shall have dissected one lateral half of a cadaver.

Sec. 12. Attendance upon at least two terms of clinical and hospital instruction, and practical work in well equipped chemical, pharmacological, hystological, pathological, bacteriological laboratories shall be required.

FACILITIES FOR INSTRUCTION.

Sec. 13. The college must show that it has a sufficient and competent corps of instructors and the necessary facilities for teaching by laboratories, clinics and hospital, and for dissections, and that the same are not less than the minimum requirement of the Association of American Medical Colleges.

MISREPRESENTATION.

Sec. 14. No medical college issuing a catalogue or announcement in which are contained misrepresentations respecting its teaching facilities or courses of study, or false representations as to the number of students matriculated or in attendance, will be regarded as in good standing.

DEFECTIVE COLLEGES.

Sec. 15. Any medical college failing at any session to conform to these requirements in any respect shall, upon satisfactory evidence thereof, be regarded as not in good standing for the session thus defective, and such good standing can only be regarded after an investigation and hearing by the Board when in regular or special session, notice thereof having been first duly given to the college.

RULE 12. The standing of all medical colleges shall be passed upon each year at the April meeting of this Board, but the list may be revised at any subsequent meeting. The standing of colleges outside the State of Iowa will be determined upon the findings of the Board in whose jurisdiction they are located; *provided*, such Board makes an annual inspection of the same and has reciprocal relations with this State, but under all circumstances the Iowa Board reserves the right to inspect and investigate any college outside the State and pass independently upon the standing of such college, or to cite evidence why the Board in whose jurisdiction the said college is located should revise its findings. This privilege is likewise extended to other State Examining Boards having reciprocal relations with this Board.

RULES FOR CONDUCTING EXAMINATIONS.

RULE 13. All applications must be made upon the official forms adopted by this Board which, together with the applicant's college diploma and the fee of ten dollars ($10) must be filed with the Secretary of the Board at least two (2) weeks before the date of examination. A senior student expecting to graduate at the end of the spring term may be admitted to the state examinations held in May and June, upon presentation of a certificate from the Dean of his college stating that the applicant has conformed to all the college requirements and will be granted a diploma at commencement, but the examination papers of such applicant will not be rated until his diploma has been issued and verified by the Secretary of this Board.

RULE 14. Students who have completed the first two (2) years of medical studies may be admitted to the state examination in Anatomy, Chemistry and Physiology upon the following conditions:

Sec. 1. Each applicant must file with his application a certificate from the Dean of his college showing that he has completed the second year work and passed the college examination thereon.

Sec. 2. The applicant shall pay to the Secretary of this Board the regular fee of ten dollars ($10), which fee shall not be returnable nor entitle said applicant to additional examination.

Sec. 3. If the applicant attains a rating of 75 per cent or above in one or more of the branches mentioned in this rule, he shall be excused from further examination in said branch or branches and the rating awarded thereon shall be credited upon his final examinations after graduation.

RULE 15. All regular examinations, except those otherwise provided for by statute, shall be held at the office of the Secretary of this Board, Capitol Building, Des Moines, commencing at 9:00 a. m., each morning and continuing for three (3) consecutive days.

RULE 16. All examinations shall be conducted by the Secretary and his assistants, and when holding examinations at places other than his office he shall employ such additional assistants and monitors as are necessary to properly conduct the said examinations. No person except the Secretary, his assistants and the candidates shall be allowed in the room during an examination.

RULE 17. On the opening day of the examination each applicant shall submit a recent photograph of himself, which shall be identified by the Secretary and attached to the application; the photograph must be suitable for filing and shall not exceed 3½ inches in width nor 4½ inches in length.

RULE 18. Before commencing the examination each applicant will be given a confidential number which he shall inscribe at the top of each page of manuscript; no other marks shall be placed on any paper whereby the identity of the candidate may become known.

RULE 19. The following is the schedule of questions to be submitted to candidates for examination:

Anatomy—		
Anatomy (general)	8	
Histology	2	
Embryology	2	12 Questions
Chemistry		10 Questions
Physiology		10 Questions
Materia Medica and Therapeutics—		
Materia Medica and Therapeutics (general)	8	
Toxicology	2	10 Questions
Obstetrics—		
Obstetrics	10	
Gynecology	5	15 Questions

Pathology—		
Pathology	8	
Bacteriology	2	
Etiology	3	13 Questions
Theory and Practice—		
Practice (general)	7	
Neurology	2	
Physical Diagnosis	2	
Pediatrics	2	
Hygiene	2	15 Questions
Surgery—		
Surgery (general)	9	
Laryngology and Rhinology	2	
Ophthalmology and Otology	3	
Medical Jurisprudence	1	15 Questions
Total		100 Questions

Two hours will be allowed for each set of ten questions, and a general average of not less than 75 per cent of correct answers will be required to pass.

RULE 20. No candidate shall under any circumstances enter the examination more than thirty minutes late unless excused by the Secretary; and no candidate shall leave the room within thirty minutes after distribution of the question papers. All time lost by being absent shall be deducted from the time allotted to the examination of that particular subject.

RULE 21. The candidates will be seated at individual tables and will not be permitted to communicate with each other during the hours of examination, nor to have in their possession help of any kind; if detected violating this rule the candidate wil be dismissed from the examination and his papers cancelled and fee forfeited.

RULE 22. Special examination paper will be supplied by the Board, but pen and ink or indelible pencil must be provided by the candidate.

RULE 23. The questions will be prepared and the answers rated by the members of the Board to whom the subject has been allotted.

RULE 24. A candidate failing to pass at his first examination shall be entitled to a second without additional fee, but for all examinations subsequent to the second a new application and a fee of ten dollars ($10) shall be required.

RULE 25. All applicants for examination will be required to make a full statement of the number and date of each state examination taken by him prior to his application to this Board, together with the ratings obtained thereon at each; also a statement as to all the places (if any) where he has practiced, the character of the practice engaged in (general, special or itinerant) and the length of time so engaged in each, and whether or not any certificate issued to him has ever been revoked or suspended.

RULE 26. All applications must be upon the official forms provided by this Board and the statements made therein subscribed and sworn to by the applicant, and attested under seal by a notary public; or if executed outside the State of Iowa, by the clerk of a court of record.

RULE 27. At the conclusion of the examination each candidate will be required to sign the following declaration:

We the undersigned each and severally certify that we are applicants for a certificate from the State Board of Medical Examiners authorizing us to practice in Iowa, and that we were present and took the examination held at ....., Iowa, on .....

We further certify upon honor that during said examination we neither received nor extended any aid to others nor resorted to any unfair means whatsoever, to secure the required rating to enable us to pass.

We further certify that we have not seen any of the sets of questions used at this examination until they were handed out by the Secretary.

RULE 28. The handwriting of the candidate must be legible; proper punctuation and the use of capital letters and general appearance of examination papers will be considered in marking answers.

The foregoing Rules and Regulations were adopted by the Iowa State Board of Medical Examiners on January 22nd, 1908, and are in full force on and after February 1st, 1908.

Attest:

LOUIS A. THOMAS,
Secretary.

(Signed)
A. M. LINN,
President.

MINIMUM REQUIREMENTS FOR EQUIPMENT OF MEDICAL COLLEGES.

At the regular meeting of the Iowa State Board of Medical Examiners held July 14-16, 1908, the following minimum requirements for the equipment of Medical Colleges was adopted.

This schedule conforms to the requirements adopted by the American Federation of Reciprocating, Examining, and Licensing Medical Boards, held at Cleveland, Ohio, April 28, 1908.

(1) Anatomy.—

(A) Gross Anatomy.

(1) A lecture room.

(a) Mounted skeleton for demonstrations.

(b) Anatomical models and charts.

(c) Preserved anatomical preparations and specimens for study and demonstration.

(2) A dissecting room well lighted and ventilated and well kept.

(a) Store room and vats for preserving cadavers, or equivalent conveniences.

(b) Apparatus for embalming cadavers, or equivalent facilities.

(c) Instruments for postmortem technique.

(d) Unmounted skeletons for use by students.

(e) Cadavers sufficient to furnish opportunity for each student to dissect a lateral half of the body, not more than four students being assigned to each cadaver.

Histology.—

(A) General apparatus.

(1) The paraffin bath and its accessories—(thermometer, tubing and gas regulator,) for embedding purposes.

(2) Two microtomes—one for cutting celluloidin section and one for cutting paraffin sections, or an interchangeable microtome will do.

(3) A projection lantern and an adequate collection of slides of tissues and organs, or an adequate set of charts to illustrate visually the structures of tissues and organs.

(4) An injection apparatus and such reagents and materials as are required for the preparation of bulk specimens. These will include:

Paraffin, hardening, clearing, reagents and stains, teasing needles, scissors, knives, camel's hair brushes, beakers, staining dishes, etc.

(B) The individual student's equipment:

One microscope for each two students, one old immersion lens for each six students, Abbe condensor and diaphragm for each six students, slides and covers, labels, stains and staining dishes, suitable reagents for mounting specimens, drawing material, alcohol lamp or Bunsen burner, teasing needles, camel's hair brushes, lifters, and medicine droppers.

(2) Physiology.—

(a) Lecture room.

(b) Laboratory.

Classes should be divided into groups of not to exceed four or five students.

(c) For Hematology.

Collection of Hemacytometers, hemometers, spectroscopes, fully equipped compound microscopes and reagents and apparatus used in Histology.

(d) For muscle and nerve work.

Equipment: Myographs including muscle clamps, muscle lever, supports, recording surfaces or a clock-work kymograph, chronograph, and stimulating apparatus including an electric battery, keys, induction coil, electrodes and a rheostat or rheochord, moist chamber with accessories for nerve work, double cylinder for heating and cooking tissues.

(e) For circulation experiments:

Heart lever, manometer with accessories, sphygmograph, tonometer with accessories, apparatus for studying capillary circulation, rubber tubing, cannulas, wire, etc., and such other accessory articles as are needed for carrying on the experiments.

(f) General equipment:

Polariscope, galvanometer, capillary electrometer, mercury pump for gas analytical work and accessories, thermostat or incubator, analytical balance, assorted tambours, assorted cannulas, chemical reagents, chemical apparatus, hydrometers, thermometers, and induction coils.

Physiology.—

(a) For work on the special senses:

Artificial eye, perimeter, ophthalmometer, ophthalmoscope, lenses, esthesiometer, color mixer, phorometer, tuning forks, ear model, Galton whistles, resonators.

(b) Respiration apparatus: Spirometer.

Materia Medica.—

(a) A goodly collection of drugs in the crude state.

(b) In the laboratory the class should be divided into groups of not more than five students each.

(c) Each student should be provided with:

Test tubes and racks, beakers, graduates, glass funnel, and filter paper, graduates (4 oz. and 8 oz.), filter stand, mortar and pestle, spatula, glass slab for making ointments, one balance per group of ten students.

The general apparatus:

An induction coil, mercury manometers, vein manometers, cannulas, blood pressure apparatus, a drum cylinder, an aspirating syringe, a cardiomygraph, drugs and their preparations must be supplied, and such other apparatus as is necessary to study the effect of drugs on the muscles and nerves.

Electro-Therapeutics.—

Well equipped dark room, with necessary reagents for developing plates.

The equipment ought to include either

(1) An induction coil, of standard make, or

(2) A static machine, a high frequency resonator, fluoroscope, electrodes, mercury turbine interruptor, or some other standard make, rheostat, X-ray tubes—(therapeutic and diagnostic), tube-rack and stand.

Clinical Diagnosis.—

In this department there must be apparatus for making complete microscopic and chemical tests. These may be obtained from other departments of the College referred to above if there is not a conflict of hours. The equipment must provide for the examination of blood, tissues, excretions, secretions and exudates.

The students should be divided into groups for this work as may be convenient.

Pathology.—

This department should be supplied with charts, abundant gross specimens obtained from post mortems and the surgical clinics. The remaining general equipment and the individual equipment of the student is the same as in Histology.

Embryology.—

Equipment same as for the department of Histology, except that the general equipment should include one set of models.

Bacteriology.—

As in the other departments, it is preferable to divide the classes into groups of four or five each, and for each group there should be provided one steam and one hot air sterilizer, one compound microscope with oil immersion lens and condenser, all the apparatus necessary for preparing the culture media, such as a set of double boilers, cork borers, a stand with rings, and clamps, a potato cutter, gelatin, cheese-cloth, cotton, filter paper and litmus paper,—an autoclave and a serum oven are sufficient for each twenty-five students.

Each student must be provided with test-tubes, rack, wire, baskets, test-tube brush, petri dishes, flasks, platinum needle, Bunsen burner, and tubing, fermentation tubes, forceps, and, unless provided by the College, the student must be required to supply himself with slides, cover glasses, labels, stains, slide boxes, and counting materials.

The department will be supplied with such apparatus and materials as are necessary for the study of bacteria, including animal cages, etc., for experimental work.

Chemistry.—

The department of chemistry must be supplied with balances, centrifuges, fume chambers, drying ovens, a polariscope, spectroscope, Kjeldahl nitrogen apparatus, apparatus for analyzing milk, microscopes, and a good stock of chemical materials, reagent bottles and reagents.

Each student should have an outfit containing beakers, blow pipe, litmus paper, flasks of various sizes, funnels, test tubes, pipettes—plain and graduate,—mortar and pestle, filter stand, iron wire triangle, wire gauze, Bunsen burner and hose, porcelain crucibles, platinum wire and foil, glass stirring rods, glass tubing, test tubes and test racks, test tube brush, filter paper, tongs, graduates, burette, pipettes, water bath, sand bath, rubber stoppers, set of reagent bottles, gas generating flask, small pair of druggists' scales, such other materials as may be needed from time to time for doing special work and which the student receives on making requisition for them.

Physiological Chemistry.—

Much of the material used in this department may be obtained from the departments of Chemistry and Physiology, and it is not necessary to make any special requirements. If the departments of Chemistry and Physiology are well equipped, the department of Physiologic Chemistry is sure to be supplied with all needed apparatus.

Clinics.—

(1) Every college must have access to a hospital.

(2) Two beds for each senior student.

(3) One patient to each bed.

(4) Fifty dispensary patients to every senior student.

Obstetrics.—

Each student should be required to be in attendance on at least five cases in obstetric practice.

Museum.—

A properly stocked museum containing:

Anatomic specimens, embryologic specimens, pathologic specimens, models, charts, drawings, shelves and other facilities for storing the specimens.

The anatomic collection should contain specimens of:

Normal bones, injected specimens, dissected specimens of joints, muscles, nerves, brain and other parts of the body.

The embryologic section should consist of models and slides showing an embryo in various stages of development. Lantern slides are also useful.

The pathological section must include specimens of all kinds, in bulk.

Library.—

The minimum library facilities of a medical school should consist of a well lighted, ventilated, and comfortably warm reading room, supplied with chairs and tables for the comfort and convenience of the students. There should be the current medical periodicals and standard text-books on the subjects of each department taught in the college.

The library should be catalogued and made available for use and placed under the supervision of a librarian. The librarian may be a student competent to perform such duties.

The foregoing requirements will be in full force and effect on and after this date, and all Medical Colleges whose equipment is now less than that prescribed by this schedule must furnish satisfactory evidence to this Board that their equipment conforms to these requirements before the opening of the school year of 1908. Dated at Des Moines, Iowa, this 16th day of July, 1908. By order of the Iowa State Board of Medical Examiners.

Signed: A. M. LINN, President.
LOUIS A. THOMAS, Sec'y.

IOWA LAWS PERTAINING TO THE PRACTICE OF MEDICINE.

CHAPTER XVII, TITLE 12, CODE.

OF THE PRACTICE OF MEDICINE.

Section 2576. Board of Medical Examiners—Examinations—Certificates.—The State Board of Medical Examiners shall consist of the physicians of the State Board of Health, and the Secretary of the Board of Health shall be Secretary thereof.. It shall hold regular meetings in January and July, and special ones as may be necessary, due notice thereof being given, at which it shall discharge the duties contemplated by this chapter. All examinations shall be in writing, each candidate for examination in any school of medicine being given the same set of questions covering Anatomy, Physiology, General Chemistry, Pathology, Surgery and Obstetrics. In Materia Medica, Therapeutics, and the Principles and Practices of Medicine, a set of questions shall be used corresponding to the school of medicine which the applicant desires to practice. The examination papers, when concluded, shall be marked upon a scale of one hundred, each candidate for examination first to pay to the Secretary of the Board a fee of ten dollars therefor. The average required to pass shall be fixed by the Board prior to the examination. Each applicant shall, upon obtaining an order for examination, receive from the Secretary, a confidential number which he shall place upon his work when completed, so that the Board, in passing thereon, shall not know by whom it was prepared. All matters connected therewith shall be filed with the Secretary and preserved for five years as a part of the records of the Board, during which time they shall be open to public inspection. If the examination is satisfactory to five members of the Board, it shall issue its certificate, under its seal, signed by its President, Secretary and not less than three other members, who may, in the absence of the others, act as an Examining Board, and the different schools of medicine represented in the Board of Health shall be represented in said number. The certificate, while in force, shall confer upon

the holder the right to practice medicine, surgery and obstetrics, and be conclusive evidence thereof. In all examinations made or proceedings had pursuant to the provisions of this chapter, any member of the Board may administer oaths and take testimony in any manner authorized by law. Any one failing in his examination shall be entitled to a second one, within three months thereafter, without further fee. If any person shall by notice in writing apply to the Secretary of the Board for an examination or a re-examination, and it fails or neglects for three months thereafter to give him the same, he may, notwithstanding any provisions of this chapter, practice medicine, until the next regular meeting of the Board without the required certificate.

Sec. 2577. Recording Certificate.—Every certificate issued under this chapter shall show whether it was granted upon examination or diploma and the school of medicine the holder practices under. He shall, before engaging in the practice of medicine, file the same for record in the office of the Recorder of the County in which he resides, who shall record it in a book provided for that purpose, which record shall be open to public inspection, and for which service the Recorder may charge a fee of fifty cents, to be paid by the certificate holder. The same record must be made of the certificate in any county to which the holder may remove and in which he proposes to practice.

Sec. 2578. Refusal of Certificate—Revocation—Procedure.—The Board of Medical Examiners may refuse to grant a certificate to any person otherwise qualified and shall revoke any certificate issued by it to any physician, who is not of good moral character, or who solicits professional patronage by agents, or who profits by the acts of those representing themselves to be his agents, or who is guilty of fraudulent representations as to his skill and ability, or who is guilty of gross unprofessional conduct, or for incompetency, or for habitual intoxication or drug habit; or if the certificate has been granted upon false and fraudulent statements as to graduation or length of practice, the Board of Medical Examiners shall, to safeguard the public health, revoke the certificate in the manner hereinafter set forth. Before the revocation of any certificate issued by the State Board of Medical Examiners the licentiate shall have been afforded an opportunity for a hearing before the Board. At least twenty (20) days prior to the date set for such a hearing, the Secretary of the State Board of Medical Examiners shall cause a written notice to be personally served upon the defendant in the manner prescribed for the serving of original notice in civil actions. Said notice shall contain a statement of the charges and the date and place set for the hearing before the Board. If the party thus notified fails to appear, either in person or by counsel at the time and place designated in said notice, the Board shall, after receiving satisfactory evidence of the truth of the charges and the proper issuance of notice, revoke said certificate. If the licentiate appear either in person or by counsel, the Board shall proceed with the hearing as herein provided. The Board may receive and consider affidavits and oral statements and shall cause stenographic reports of the oral testimony to be taken, which, together with all other papers pertaining thereto, shall be preserved for two years. If five members of the Board, present at the hearing, are satisfied that the licentiate is guilty of any of the offenses charged the license shall be revoked. After the revocation of the certificate the holder thereof shall not practice medicine, surgery or obstetrics in this state, for such times as the State Board of Health may determine. Any person aggreived by any ruling or order entered under the provisions of this act shall have the right of an appeal to the District Court in the county where the alleged offense was committed, upon giving notice to the Board of Medical Examiners of such appeal within twenty days after the entry of such ruling, order or judgment.

Sec. 2579. Who Deemed Practitioner.—Any person shall be held as practicing medicine, surgery or obstetrics, or to be a physician within the meaning of this chapter, who shall publicly profess to be a physician, surgeon or obstetrician, and assume the duties, or 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; but it shall not be construed to prohibit students of medicine, surgery or obstetrics, who have not had less than two courses of lectures in a medical school of good standing, from prescribing under the supervision of preceptors, or gratuitous service in case of emergency, nor to prevent the advertising, selling or prescribing natural mineral waters flowing from wells or springs, nor shall it apply to surgeons of the United States Army or Navy, nor of the Marine Hospital Service, nor to physicians or midwives who have obtained from the Board of Examiners a certificate permitting them to practice medicine, surgery or obstetrics without a diploma from a medical school or examination by the Board, nor to physicians as defined herein, who have been in practice in this State for five con-

secutive years, three years of which time shall have been in one locality, nor to filling prescriptions by a registered pharmacist, nor to the advertising and sale of patent or proprietary medicines.

Sec. 2580. Penalties.—Any person who shall present to the Board of Medical Examiners a fraudulent or false diploma, or one of which he is not the rightful owner, for the purpose of procuring a certificate as herein provided, or shall file or attempt to file, with the Recorder of any County in the State the certificate of another as his own, or who shall falsely personate any one to whom a certificate has been granted by such Board, or shall practice medicine, surgery or obstetrics in the State without having first obtained and filed for record the certificate herein required, and who is not embraced in any of the exceptions contained in this chapter, or who continues to practice medicine, surgery or obstetrics after the revocation of his certificate, is guilty of a misdemeanor, and, upon conviction thereof, shall be fined not less than three hundred dollars, nor more than five hundred dollars, and costs of prosecution, and shall stand committed to the county jail until such fine is paid; and whoever shall file or attempt to file with the Recorder of any County in the State the certificate of another with the name of the party to whom it was granted or issued erased, and the claimant's name inserted, or shall file or attempt to file with the Board of Medical Examiners any false or forged affidavit of identification, shall be guilty of forgery.

Sec. 2581. Itinerant Physicians.—Every physician practicing medicine, surgery or obstetrics, or professing or attempting to treat, cure or heal diseases, ailments or injuries by any medicine, appliance or method, who, by himself, agents or employe goes from place to place, or from house to house, or by circulars, letters or advertisements solicits persons to meet him for professional treatment at places other than his office at the place of his residence, shall be considered an itinerant physician; and any such itinerant physician shall, in addition to the certificate elsewhere provided for in this chapter, procure from the State Board of Medical Examiners a license as an itinerant, for which he shall pay to the Treasurer of State, for use of the State of Iowa, the sum of two hundred and fifty dollars per annum. Upon payment of this sum, the Secretary shall issue to the applicant therefor a license to practice within the State, as an itinerant physician, for one year from the date thereof. The Board may, for satisfactory reasons, refuse to issue such license, or may cancel such license upon satisfactory evidence of incompetency

or gross immorality. Any person practicing medicine as an itinerant physician, as herein defined, without having procured such license, shall be guilty of a misdemeanor, and, upon conviction thereof, shall be fined not less than three hundred dollars, nor more than five hundred dollars, and costs, and shall be committed to the county jail until such fine is paid; provided, however, that nothing herein shall be construed to prevent any physician otherwise legally qualified from attending patients in any part of the State to whom he may be called in the regular course of business, or in consultation with other physicians.

Sec. 2582. Examination and Diploma Required.—From and after January 1, 1899, all persons beginning the practice of medicine in the State of Iowa must submit to an examination as set forth in this Chapter, and in addition thereto, shall present diplomas from medical colleges recognized as in good standing by the State Board of Medical Examiners, and all persons receiving their diplomas subsequent to January 1, 1899, shall present evidence of having attended four full courses of study of not less than twenty-six weeks each, no two of which shall have been given in any one year. The State Board of Medical Examiners shall examine the graduates of the Medical Departments of the State University of Iowa and of such other medical colleges in this State as are recognized by said Board of Medical Examiners as being in good and legal standing at the Annual Medical Commencement and at the location of said State University and other medical colleges respectively.

REGISTRATION OF PHYSICIANS REGISTERED IN OTHER STATES.

Section 2582 of the Code supplement was amended by the Thirtieth General Assembly by adding thereto the following:

"(a) A certificate of registration showing that an examination has been made by the proper board of any state, on which an average grade of not less than seventy-five (75) per cent was awarded, the holder thereof having been at the time of said examination the legal possessor of a diploma from a medical college in good standing in this state, may be accepted in lieu of an examination, as evidence of qualification. But in case the scope of said examination was less than that prescribed by this state, the applicant may be required to submit to a supplemental examination in such subjects as have not been covered.

"(b) A certificate of registration or license, issued by the proper board of any state, may be accepted as evidence of qualification for registration in this state, provided the holder thereof was, at the time of such registration, the legal possessor of a diploma issued by a medical college in good standing in this state, and that the date thereof was prior to the legal requirement of the examination test in this state. The fee for such examination shall be fifty dollars."

Sec. 2582-a. Restrictions.—If, by the laws of any state or the rulings or decisions of the appropriate officers or boards thereof, any burden, obligation, requirement, disqualification or disability is put upon physicians registered in this state or holding diplomas from medical colleges in this state, which are in good standing therein, affecting the right of said physicians to be registered or admitted to practice in said state, then the same or like burdens, obligations, requirements, disqualification or disabilty shall be put upon the registration in this state of physicians registered in said state, or holding diplomas from medical colleges situated therein.

IOWA LAWS PERTAINING TO THE PRACTICE OF OSTEOPATHY.

CHAPTER XVIIa, TITLE XII, OF SUPPLEMENT TO CODE.

OF THE PRACTICE OF OSTEOPATHY.

Section 2583-a. Diploma—Examination—Certificate. Any person holding a diploma from a legally incorporated school of Osteopathy, recognized as of good standing by the Iowa Osteopathic Association, and wherein the course of study comprises a term of at least twenty (20) months, or four (4) terms of five (5) months each, in actual attendance at such school, and which shall include instruction in the following branches, to-wit: Anatomy, including dissection of a full lateral half of the cadaver, Physiology, Chemistry, Histology, Pathology, Gynecology, Obstetrics and theory of Osteopathy and two full terms of practice of Osteopathy, shall, upon the presentation of such diploma to the State Board of Medical Examiners and satisfying such Board that he is the legal holder thereof, be granted by such Board an examination on the branches herein named, (except upon the theory and practice of Osteopathy until such time as there may be appointed an Osteopathic physician on the State Board of Health and of Medical Examiners). The fee for said examination, which shall accompany the application, shall be ten dollars ($10) and the examination shall be conducted in the same manner, and at the same place and on the same date that physicians are examined as prescribed by Section twenty-five hundred and seventy-six (2576) of the Code. The same general average shall be required as in cases of physicians; provided that Osteopaths who are graduates of legally incorporated schools of Osteopathy as above recognized, and who are at the time of the passage of this act engaged in the practice of Osteopathy in Iowa, shall be entitled to receive a certificate upon the payment of the prescribed fee without such examination. Upon passing a satisfactory examination as above prescribed the said Board of Medical Examiners shall issue a certificate to the applicant therefor, signed by the President and Secretary of said Board, which certificate shall authorize the holder thereof to practice Osteopathy

in the State of Iowa. This certificate when issued shall be registered with the Recorder of the county in which the holder thereof resides and for which he shall pay a fee of fifty cents (50c). And the holder thereof shall not be subject to the provisions of Section two thouand five hundred eighty (2580) of the Code.

Sec. 2583-b. Drugs—Major or Operative Surgery. The certificate provided for in the foregoing section shall not authorize the holder thereof to prescribe or use drugs in his practice, nor to perform major or operative surgery.

Sec. 2583-c. Revocation of Certificate. The Board of Medical Examiners may refuse to grant a certificate to any person otherwise qualified, who is not of good moral character. For like cause, or for incompetency, or habitual intoxication, or upon satisfactory evidence by affidavit or otherwise that a certificate had been granted upon false and fraudulent statements as to graduation or length of practice, the said Board may revoke a certificate by an affirmative vote of at least five (5) members of the Board, which number shall include one or more members of the different schools of medicine represented in said Board. After the revocation of a certificate, the holder thereof shall not practice osteopathy, surgery, or obstetrics in the State.

Sec. 2583-d. Fraudulent Diploma—False Representation—Penalties. Any person who shall present to the Board of Medical Examiners a fraudulent or false diploma, or one of which he is not the rightful owner, for the purpose of procuring a certificate as herein provided, or shall file, or attempt to file, with the Recorder of any county in the State the certificate of another as his own, or who shall falsely personate anyone to whom a certificate has been granted by such Board, or shall practice Osteopathy, surgery or obstetrics in the State without having first obtained and filed for record the certificate herein required, and who is not embraced in any of the exceptions contained in this Chapter, or who continues to practice Osteopathy, surgery or obstetrics after the revocation of his certificate, is guilty of a misdemeanor, and upon conviction thereof, shall be fined not less than three hundred dollars ($300), nor more than five hundred dollars ($500), and cost of prosecution, and shall stand committed to the county jail until such fine is paid; and whoever shall file or attempt to file with the Recorder of any county in the State the certificate of another with the name of the party to whom it was granted or issued erased, and the claimant's name inserted,

or shall file or attempt to file with the Board of Medical Examiners any false or forged affidavit of identification, shall be guilty of forgery.

Sec. 2583-e. Itinerant Osteopath—License. Every person practicing Osteopathy, or obstetrics, or professing to treat, cure or heal diseases, ailments or injury by any Osteopathic application or method, who goes from place to place, or from house to house, or by circulars, letters or advertisements solicits persons to meet him for professional treatment at places other than his office at the place of his residence, shall be considerd an itinerant Osteopath; and such itinerant Osteopath shall, in addition to the certificate elsewhere provided for in this Chapter, procure from the State Board of Medical Examiners a license as an itinerant, for which he shall pay to the Treasurer of the State, for use of the State of Iowa, the sum of two hundred and fifty dollars, ($250) per annum. Upon payment of this sum, the Secretary shall issue to the applicant therefor a license to practice within the State, as an itinerant Osteopath, for one year from the date thereof. The Board may, for satisfactory reasons, refuse to issue such license, or may cancel such license upon satisfactory evidence of incompetency or gross immorality.

Sec. 2583-f. Acts in Conflict—Repeal. All acts and parts of acts in conflict herewith are hereby repealed.

INDEX

A

PAGE

Albert, Dr. Henry, address and paper by....119, 130
Animal tuberculosis, what shall we do with it?.... 173
ATTORNEY GENERAL—
Opinion concerning publications 26
Quarantine expenses 32
Disinfection of school houses.... 34

B

BACTERIOLOGICAL LABORATORY—
In public health work.... 119
Second biennial report of.... 63
Number and kinds of examinations.... 63
Statistics of examinations made.... 64
Special examinations, water, rabies, glanders.... 67
Conditions governing auxiliaries.... 67
Research work of the laboratory.... 69
Classified summary of expenses.... 70
Personnel of the laboratory.... 71
Diphtheria, findings and observations.... 71
BATH ROOMS—
Installation of 217
Traps and vents.... 219
Soil pipes 220
Waste pipes 221
Blank forms for use of local boards of health.... 258
Buildings, paper relating to proper ventilation of.... 221
Butter, tubercle bacilli, occurrence and vitality in.... 183

C

Carstens, Dr. J. H., paper by, hygiene of young girls.... 208
Cerebrospinal meningitis, relating to....22, 65, 274
Chronic running ears, paper relating to.... 213
Circular of information adopted by state and municipal boards.... 207
Conditions influencing production of sanitary milk.... 267
Conference of state and municipal boards of health.... 207
Conniff, Dr. R. E., testimonial by state board of health.... 79
Contents, table of educational articles.... 9
Cotton, W. E., paper by, relating to bacilli in butter.... 183
Cummins, Gov. A. B., address by.... 113

D

PAGE
Dairy products and municipal inspection of meat 166
Day, L. Enos, paper by, relating to sanitary milk supply 259
Decker, Dr. G. E., paper by, relating to medical inspection of schools. 226
DEPARTMENT OF VITAL STATISTICS 81
Classified summary of expenses 82
Births, marriages, divorces, deaths 83, 85
Record of deaths, tables concerning 87, 89, 91, 92
Diphtheria, statistics concerning 21, 64, 65, 71
DISINTERMENTS—
Permits required in all cases 43
Particulars required 43
When prohibited 43
Special permits, when required 43
Must be done by a licensed embalmer 44
Bodies deposited in receiving vaults 44
Bodies disinterred outside this state 44
Circular letter relating to, by state board 45
DISINFECTANTS AND DISINFECTION—
Paper concerning 130
Gaseous disinfection 130
Formaldehyde 130
Author's experiments 133
Liquid disinfectants 134
Outline of methods 135
Disinfection of school houses, opinion of attorney general 34
Disposition of tuberculosis cattle 178
Districts, public health, counties composing 6
Doolittle, Dr. E. Warren, address by 113

E

Ears, chronic running, paper concerning 213
Economic aspect of modern treatment of tuberculosis 160
Elker, Dr. B. L., paper by, concerning venereal diseases 202
Remarks by 267
EMBALMING DEPARTMENT—
Organization of 41
Summary of classified expenses 42
First committee, fees, etc 42
Recommendations as to 42
Disinterment must be done by licensed embalmer 44
Scientific, relation to public health 223
Epidemic cerebrospinal meningitis 274
Equipment of medical colleges, minimum 288

PAGE
EXPENSES, CLASSIFIED EXPENDITURES—
State board of health 15
Pay of employes 16
Other states, a comparison 17
Embalming department 42
Nurses department 56
Bacteriological laboratory 70
Vital statistics, department 82

F

Farrington, A. M., remarks by concerning bacilli in butter 184
FRANCIS, CHARLES, PAPER BY—
Concerning ventilation of buildings 221
Sewage disposal 150

G

Geneva Cross, The, Information concerning 107
Grandin, Dr. Egbert H., paper by, enlightenment as to venereal disease 204

H

Hart, George H., paper by, relating to rabies 235
Health, wealth and happiness, how to augment 168
Health officers, their appointment and duties 108
Hearing and sight, defects in school children 230
H. G. L., paper by, concerning chronic running ears 213
Hygiene of young girls, paper relating to 208

I

Ice, danger from use of impure 154
Indefinite terms frequently used, to be avoided 93
INFECTIOUS DISEASES—
Report of 19
Blank forms for use in reporting 19, 20
Statistical tables relating to 21
Information concerning reciprosity 276
INFLUENZA—
Statistics concerning 21
Remarks concerning, also pneumonia 22
Insects, and the transmission of disease 136
IOWA HEALTH BULLETIN—
Concerning its publication 57
Index to Vol. xxi 58

J

Johnson, Dr. G. A., paper by, disposition of tuberculosis cattle 178

K

PAGE
Kellogg, Dr. J. H., paper by, relating to meat infection 163
Kennedy, Dr. J. F., testimonial to by state board of health 79
In memoriam 129
Kime, Dr. J. W., paper by, relating to animal tuberculosis 173
Kinney, C. N., paper by, relating to water analysis 155

L

Langworthy, Dr. Henry Glover, paper by, defects of hearing and sight 230
Laws pertaining to practice of medicine in Iowa 293
Governing the practice of Osteopathy 299
Lesan, President Cassius T., address by, state and local boards 116
Letter of transmittal of the fourteenth biennial report 3
Linn, Dr. A. M., paper by, relating to cerebrospinal meningitis 274
List of blank forms prescribed for local boards 258
Local boards of health, duties and powers defined 12
Louden, William, paper by, a plea for national health 145
Lyons, Hon. Charles W., address by 111

M

MATERNITY HOSPITALS—
Department organized 47
Statistics concerning, license, fees, etc 47
Additional regulations adopted 48
McNeil, J. H., paper by, the production of sanitary milk 267
MEASLES—
Remarks relating to 24
Statistics concerning 21
Meat and dairy inspection, municipal 166
Inspection of, paper relating to 163
MEDICAL COLLEGES—
Minimum requirements as to equipment 288
Inspection of school children 226
Laws of Iowa and their enforcement 252
Relating to itinerant physicians 254
Specialists and nostrum venders 256
Osteopaths 255
Illegal practitioners 256
Melvin, A. D., introductory remarks 235
Members of the state board of health, 1908 5
Memoriam. Dr. Josiah Forrest Kennedy 129
Milk, conditions influencing the production of sanitary 267
Necessity of sanitary supply 259
Minimum requirements for equipment of medical colleges 288
Municipal inspection of meats and dairy products 166

N

PAGE
Necessity of a sanitary milk supply 259
NURSES DEPARTMENT—
Organization of 49
Training schools in good standing, list of 49, 54
Subjects for examination 51
Admission to training school, conditions 52
Requirements for training schools 52
Special or state hospitals for training schools 52
Branches taught 52
Period of training 53
Schedule of subjects, three year course 53
Summary of classified expenditures 56
Recommendations 56

O

Obligations of the state, sanitary 11
Osteopathy, laws governing the practice of in Iowa 299

P

Puerperal septicemia, statistics concerning 21
Pettit, Dr. J. W., paper by, modern treatment of tuberculosis 169
Physicians registered in other states, registration of 298
Plea for national health, paper concerning 145
Plumbing, paper relating to sanitary 215
Pneumonia, statistics concerning 21
Remarks relating to, also influenza 22
Powers, Dr. F. W., testimonial to, by state board of health 80
Practice of medicine, laws relating to in Iowa 293
Preface to fourteenth biennial report 7
Prevalence of defects of hearing and sight, paper relating to 230
Public health districts, list of counties composing 6
Public schools, teaching sex matters in 206

Q

QUARANTINE—
Rules relating to 125
Expenses, how paid, law relating to 31
Opinion of attorney general concerning 33

R

PAGE

RABIES—
- Its increasing prevalence ... 235
- National prevalence of the disease ... 237
- Madstones ... 239
- Dogs and water, dog days, lyssophobia ... 240
- Skepticism as to the existence of ... 241
- Furious and dumb types ... 243
- Disposal of dogs after biting persons ... 244
- Post-mortem examinations ... 245
- Pasteur treatment and its results ... 248
- Methods and value of treatment ... 249
- Methods of prevention ... 250
- Muzzling dogs, results in other countries ... 252

RECIPROCITY—
- Information concerning ... 278
- Application forms ... 279
- Documents to be filed ... 279
- Credentials, verification of ... 279
- Prior examinations ... 279
- Identification of applicants ... 280
- When residence is not required ... 280
- Non-resident physicians, and agents ... 280
- Educational requirements ... 281
- Annual inspection of colleges ... 281
- Minimum schedule of requirements ... 281
- Medical science branches included in course ... 282
- Lecture courses required, number of ... 283
- Attendance, quizzes and examinations ... 283
- Dissections, clinics, hospital attendance ... 283
- Misrepresentations ... 284
- Defective colleges ... 284
- Conducting examinations ... 284

REPORT OF INFECTIOUS DISEASES—
- Blank forms for use in ... 19, 20
- Statistical tables, relating to ... 21

Registration of physicians registered in other states ... 298
Resolutions adopted by state medical association ... 257
Rogers, Burton, paper by, to augment health, wealth, happiness ... 168
RULES AND REGULATIONS—
- Adopted by state board of health ... 25
- Disinfection and payment of expenses ... 25
- Opinion of attorney general, publication ... 25
  - As to quarantine expenses ... 33
- Circular letter to county auditors ... 29
- Quarantine expenses ... 31
- Disinfection of school houses ... 34

Rules governing admission under reciprocity ... 34

S

PAGE

Sanitary obligations of the state ... 11
- Plumbing, paper relating to ... 215

Scarlet fever, statistics concerning ... 215
School children, inspection of ... 226
- Defects of hearing and sight, among ... 230

Schroeder, Dr. E. C., paper by, tubercle bacilli in butter ... 183
Scientific embalming, its relation to public health ... 223
Sewage, disposal of, paper concerning ... 150
Sex matters, teaching in public schools ... 206
Smallpox, statistics concerning ... 21
STATE BOARD OF HEALTH—
- Members of, 1908 ... 5
- Officers of ... 5
- Employes in secretary's office ... 5
  - Bacteriological laboratory ... 5

T

TUBERCLE BACILLI IN BUTTER—
- Occurrance of, vitality of ... 183
- More frequent in butter than milk ... 185
- Vitality of ... 186
- Inoculation tests with guinea pigs ... 187
- Greater frequency in lung tuberculosis ... 191
- Tables relating to ... 197

TYPHOID FEVER—
- Remarks concerning ... 23
- Statistics concerning ... 21, 64, 65
- Origin and cause of ... 147
- Methods of spread ... 148
- Prevention of ... 148
- Care of a patient ... 149

V

Vaccination, results of ... 211
Venereal diseases, paper relating to ... 202
- Should the public be enlightened as to? ... 204

Ventilation of buildings, paper relating to ... 221
VITAL STATISTICS—
- Department of ... 81
- Classified summary of expenses ... 82
- Births, marriages, divorces and deaths ... 83, 85
- Records of deaths, tables concerning ... 87, 89, 91 92

W

PAGE

WATER SUPPLIES—
- Analysis of public 35
- Samples sent for analysis 35
- When samples to be submitted..... 35
- Report on analysis and fees 35
- Rules and regulations governing analysis..... 35
- Action to be taken on report..... 36
- Collection of samples, collection blanks 36
- Manner of labeling and shipping..... 37
- Reports to be published and recorded..... 38
- Recommendations by state board of health..... 39
- Examinations made by bacteriological laboratory..... 67

Water supply and sewage, paper concerning..... 152
Water, sanitary analysis and purification..... 155
- Object of sanitary analysis 155

Whooping cough, statistics concerning..... 21

Y

Young girls, hygiene of, paper relating to..... 208