Mrs. Isabel C. Sumner

Formerly connected with Iowa State Board of Health work

SIXTEENTH ANNUAL REPORT

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF IOWA

FOR THE

Fiscal Period Ending June 30, 1912

PRINTED BY ORDER OF THE GENERAL ASSEMBLY

DES MOINES
ROBERT HENDERSON, STATE PRINTER
1913

Nuisance	161
Peddling without license	1
Practicing medicine without license	1
Receiving and concealing stolen goods	2
Resisting an officer	12
Selling intoxicating liquor contrary to law	54
Selling cigarette papers	1
Selling to or procuring for minor or inebriate, intoxicating liquor	29
Selling drugs without a permit	1
Soliciting orders for intoxicating liquor	2
Selling obscene literature	2
Transporting liquors illegally	1
Vagrancy	13
Violation of city ordinance	7
Violation of pure food laws	1

This Biennial Report

is affectionately dedicated to the memory of

Mrs. Isabel C. Sumner

whose untiring energy and devotion to health work has aided materially in reducing infant mortality in Iowa.

LETTER OF TRANSMITTAL.

STATE OF IOWA,
OFFICE OF SECRETARY STATE BOARD OF HEALTH.
Des Moines, Iowa, October 31, 1912.

To His Excellency, BERYL F. CARROLL, Governor of Iowa:

SIR:—In accordance with the provisions of Section 2565 of the Code, I have the honor to present the Sixteenth Biennial Report of the State Board of Health for the period commencing July 1, 1910, and ending June 30, 1912.

Very respectfully yours,

GUILFORD H. SUMNER, M. D., *Secretary*.

MEMBERS OF THE STATE BOARD OF HEALTH, JUNE 30, 1912.

HON. GEORGE COSSON, Attorney General, Ex-Officio, Des Moines.

JAMES I. GIBSON, State Veterinarian, Ex-Officio, Des Moines.

LAFAYETTE HIGGINS, Civil Engineer, Des Moines.

PHYSICIANS.

G. F. SEVERS, (E) Centerville, Term expires January 31, 1912.

BERT L. EIKER, (R) Leon, Term expires January 31, 1913.

G. A. SMITH, (R) Clinton, Term expires January 31, 1914.

ALBERT DE BEY, (R) Orange City, Term expires January 31, 1915.

T. U. MCMANUS, (R) Waterloo, Term expires January 31, 1916.

E. E. RICHARDSON, (H) Webster City, Term expires January 31, 1917.

G. A. HUNTOON, (H) Des Moines, Term expires January 31, 1918.

OFFICERS OF THE BOARD.

B. L. EIKER, President.

GUILFORD H. SUMNER, Secretary.

HENRY ALBERT, Director of the Bacteriological Laboratory.

CHARLES N. KINNEY, Chemist.

PUBLIC HEALTH DISTRICTS.

DISTRICT No. 1.—Allamakee, Black Hawk, Bremer, Buchanan, Butler, Chickasaw, Clayton, Delaware, Fayette, Floyd, Grundy, Howard, Mitchell and Winneshiek. Represented by Dr. T. U. McManus, Waterloo.

DISTRICT No. 2.—Benton, Cedar, Clinton, Dubuque, Iowa, Jackson, Johnson, Jones, Linn, Muscatine and Scott. Represented by Dr. George A. Smith, Clinton.

DISTRICT No. 3.—Appanoose, Davis, Des Moines, Henry, Jefferson, Keokuk, Lee, Louisa, Mahaska, Monroe, Wapello, Washington and Van Buren. Represented by Dr. G. F. Severs, Centerville.

DISTRICT No. 4.—Calhoun, Cerro Gordo, Emmet, Franklin, Hamilton, Hancock, Hardin, Humboldt, Kossuth, Palo Alto, Pocahontas, Webster, Winnebago, Worth and Wright. Represented by Dr. E. E. Richardson, Webster City.

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

DISTRICT No. 6.—Adair, Audubon, Carroll, Cass, Crawford, Greene Guthrie, Harrison, Monona, Pottawattamie and Shelby. Not represented.

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

DISTRICT No. 8.—Adams, Clarke, Decatur, Fremont, Lucas, Mills, Montgomery, Page, Ringgold, Taylor, Union and Wayne. Represented by Dr. B. L. Eiker, 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. A. P. Hanchett, of Council Bluffs, and Dr. A. C. Moerke, of Burlington, were members of the Board of Health. The former retired by the expiration of term, January 31, 1911, and the latter by resignation October 1, 1911, and was succeeded by Dr. G. F. Severs, of Centerville. Each held the office of President during his senior year of membership. Dr. Geo. E. Decker, of Davenport, also resigned at the same time as did Dr. Moerke, and was succeeded by Dr. G. A. Smith of Clinton.

FOREWORD.

The present Biennial Report which began July 1, 1910, and ended June 30, 1912, will show marked progress in all lines of public health work in the State. It will be noted by reading Section 2565 of the Code that the Secretary of the State Board of Health is to place before the Governor, biennially, a report of the Board, which shall include "So much of its proceedings, such information concerning Vital Statistics, such knowledge respecting disease, 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."

This Sixteenth Biennial Report should note that our State has not made any material progress in improving our law relating to Vital Statistics. Births and deaths are not properly reported by the undertakers and assessors, as the law provides. Undertakers are derelict in sending in the death certificates which come into their hands, and for some reason unknown to the State Board of Health office, assessors over the state are not proficient in obtaining birth records, though county auditors and county clerks have been repeatedly notified and instructed regarding the law, and have been provided with the necessary blank forms which correspond to those furnished by the United States Census Bureau, at Washington, D. C. There should be some method whereby proper records of births and deaths can be procured and kept by the State. Let us hope for the improvement which should be forthcoming in the near future.

The great diseases which should attract our notice more than all others are pneumonia, tuberculosis, typhoid fever, scarlet fever, diphtheria, measles, whooping cough, infantile diseases including infantile paralysis and such other diseases as are communicable, for all diseases which are communicable, or transmitted from person to person, should be limited in their spread; in other words, all transmissible diseases should be obliterated as much as possible. Pneumonia and tuberculosis are the diseases which stand at the head of the list and which cause the greatest mortality among our people. More people die from pneumonia in Iowa than from any

other disease, and tuberculosis stands next. Much credit should be given Mr. A. E. Kepford, State Lecturer on Tuberculosis, for his excellent efforts along the lines of educating the people of our State in preventing this very much dreaded disease which is taking our people away by hundreds every year. It may not be known that a whole town of inhabitants, composed of fifteen hundred people is wiped from the map of Iowa annually from this disease tuberculosis alone. All praise to Mr. Kepford for holding up his hands in holy horror for this tremendous loss of human life. Some say that we are not making progress along this line, but are we to stop trying to educate the people? I think we should double our energies and make larger appropriations for disseminating knowledge among the people. The Secretary wishes Brother Kepford God's speed and help in his great work, and may he live to see his excellent efforts crowned with permanent and lasting success.

In the matter of hygiene, the Iowa State Board of Health publishes in its rules and regulations certain lines of procedure which should be followed by all health officials and the people, in limiting the spread of communicable diseases. The quarterly health bulletins also contain much valuable information, fourteen thousand copies of which are distributed quarterly free to the people and all officers. Many persons outside of our State have asked to be placed upon the mailing list for the Iowa State Board of Health publications, which we have done; and very favorable comment has been received from the newspaper and magazine press at large, commending the Iowa State Board of Health for its excellent publications. We hope to enlarge our efforts in this field.

As regards our suggestions, it is only necessary to say that we refer and have referred to our former Biennial Report, 1908-1910, and ask that every suggestion made in that report be executed and carried out, as I believe none of them have been considered sufficiently to have yet been enacted into law. It is hardly necessary to repeat our suggestions in this Biennial Report, as that would be needless expenditure of time and money, for it is easier to again read our Biennial Report of 1908-1910.

MRS. ISABEL C. SUMNER.

The preparation of this Sixteenth Biennial Report has been delayed because of the long illness of Mrs. Isabel C. Sumner, wife of the Secretary, and which resulted in her passing from this life

to the beyond, on October 14, 1912. Mrs. Sumner had a most wonderful conception of the great needs of our State, and we all feel her loss in the preparation of this very important report. The compiling of the Vital Statistics part of all reports of the State Board of Health office was under her immediate supervision, and because of this fact and her wonderful help in all lines of public health work, the Iowa State Board of Health has kindly dedicated this Sixteenth Biennial Report to her honored memory. She was idolized by every person who knew her personally, for her high ideals and personal interest in others, ever ready with cheerful words of praise and encouragement to all in the State Board of Health office. Her picture appears on the front page of this biennial report and her place made vacant by her death cannot be filled, for her untiring interest in the work of public health, in which her husband was so much interested, led her to outline and carry into effect great schemes for public good. Her memory is sweet and she has gone to her final reward where she has received her welcome from our Heavenly Father: *"Well done, thou good and faithful servant; thou hast been faithful over a few things, I will make thee ruler over many things; enter thou into the joy of thy lord."* Thus endeth the life of one of God's noble women—absent but not forgotten—and her memory still lives, and her influence for good will ever be present with all with whom she ever associated. We love and revere her true womanly Christian life.

The following poem, composed by William Gail Andrews, a clerk in the State Board of Health office, conveys the love and esteem in which Mrs. Sumner was held by the employees of the office. Mr. Andrews says: "Her life has been an inspiration, her influence has made us strive harder to live better and to get out of life its full value."

More than friend to us you've been
And now you must go and leave us here,
We'll miss you so, but you must go
To the land where there's no pain to fear.

Oh, friend and comrade that we love,
Your life to us has an inspiration been,
And now your soul ascends like a dove
To God, our Saviour and our friend.

And while you go and we stay here;
May your departing soul find rest
And may you know that your life is dear
To us, whom you loved and whose lives you've blessed.

Now no pain can come to you
And all earth's troubles are o'er,
And God, our Maker, kind and true,
Has taken you home to the other shore.

The work of the State Board of Health office has so materially increased in the last few years that it seems almost impossible to keep the many departments fully up to standard, for the reason that ample funds and legal procedure have not been furnished in the past by the legislatures, hence in the preparation of this, the Sixteenth Biennial Report, it must be stated that the work of the Secretary is of such a nature as to require most of his time in looking after clerical details instead of being able to devote his time to scientific investigation in order that the people of our State may be informed in regard to preventive measures to be taken to prevent sickness and untimely deaths, for this should be the chief aim of State Board of Health work, and the legislature should see to it that ample funds and legal procedure are fully furnished for this most important work. The work of the State Board of Health office is always pressing and important, and because we have not the money or power to do the work which is put upon us, we are discredited and criticised. This should not be. All departments of public health work should receive first attention from our legislature, because the happiness and prosperity of our people depend first of all upon good health, which is obtainable, but money and methods must be forthcoming in order to secure these grand results. We shall hope for much from coming legislatures.

Three serious epidemics of typhoid fever have occurred in our State during this biennial period, viz., in Des Moines in November and December, 1910, in Cedar Falls in October, November and December, 1911, and in Oskaloosa in March and April, 1912. Reports of all three of these epidemics are to be found in this, the Sixteenth Biennial Report. By perusing these full and complete reports, it will be seen that no provision whatever had been made by any previous legislature to provide means to investigate into any such emergency epidemics, and it seems proper to state here that some method should be adopted by our law makers that will enable the State Board of Health to fully investigate the sanitary conditions of the whole state in order that these epidemics may be prevented instead of being investigated after they are fully under headway and the people are beginning to die. The proper methods are employed to keep hogs from dying, and why not take as much or more care of the people. These are things for our most careful consideration, and let us consider and act in order that human life may be conserved.

The financial part of this report has received careful consideration from the Secretary, and he has deemed it advisable at this time to render as complete and full a report as possible of all receipts and expenditures in each department under the immediate jurisdiction of the Board. A detailed statement has also been filed with the Executive Council and will appear in the published report of that body. A careful perusal of these reports, together with the summary, is an essential element in order to gain an intelligent conception of the work which has been done by the State Board of Health. The Board has made the most of the means which it has had at hand for promulgating the health work of the State, and believes that progress has been made and that good has been accomplished. What the Board needs is money and power to educate the people—the opportunity is here. Preventive medicine is the work of all boards of health, and the Iowa State Board of Health is desirous of doing its full duty and discharging its every obligation. Professor Virchow, who was employed by the German Government to investigate an epidemic of typhus fever in Upper Silesia, said in his report: "The remedy lies not in medicine, but in education." This brave young physician wrote that the great era of social progress in progressive medicine is upon us, and it behooves us to meet conditions and educate the people. The German Government awoke to the fact that it found itself reading treatises on sociological questions which related purely and solely to preventive medicine. Young Virchow was relieved from the government service, and with his dismissal, was a request that he take a vacation and leave the country. This most important era of preventive medicine which Dr. Virchow helped to install has come to stay. The cure-all doctor, the exclusively pill-and-potion doctor, the advertising quack, the so-called drugless healer of human ills, the so-called faith healer, the patent medicine man, the medical liberty league man or the teacher who claims that human ills are only imaginary is not the modern, scientific doctor of today.

The sphere of the medical man has been enlarged, and he has discovered that tuberculosis, typhoid fever, diphtheria, scarlet fever, smallpox and many of the diseases are economic maladies, and that trade and occupational diseases will not disappear until social conditions are made better. It will soon become a self-evident truth that no man can become a good physician unless he is thoroughly versed in preventive medicine and is willing to lend his personal influence for the betterment of all social conditions. A

good physician will be a true medical sociologist. Ignorance goes hand in hand with poverty, and poverty walks with disease, and disease destroys.

A few topics have been selected to be treated in this Biennial Report, and it is hoped in such a manner that the people of the State may comprehend the importance of making the department of health of Iowa equal to any of the other states. The table of contents gives a complete conception of the more important problems which confront the Board of Health, and it must be construed that the Board has no other motive than to advance all the public health interests of our state and nation.

The pages of this biennial report should be perused carefully by all the people and members of the legislature in order that wise and proficient laws may be enacted for the public welfare. Because the Iowa State Board of Health is the custodian of the public health of the citizenship of our State and as such, is given "general supervision over the interest of health and life," and is required by statute to "make such rules and regulations as it may find necessary for the preservation of the public health;" therefore, it is but reasonable to expect that the public will interest itself in matters which relate to its own general well being and comfort.

We have labored faithfully to keep sickness and disease from our borders, and much has been accomplished along all lines of progress for other interests and our institutions, upon the recommendations of those in charge; and now let us not neglect the health matters of our State when the common budget is made up, in order that we may keep step with other states in protecting human life. The work of the State Board of Health will be successful in so far as the people sustain it, and the legislature gives it power and money with which to work. The State Board of Health can plan and execute those things only, which the people and legislature formulate and make provision for.

It is hoped that the people of Iowa will be interested in the pages of this biennial report, and a few but important articles have been selected and inserted upon various health topics, on account of their special importance, and these have been simplified as much as possible and we hope all of them will be of vital interest to all the people of our commonwealth; and if these pages are carefully read, all will be interested and benefited.

GUILFORD H. SUMNER, *Secretary.*

CONTENTS.

THE STATE AND PUBLIC HEALTH.

In these days of progress and great financial activity, the best asset is good health, for without this most essential feature in our economy, we are like a rudderless vessel drifting about upon a shoreless sea, hoping against hope, with no assurance that we shall ever reach any haven of rest and safety.

It is practical economy worked out in a most practical way when a State undertakes to protect the lives and health of its citizens. Wealth is not increased in money and lands alone. The great storehouse of wealth lies in making our people happy and content, and this can be accomplished in no better way than in making ample provision for preventing disease. If we secure wealth in our lands and money, of what practical value is it without health? Any community whose health is such that it ceases to produce its sustenance becomes a burden to the State, and its chief industry is to consume; in other words, the individual or community, as the case may be, at once becomes a public charge, and it needs no argument to convince a proper financier that any commonwealth that provides means, by enacting proper health laws and furnishing money to execute the same, in order that its citizenship may be kept healthy and prosperous, brings about conditions which promote long life, happy homes and prosperous business interests—three most essentials in a State's wealth.

We must go forward. The most has been made with our appropriations, and we cannot build up any imaginary conditions. Real conditions exist, and our streams are becoming so polluted that we are now beginning to consume our own sewage, cattle are becoming tubercular and our dairy products are surely in a most dangerous state, infant mortality is increasing and the general health of our State is threatened, hence to go backward is unscientific and foolish, and extremely non-progressive, and we must now go forward or else we shall become utterly oblivious for our future happiness, as nothing but sickness, death and misery can follow our neglect in this most important work of public health.

The annual appropriation of $5,000 has long ago ceased to be sufficient to meet the great needs of a state like Iowa. This amount, when divided among two and a quarter millions of Iowa citizenship, does not amount to very much per person, hence this amount should be increased many times. With this appropriation of $5,000 for the entire state of Iowa, the State Board of Health has been able to do much, but not all that should have been done. The last legislature, the Thirty-fourth General Assembly, increased the Secretary's salary but it did not increase the appropriation therefor, hence it should be remembered that the salary of the Secretary is paid from this $5,000 appropriation, and the balance is used for public health purposes.

The great amount of clerical and detail work which is necessary to carry on the work in the State Board of Health office makes it necessary that ample appropriation be made in order that the requirements made upon us may be fully met. The amount given us by the Thirty-fourth General Assembly has not been sufficient to meet the demands. We tabulate below so that a picture of the expenditures can be seen, and it should be observed that it is necessary that a material increase in the annual appropriation should be made by our Thirty-fifth General Assembly.

AMOUNTS NECESSARY TO BE APPROPRIATED BY THE THIRTY-FIFTH GENERAL ASSEMBLY, FOR CONTINGENT AND GENERAL EXPENSES OF THE STATE BOARD OF HEALTH.

Board of Health Department.	Amount Necessary.
One assistant to secretary	$ 1,200.00
One keeper of accounts	900.00
One clerk and stenographer	900.00
Extra clerk hire	900.00
Total for Board of Health	$ 3,900.00

N. B. It should be remembered here that the above amount provides for clerks for the Embalmers, Nurses, Medical and Optometry Examiners, besides the work of the State Board of Health. It will require this amount to carry on the work of these five important departments, and the work will be hard for these clerks to do all that will be required of them.

Vital Statistics Department.	Amount Necessary.
One assistant to registrar	$ 1,200.00
One clerk and stenographer	900.00
Total for Vital Statistics	$ 2,100.00

N. B. It must be noted in this department that we receive nearly two thousand death certificates each month, or over twenty thousand yearly, and all these must be transcribed for each county in the state, and sent to the clerk of courts for record in each county; and it requires that there should be an assistant to the registrar and one clerk and stenographer to do this work which is required by law. Besides all this transcribing, records must be obtained from all the counties of all marriages, divorces and births. The law compels the registrar to do this work, hence ample help is essential in order that these important records may be properly kept.

We append herewith the eight quarterly reports in each of the departments, connected with the State Board of Health, and which is followed by a statement of the resources from which all these expenditures have been made. A summary will be found at the end of each department associated with the appropriation or fees as the case may be. A careful accounting has been made of all funds placed at the disposal of the State Board of Health.

The eight quarterly statements of the different departments, located in the State Board of Health office, hereby follow in the order classified below:

I. Board of Health.
II. Embalmers.
III. Nurses.
IV. Antitoxin.
V. Bacteriological.
VI. Medical Examiners.
VII. Optometry.
VIII. Vital Statistics.
IX. Vital Statistics.
Special Fees.

APPROPRIATIONS FOR THE STATE BOARD OF HEALTH FOR THE FISCAL PERIOD ENDING JUNE 30, 1912.

DEPARTMENTS.

Board of Health:	
Appropriation	$ 10,000.00
Clerk hire	5,400.00
Bacteriological	12,000.00
Antitoxin	4,000.00
Vital Statistics:	
Appropriation	4,000.00
Clerk hire	1,800.00
Total	$ 37,200.00

FEES RECEIVED BY THE STATE BOARD OF HEALTH OFFICE FOR THE FISCAL PERIOD ENDING JUNE 30, 1912.

Embalmers' Examiners	$ 3,155.00
Nurses' Examiners	1,532.00
Medical Examiners	8,843.00
Optometry:	
Appropriation	300.00
Fees	130.00
Total	$ 13,960.00

AGGREGATE OF TOTALS.

Appropriations	$ 37,200.00
Fees	13,960.00
Total	$ 51,160.00

FEES TURNED INTO STATE GENERAL FUND. NOT USED BY THE BOARD.

Maternity Hospital	None
Vital Statistics	$ 165.55
Total	$ 165.55

STATE BOARD OF HEALTH.
SUMMARY FOR QUARTER ENDING SEPTEMBER 30, 1910.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 265.63
Salaries and clerk hire	525.00
Printing and stationery	19.50
Miscellaneous	2.84
Telephone and telegraph	19.02
Expressage	7.70
	$ 839.69

MEMBERS' EXPENSE.

August	2	E. E. Richardson	$ 18.81
August	2	A. de Bey	27.52
August	2	G. E. Decker	22.25
August	2	B. L. Eiker	18.33
August	2	A. C. Moerke	21.95
August	2	A. C. Moerke	18.68
August	2	A. P. Hanchett	21.76
August	2	T. U. McManus	8.92
August	2	T. U. McManus	16.75
September	1	G. E. Decker	17.45
September	1	E. E. Richardson	10.32
September	1	E. E. Richardson	7.91
September	1	T. U. McManus	9.35
September	1	A. C. Moerke	12.95
September	1	A. de Bey	21.85
September	1	B. L. Eiker	10.83
			$ 265.63

SALARIES AND CLERK HIRE.

July	30	G. H. Sumner, secretary's salary for July	$ 100.00
July	30	Isabel Sumner, salary for July	75.00
August	31	G. H. Sumner, secretary's salary for August	100.00
August	31	Isabel Sumner, salary for August	75.00
September	30	G. H. Sumner, secretary's salary for September	100.00
September	30	Isabel Sumner, salary for September	75.00
			$ 525.00

PRINTING AND BINDING.

August	2	J. H. Welch Printing Co.	$ 14.50
August	2	G. A. Miller Printing Co.	5.00
			$ 19.50

MISCELLANEOUS.

August	2	Addressograph Co.	$ 2.34
September	1	Underwood Typewriter Co.	.50
			$ 2.84

TELEPHONE AND TELEGRAPH.

August	2	Iowa Telephone Co.	$ 5.00
September	1	Western Union Telegraph Co.	1.86
September	1	Mutual Telephone Co.	6.00
September	1	Iowa Telephone Co.	2.70
September	1	Western Union Telegraph Co.	.73
September	1	Western Union Telegraph Co.	2.73
			$ 19.02

EXPRESS.

August	2	U. S. Express Co.	$ 2.65
August	2	Adams Express Co.	1.88
August	2	American Express Co.	1.65
August	2	Wells Fargo & Co. Express	.95
September	1	American Express Co.	.32
September	1	American Express Co.	.25
			$ 7.70

Annual appropriation	$ 5,000.00
Amount credited	36.70
	$ 5,036.70

(The above bill was paid in June; it should have been paid in July.)

Expenses of first quarter	839.69
Balance on hand September 30, 1910	$ 4,197.01

STATE BOARD OF HEALTH.

SUMMARY OF EXPENSES FOR QUARTER ENDING DECEMBER 31, 1910.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 389.01
Salaries and clerk hire	584.70
Printing and binding	124.50
Postage	90.00
Telephone and telegraph	56.43
Express	14.47
Miscellaneous	73.99
Total	$ 1,333.10

MEMBERS' EXPENSE, ATTENDING MEETINGS.

October	7	G. E. Decker	$ 9.85
October	7	A. C. Moerke	10.85
October	7	E. E. Richardson	8.43
October	7	B. L. Eiker	14.63
October	7	A. de Bey	22.43
November	1	A. C. Moerke	20.29
November	1	T. U. McManus	18.10
November	18	E. E. Richardson	17.06
November	18	A. de Bey	23.12
November	18	G. E. Decker	27.10
November	18	A. P. Hanchett	21.56
November	18	B. L. Eiker	16.98
December	19	E. E. Richardson	8.51
December	19	G. E. Decker	12.95
December	19	A. C. Moerke	11.80
		Total	$ 243.66

OTHER OFFICIAL EXPENSE.

October	7	H. W. Grefe	$ 9.50
October	7	E. E. Richardson	50.50
October	7	G. H. Sumner	9.20
October	7	A. de Bey	69.60
November	1	G. E. Decker	6.55
		Total	$ 145.35

SALARIES AND CLERK HIRE.

October	7	L. B. Tait	$ 7.20
October	31	G. H. Sumner	100.00
October	31	Isabel Sumner	75.00
November	30	G. H. Sumner	100.00
November	30	Isabel Sumner	75.00
December	2	Lynn Clemens	7.50
December	31	Lynn Clemens	45.00
December	31	G. H. Sumner	100.00
December	31	Isabel Sumner	75.00
		Total	$ 584.70

PRINTING AND BINDING.

October	7	G. A. Miller Printing Co.	$ 43.25
November	1	J. H. Welch Printing Co.	5.25
November	1	Kenyon Printing Co.	46.00
November	1	Homestead Printing Co.	23.75
December	2	G. A. Miller Printing Co.	6.25
		Total	$ 124.50

POSTAGE.

December	2	J. I. Myerly, P. M.	$ 90.00
		Total	$ 90.00

TELEPHONE AND TELEGRAPH.

October	7	Iowa Telephone Co.	$ 33.60
October	7	Western Union Telegraph Co.	2.54
November	1	Iowa Telephone Co.	9.80
November	1	Western Union Telegraph Co.	9.10
December	2	Western Union Telegraph Co.	1.39
		Total	$ 56.43

EXPRESSAGE.

October	7	Adams Express Co.	$ .55
October	7	U. S. Express Co.	1.04
October	7	American Express Co.	4.00
November	1	Wells Fargo & Co.	.30
November	1	U. S. Express Co.	1.30
November	1	American Express Co.	2.04
November	1	Adams Express Co.	2.03
December	2	U. S. Express Co.	1.15
December	2	Adams Express Co.	1.00
December	2	American Express Co.	.46
December	2	Wells Fargo & Co. Express	.60
		Total	$ 14.47

MISCELLANEOUS.

October	7	Baker-Trisler Co.	$ 6.30
October	7	White Line Transfer Co.	2.19
October	7	Underwood Typewriter Co.	.75
October	7	Addressograph Co.	2.97
October	7	Des Moines Dress Club	1.50
November	1	Smith Premier Typewriter Co.	9.00
November	1	Des Moines Rubber Stamp Works	1.55
November	1	Addressograph Co.	2.00
December	2	Baker-Trisler Co.	20.18
December	2	Homestead Printing Co.	1.25
December	2	Luella Nash, rept. meeting	26.30
		Total	$ 73.99

Balance on hand September 30, 1910	$ 4,197.01
Total expenses for quarter	1,333.10
Balance on hand December 31, 1910	$ 2,863.91

STATE BOARD OF HEALTH.

SUMMARY OF EXPENSES FOR QUARTER ENDING MARCH 31, 1911.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 284.77
Salaries and clerk hire	625.00
Printing and stationery	79.52
Telephone and telegraph	45.58
Expressage	2.01
Miscellaneous	30.91
	$ 1,067.79

MEMBERS' EXPENSE.

January	18	A. C. Moerke	$ 10.53
January	18	B. L. Eiker	10.93
January	18	G. E. Decker	8.50
March	1	B. L. Eiker	6.63
March	1	B. L. Eiker	17.98
March	1	E. E. Richardson	7.41
March	1	E. E. Richardson	22.01
March	1	A. de Bey	34.62
March	1	A. de Bey	22.10
March	1	G. E. Decker	27.45
March	1	G. E. Decker	13.45
March	1	G. E. Decker	3.10
March	1	A. P. Hanchett	37.17
March	1	A. C. Moerke	24.38
March	17	G. E. Decker	13.20
March	17	A. C. Moerke	25.31
			$ 284.77

SALARIES AND CLERK HIRE.

January	31	G. H. Sumner, secretary	$ 100.00
January	31	Isabel Sumner	75.00
February	2	Lynn Clemens	50.00
February	28	G. H. Sumner, secretary	100.00
February	28	Isabel Sumner	75.00
February	28	Lynn Clemens	50.00
March	31	G. H. Sumner, secretary	100.00
March	31	Isabel Sumner	75.00
			$ 625.00

PRINTING AND STATIONERY.

January	3	Baker-Trisler Co.	$ 6.12
February	2	The Homestead Printing Co.	46.50
February	2	The Homestead Printing Co.	16.65
February	2	The Homestead Printing Co.	6.50
February	2	The Homestead Printing Co.	3.75
			$ 79.52

TELEPHONE AND TELEGRAPH.

January	3	Iowa Telephone Co.	$ 8.45
January	3	Iowa Telephone Co.	6.20
February	2	Western Union Telegraph Co.	3.90
February	2	Western Union Telegraph Co.	3.70
February	2	Postal Telegraph-Cable Co.	.60
February	2	Postal Telegraph-Cable Co.	.97
February	2	Iowa Telephone Co.	13.40
March	1	Western Union Telegraph Co.	1.94
March	1	Iowa Telephone Co.	4.43
March	1	Iowa Telephone Co.	1.99
			$ 45.58

EXPRESSAGE.

January	3	U. S. Express Co.	$ .25
January	3	Adams Express Co.	.10
January	3	American Express Co.	1.66
			$ 2.01

MISCELLANEOUS.

January	3	Baker-Trisler Co.	$ .25
January	3	Des Moines Rubber Stamp Works.	4.95
January	3	Backman Sheet Metal Co.	1.75
March	1	Homestead Printing Co.	14.05
March	1	Baker-Trisler Co.	8.11
March	1	American Publishing Co. (Sub.)	1.00
March	1	Des Moines Rubber Stamp Works.	.80
			$ 30.91

Balance on hand January 1, 1911	$ 2,863.91
Total expenses for quarter	1,067.79
Balance on hand March 31, 1911	$ 1,787.87
Refunded by Dr. G. E. Decker	8.25
	$ 1,796.12

STATE BOARD OF HEALTH.

SUMMARY OF EXPENSES FOR QUARTER ENDING JUNE 30, 1911.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 177.71
Other official expense	9.50
Drawing and engraving	6.30
Salaries and clerk hire	843.33
Printing, stationery and books	416.91
Telephone	55.63
Telegraph	18.52

Express	1.95
Postage	150.50
Miscellaneous	115.64
	$ 1,795.99

MEMBERS' EXPENSE.

May	3	A. P. Hanchett.	$ 17.81
May	3	A. C. Moerke.	13.18
May	17	T. U. McManus.	32.50
May	17	E. E. Richardson.	14.86
May	17	B. L. Eiker.	12.58
May	17	A. C. Moerke.	11.93
May	17	A. de Bey.	25.61
May	17	G. E. Decker.	17.40
June	1	Geo. E. Decker.	12.25
June	1	A. C. Moerke.	10.93
June	20	E. E. Richardson.	8.66
			$ 177.71

OTHER OFFICIAL.

April	3	Geo. E. Decker.	$ 5.15
June	20	Geo. E. Decker.	1.30
June	31	Geo. E. Decker.	3.05
			$ 9.50

DRAWING AND ENGRAVING.

April		Des Moines Engraving Co.	$ 4.86
July		Des Moines Engraving Co.	1.44
			$ 6.30

SALARIES AND CLERK HIRE.

April		G. H. Sumner, secretary.	$ 100.00
April		Isabel Sumner	75.00
April		Lynn Clemens (March salary)	50.00
May		G. H. Sumner.	200.00
May		G. H. Sumner.	13.33
May		Lynn Clemens (April salary)	50.00
May		Lynn Clemens (May salary)	50.00
June		G. H. Sumner.	200.00
June		Lynn Clemens	50.00
June		Pauline Mueller	55.00
			$ 843.33

PRINTING, STATIONERY AND BOOKS.

April		Baker-Trisler & Co.	$ 7.00
April		Baker-Trisler & Co.	1.00
May		Homestead Printing Co., (1-3 B.)	80.00
May		Homestead Printing Co.	1.00

May	Harrison Printing Co	7.75
June	Homestead Printing Co., (1-3 B.)	86.67
July	J. H. Welch Printing Co	12.50
July	Pratt-Mendsen Co	82.29
July	John Wiley & Sons	18.00
July	Homestead Printing Co	35.00
July	Homestead Printing Co	22.50
July	E. D. Chassell	25.20
July	Homestead Printing Co	30.00
July	Homestead Printing Co	8.00
		$ 416.91

TELEPHONE.

April	Iowa Telephone Co	$ 23.58
May	Iowa Telephone Co	15.24
June	Iowa Telephone Co	16.81
		$ 55.63

TELEGRAPH.

May	Western Union Telegraph Co	$ 5.44
June	Western Union Telegraph Co	13.08
		$ 18.52

EXPRESS.

June	Adams Express Co	$ .70
June	American Express Co	1.00
June	United States Express Co	.25
		$ 1.95

MISCELLANEOUS.

April	Baker-Trisler & Co	$ 1.36
April	Baker-Trisler & Co	7.39
April	Baker-Trisler & Co	2.61
April	Des Moines Rubber Stamp Co	.25
April	Des Moines Engraving Co	17.64
June	Baker-Trisler Co	67.69
June	Baker-Trisler Co	1.45
June	Underwood Typewriter Co	.50
June	Subscription to Medical Journal, Pub. H.	3.00
June	Des Moines Stationery Co	13.50
June	Des Moines Rubber Stamp Co	.25
		$ 115.64

POSTAGE.

	L. C. Kurtz, Postmaster	$ 150.50
Balance on hand March 31, 1911		$ 1,796.12
Total expense for the quarter		1,795.99
Balance on hand July 31, 1911, charged off		$ .13

IOWA STATE BOARD OF HEALTH.

SUMMARY OF EXPENSES FOR QUARTER ENDING SEPTEMBER 30, 1911.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 60.46
Other official	66.47
Drawing and engraving	8.75
Salaries and clerk hire	1,050.00
Printing and stationery	169.70
Books, (Index)	.90
Telephone and telegraph	3.28
Express	1.48
Miscellaneous	2.07
	$ 1,363.11

MEMBERS' EXPENSE.

September	6	G. A. Smith	$ 24.15
September	6	B. L. Eiker	6.79
September	6	E. E. Richardson	18.74
September	6	A. C. Moerke	10.78
			$ 60.46

OTHER OFFICIAL.

September	1	G. H. Sumner	$ 14.69
September	1	B. L. Eiker	15.91
September	15	G. H. Sumner	13.72
September	30	B. L. Eiker	12.90
September	30	B. L. Eiker	9.25
			$ 66.47

DRAWING AND ENGRAVING.

September	1	Iowa Lithographing Company	$ 8.75
			$ 8.75

SALARIES AND CLERK HIRE.

July	31	G. H. Sumner, Secretary	$ 200.00
July	31	Rosa Ives Pelton (clerk)	75.00
July	31	Lynn Clemens (clerk)	75.00
August	31	G. H. Sumner, Secretary	200.00
August	31	Rosa Ives Pelton (clerk)	75.00
August	31	Lynn Clemens (clerk)	75.00
September	30	G. H. Sumner, Secretary	200.00
September	30	Rosa Ives Pelton (clerk)	75.00
September	30	Lynn Clemens (clerk)	75.00
			$ 1,050.00

PRINTING AND STATIONERY.

September	1	Homestead Printing Company	$ 131.70
September	1	Pratt-Mendsen Company	18.00
September	15	E. D. Chassell	20.00
			$ 169.70

BOOKS.

September	1	Index	$ .90
			$ .90

TELEPHONE AND TELEGRAPH.

September	1	Western Union Tel. Company	$ 2.88
September	1	Mutual Telephone Company	.40
			$ 3.28

EXPRESS.

September	1	American Express Company	$ .80
September	1	Adams Express Company	.68
			$ 1.48

MISCELLANEOUS.

September	15	McNamara-Kenworthy Company	$ 2.07
			$ 2.07

Amount appropriated	$ 5,000.00
Amount appropriated for clerks	1,800.00
Total	$ 6,800.00
Expense of quarter	1,363.11
Balance on hand ending September 30, 1911	$ 5,436.89

IOWA STATE BOARD OF HEALTH.

SUMMARY OF EXPENSES FOR QUARTER ENDING DECEMBER 30, 1911.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 26.29
Other official expense	126.29
Drawing and engraving	9.12
Salaries and clerk hire	1,050.00
Printing, binding and stationery	805.69
Telephone and telegraph	12.48
Express	12.65
Miscellaneous	29.23
	$ 2,071.75

MEMBERS' EXPENSE.

November	1	A. de Bey	$ 26.29
			$ 26.29

OTHER OFFICIAL.

October	17	G. A. Smith	$ 8.56
November	11	G. H. Sumner	9.99
November	29	G. A. Huntoon	8.09
November	29	A. de Bey	16.80
December	18	E. E. Richardson	82.85
			$ 126.29

DRAWING AND ENGRAVING.

November	1	Des Moines Engraving Co	$ 9.12
			$ 9.12

SALARIES AND CLERK HIRE.

October	31	G. H. Sumner, Secretary	$ 200.00
October	31	R. I. Pelton	75.00
October	31	Lynn Clemens	75.00
November	29	G. H. Sumner, Secretary	200.00
November	29	R. I. Pelton	75.00
November	29	Lynn Clemens	75.00
December	30	G. H. Sumner, Secretary	200.00
December	30	R. I. Pelton	75.00
December	30	Lynn Clemens	75.00
			$ 1,050.00

PRINTING, BINDING AND STATIONERY.

November	1	American Litho Co	$ 1.00
November	1	Des Moines Stationery Co	2.25
November	29	The Homestead Printing Co	12.50
November	29	The Homestead Printing Co	55.59
November	29	The Homestead Printing Co	734.35
			$ 805.69

TELEPHONE AND TELEGRAPH.

November	1	Iowa Telephone Co	$ 6.45
November	1	Iowa Telephone Co	3.29
November	1	Mutual Telephone Co	.35
November	1	Western Union Telegraph Co	.75
November	1	Western Union Telegraph Co	.57
November	29	Western Union Telegraph Co	1.07
			$ 12.48

EXPRESS.

November	1	American Express Co	$ .60
November	1	Wells Fargo Express Co	.65
November	1	Adams Express Co	.86
November	29	Adams Express Co	4.57
November	29	Wells Fargo Express Co	3.03
November	29	American Express Co	2.94
			$ 12.65

MISCELLANEOUS.

November	1	Addressograph Co	$ 9.71
November	1	Des Moines Rubber Stamp Co	8.35
November	1	The Homestead Printing Co	4.00
November	1	McNamara-Kenworthy	3.83
November	29	McNamara-Kenworthy	.24
November	29	The Homestead Printing Co	2.10
November	29	McNamara-Kenworthy Co	1.00
			$ 29.23

Balance on hand September 30, 1911	$ 5,436.89
Expenses for quarter ending December 30, 1911	2,071.75
On hand December 30, 1911	$ 3,365.14

IOWA STATE BOARD OF HEALTH.

SUMMARY FOR EXPENSES OF QUARTER ENDING MARCH 30, 1912.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 8.04
Printing and stationery	197.30
Salaries	1,050.00
Telegraph and telephone	31.84
Express	26.12
Miscelleaneous	93.69
	$ 1,406.99

MEMBERS' EXPENSE.

February	22	G. A. Smith	$ 8.04
			$ 8.04

SALARIES.

January	31	G. H. Sumner, secretary	$ 200.00
January	31	R. I. Pelton	75.00
January	31	Lynn Clemens	75.00
February	29	G. H. Sumner, secretary	200.00
February	29	R. I. Pelton	75.00
February	29	Lynn Clemens	75.00

March	30	G. H. Sumner, secretary	200.00
March	30	R. I. Pelton	75.00
March	30	Lynn Clemens	75.00
			$ 1,050.00

PRINTING AND STATIONERY.

January	17	Homestead Printing Co.	$ 23.75
January	17	Homestead Printing Co.	17.65
January	17	Homestead Printing Co.	16.05
February	1	McNamara-Kenworthy Co.	7.60
February	22	Homestead Printing Co.	9.50
February	22	Homestead Printing Co.	80.00
February	22	Homestead Printing Co.	27.25
February	22	Homestead Printing Co.	10.70
February	22	Homestead Printing Co.	4.80
			$ 197.30

TELEPHONE AND TELEGRAPH.

January	17	Iowa Telephone Co.	$ 14.66
January	17	Western Union Telegraph Co.	4.73
January	17	Iowa Telephone Co.	4.20
February	1	Iowa Telephone Co.	2.25
February	22	Iowa Telephone Co.	5.18
February	22	Western Union Telegraph Co.	.57
February	22	Western Union Telegraph Co.	.25
			$ 31.84

EXPRESS.

January	17	U. S. Express Co.	$ 18.92
January	17	American Express Co.	2.55
February	1	American Express Co.	1.40
February	1	Wells Fargo Express Co.	.60
February	1	Adams Express Co.	.55
February	22	Wells Fargo Express Co.	.60
February	22	American Express Co.	1.50
			$ 26.12

MISCELLANEOUS.

January	17	Annual dues, State and Prov. Boards of Health.	$ 10.00
January	17	The Homestead Printing Co. (electrotype)	3.35
January	17	R. L. Polk & Co. (directory)	7.00
February	1	Koch Ptg. Co., (file guides)	45.86
February	1	D. M. Engraving Co., (half tones for Bulletin)	11.76
February	1	Addressograph Co.	9.82
February	1	Des Moines Engraving Co. (half tones)	3.90
February	1	The American City Magazine	2.00
			$ 93.69

Balance on hand December 30, 1911	$ 3,365.14
Expenses for quarter ending March 30, 1912	1,406.99
Balance on hand March 30, 1912	$ 1,958.15

IOWA STATE BOARD OF HEALTH.

SUMMARY FOR EXPENSES OF QUARTER ENDING JUNE 30, 1912.

CLASSIFIED SUMMARY OF EXPENSES.

Drawing and engraving	$ 24.75
Other official expense	48.39
Salaries	1,230.00
Printing and stationery	389.15
Postage	150.50
Books	4.50
Telephone and telegrams	69.68
Express	8.33
Miscellaneous	25.14
	$ 1,950.44

DRAWING AND ENGRAVING.

August	20	Des Moines Engraving Co.	$ 24.75

OTHER OFFICIAL EXPENSE.

April	2	A. De Bey	$ 44.80
June	19	T. U. McManus	3.59
			$ 48.39

SALARIES.

April	30	G. H. Sumner, secretary	$ 200.00
April	30	R. I. Pelton	75.00
April	30	Lynn Clemens	75.00
May	31	G. H. Sumner, secretary	200.00
May	31	R. I. Pelton	75.00
May	31	Lynn Clemens	75.00
June	29	G. H. Sumner, secretary	200.00
June	29	R. I. Pelton	75.00
June	29	Lynn Clemens	75.00
June	29	H. W. Grefe	180.00
			$ 1,230.00

PRINTING AND STATIONERY.

April	2	Homestead Printing Co.	$ 29.15
April	2	Homestead Printing Co.	19.45
April	2	Homestead Printing Co.	19.35
April	2	Homestead Printing Co.	18.65
April	2	Homestead Printing Co.	2.50
May	1	Homestead Printing Co.	28.60
May	1	Homestead Printing Co.	8.60
May	1	Homestead Printing Co.	4.85
July	2	Homestead Printing Co.	60.00
August	20	Homestead Printing Co.	180.00
August	20	Homestead Printing Co.	18.00
			$ 389.15

POSTAGE.

August	20	L. C. Kurtz, P. M.	$ 150.50

BOOKS.

April	2	American Medical Assn.	$ 2.50
April	2	Journal of Public Health	2.00
			$ 4.50

TELEPHONE AND TELEGRAMS.

April	2	Iowa Telephone Co.	$ 17.40
April	2	Iowa Telephone Co.	1.60
April	2	Western Union Telephone Co.	.85
May	1	Iowa Telephone Co.	8.40
May	1	Western Union Tel. Co.	.65
June	6	Western Union Tel. Co.	9.47
June	6	Iowa Telephone Co.	5.10
July	2	Western Union Tel. Co.	8.20
August	20	Iowa Telephone Co.	9.68
August	20	Iowa Telephone Co.	8.33
			$ 69.68

EXPRESS.

April	2	Adams Express Co.	$ .45
May	1	United States Express Co.	2.93
May	1	Adams Express Co.	1.60
May	1	United States Express Co.	1.10
May	1	United States Express Co.	.50
June	6	American Express Co.	.45
July	2	United States Express Co.	1.00
July	2	Adams Express Co.	.30
			$ 8.33

MISCELLANEOUS.

April	2	Homestead Printing Co.	$ 9.00
April	2	The Gem Ventilator Co.	3.25
April	2	Underwood Typewriter Co.	.80
May	1	Addressograph Co.	1.44
July	2	Holmes Irving Co.	1.50
July	2	Addressograph Co.	2.45
July	2	McNamara-Kenworthy Co.	.50
August	2	Frank S. Betz Co.	4.00
August	2	Homestead Printing Co.	1.45
August	2	Channing L. Smith	.75
			$ 25.14

Balance on hand March 30, 1912	$ 1,958.15
Expense of quarter ending June 30, 1912	1,950.44
Amount charged to General Revenue Fund	$ 7.71

EMBALMERS' DEPARTMENT.

SUMMARY OF EXPENSES FOR QUARTER ENDING SEPTEMBER 30, 1910.

CLASSIFIED SUMMARY OF EXPENSES.

Salaries and clerk hire	$	75.00
Miscellaneous		4.00
	$	79.00

SALARIES AND CLERK HIRE.

July	30	G. H. Sumner, secretary, salary for July	$ 25.00
August	31	G. H. Sumner, secretary, salary for August	25.00
September	30	G. H. Sumner, secretary, salary for September	25.00
			$ 75.00

MISCELLANEOUS.

September	2	Capital City Commercial College	$ 4.00
			$ 4.00

Receipts for quarter	$ 160.00
Expenditures for quarter ending September 30, 1910	79.00
Balance on hand September 30, 1910	$ 81.00

EMBALMERS' DEPARTMENT

SUMMARY OF EXPENSES FOR QUARTER ENDING DECEMBER 31, 1910.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$	200.00
Other official expense		25.50
Salaries and clerk hire		77.50
Printing and stationery		72.75
Miscelleaneous		17.60
Postage		108.00
Total	$	501.35

MEMBERS' EXPENSE.

October	8	E. E. Richardson	$ 80.00
October	8	F. L. Unterkircher	24.00
October	19	R. R. McBride	16.00
October	19	A. de Bey	80.00
		Total	$ 200.00

OTHER OFFICIAL EXPENSE.

October	8	F. L. Unterkircher	$ 15.50
October	19	R. R. McBride	10.00
		Total	$ 25.50

SALARIES AND CLERK HIRE.

October	31	G. H. Sumner	$ 25.00
November	30	G. H. Sumner	25.00
December	31	G. H. Sumner	25.00
October	31	Francis Jones	1.25
October	31	G. Greene	1.25
		Total	$ 77.50

PRINTING AND STATIONERY.

October	7	G. A. Miller Ptg. Co.	$ 9.50
November	1	Kenyon Ptg. Co.	46.00
December	2	G. A. Miller Ptg. Co.	9.75
December	2	Homestead Ptg. Co.	7.50
		Total	$ 72.75

MISCELLANEOUS.

October	7	Baker-Trisler Co.	$ 9.60
November	1	Addressograph Co.	2.00
December	2	Underwood Typewriter Co.	6.00
		Total	$ 17.60

POSTAGE.

December	31	J. I. Myerly, P. M.	$ 108.00
			$ 108.00

Balance on hand September 30, 1910	$ 81.00
Total receipts for quarter	1,087.00
Total	$ 1,168.00
Total expenditures for quarter	501.35
Balance on hand December 31, 1910	$ 666.65

EMBALMERS' DEPARTMENT.

SUMMARY FOR QUARTER ENDING MARCH 31, 1911.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$	151.70
Salaries		75.00
Engraving and drawing		42.50
Printing and Stationery		347.00
	$	616.20

MEMBERS' EXPENSE.

February	2	A. de Bey	$ 16.00
February	28	E. E. Richardson	17.50
March	1	A. de Bey	40.40
March	1	E. E. Richardson	40.00
March	1	F. L. Unterkircher	37.80
			$ 151.70

SALARIES.

January	31	G. H. Sumner, secretary	$ 25.00
February	28	G. H. Sumner, secretary	25.00
March	31	G. H. Sumner, secretary	25.00
			$ 75.00

ENGRAVING.

January	3	Iowa Lithographing Co.	$ 42.50
			$ 42.50

PRINTING AND STATIONERY.

January	3	The Homestead Printing Co.	$ 130.00
January	3	The Homestead Printing Co.	114.00
January	3	The Homestead Printing Co.	87.00
February	2	Iowa Lithographing Co.	16.00
			$ 347.00

Balance on hand January 1, 1911	$ 666.65
Paid Treasurer of State March 4, 1911	219.00
	$ 885.65
Total expenditures for quarter	616.20
Balance on hand March 31, 1911	$ 269.45

EMBALMERS' DEPARTMENT.

SUMMARY FOR QUARTER ENDING JUNE 30, 1911.

CLASSIFIED SUMMARY OF EXPENSES.

Salaries and clerk hire	$ 75.00
Printing and stationery	209.77
Drawing and engraving	18.60
Express	4.56
Miscellaneous	3.38
Postage	22.21
	$ 333.52

SALARIES.

April	30	G. H. Sumner	$ 25.00
May	31	G. H. Sumner	25.00
June	30	G. H. Sumner	25.00
			$ 75.00

PRINTING AND STATIONERY.

April	30	J. H. Welch Ptg. Co.	$ 1.50
April	30	The Homestead Ptg. Co.	38.60
May	31	The Homestead Ptg. Co.	80.00
May	31	Sioux County Herald	3.00
June	30	The Homestead Ptg. Co.	86.67
			$ 209.77

DRAWING AND ENGRAVING.

May	31	Des Moines Engraving Co.	$ 18.60

EXPRESS.

April	30	Wells Fargo Express Co.	$ 3.16
April	30	American Express Co.	1.40
			$ 4.56

MISCELLANEOUS.

April	30	C. C. C. College	$ 3.38

POSTAGE.

June	30	L. C. Kurtz, P. M.	$ 22.21

Balance on hand March 31, 1911	$ 269.45
Paid Treasurer of State June 2, 1911	64.00
	$ 333.45
Total expenditures for quarter	333.52
Overdrawn	$ .07

IOWA STATE BOARD OF HEALTH.

EMBALMERS' DEPARTMENT.

SUMMARY FOR QUARTER ENDING SEPTEMBER 30, 1911.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 129.50
Other officials	143.20
Salaries	75.00
Drawing and engraving	13.75
Printing, binding and stationery	140.50
Express	6.64
	$ 508.59

MEMBERS' EXPENSE.

September	21	E. E. Richardson	$ 65.50
September	21	A. de Bey	16.00
September	21	A. de Bey	48.00
			$ 129.50

OTHER OFFICIAL EXPENSES.

September	1	G. H. Sumner	$ 143.20

SALARIES.

July		G. H. Sumner	$ 25.00
August		G. H. Sumner	25.00
September		G. H. Sumner	25.00
			$ 75.00

DRAWING AND ENGRAVING.

September	1	Iowa Litho. Co.	$ 13.75

PRINTING, BINDING AND STATIONERY.

September	1	Homestead Ptg. Co.	$ 124.00
September	15	Homestead Ptg. Co.	16.50
			$ 140.50

EXPRESS.

September	1	Adams Express Co.	$ 5.14
September	1	American Express Co.	1.20
September	1	United States Express Co.	.30
			$ 6.64
August	11	Paid State Treasurer	$ 1,252.00
June	30	Overdrawn	.07
			$ 1,251.93
Expenses of quarter ending September 30			508.59
Balance on hand September 30, 1911			$ 743.34

STATE BOARD OF HEALTH.

EMBALMERS' DEPARTMENT.

SUMMARY FOR QUARTER ENDING DECEMBER 30, 1911.

CLASSIFIED SUMMARY OF EXPENSES.

Salaries	$ 75.00
Printing and stationery	55.58
Express	.68
Miscellaneous	10.67
	$ 141.93

SALARIES.

October	G. H. Sumner	$ 25.00
November	G. H. Sumner	25.00
December	G. H. Sumner	25.00
		$ 75.00

PRINTING AND STATIONERY.

November	29	The Homestead Printing Co.	$ 55.58

EXPRESS.

November	American Express Co.	$ .68

MISCELLANEOUS.

November	McNamara-Kenworthy	$ 6.17
November	Capital City Commercial College	4.50
		$ 10.67
Balance on hand September 30, 1911		$ 743.34
Paid State Treasurer November 3, 1911		68.00
		$ 811.34
Expenses for quarter		141.93
Balance on hand December 30, 1911		$ 669.41

STATE BOARD OF HEALTH.

EMBALMERS' DEPARTMENT.

SUMMARY FOR QUARTER ENDING MARCH 30, 1912.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 181.48
Printing and stationery	80.00
Salaries	75.00
Miscellaneous	5.00
Express	1.15
	$ 342.63

MEMBERS' EXPENSE.

February	22	C. S. Hopkins	$ 61.80
February	22	G. A. Smith	66.00
March	1	Charles Emerson	53.68
			$ 181.48

PRINTING AND STATIONERY.

February	22	The Homestead Printing Co.	$ 80.00

SALARIES.

January	31	G. H. Sumner	$ 25.00
February	29	G. H. Sumner	25.00
March	30	G. H. Sumner	25.00
			$ 75.00

MISCELLANEOUS.

February	22	Drake University	$ 5.00

EXPRESS.

January	2	U. S. Express Co.	$ .50
February	22	American Express Co.	.45
February	22	Adams Express Co.	.20
			$ 1.15

Balance on hand December 30, 1911	$ 669.41
Paid State Treasurer February, 1912	224.00
	$ 893.41
Expenses for quarter	342.63
Balance on hand March 30, 1912	$ 550.78

STATE BOARD OF HEALTH.

EMBALMERS' DEPARTMENT.

SUMMARY FOR QUARTER ENDING JUNE 30, 1912.

CLASSIFIED SUMMARY OF EXPENSES.

Other official expense	$ 65.50
Salaries	75.00
Printing and stationery	458.45
Subscription to N. Am. Conf. Emb.	10.00
Express	1.00
Miscellaneous	4.50
Postage	17.33
	$ 631.78

MEMBERS' EXPENSE.

June	5	E. E. Richardson	$ 65.50

SALARIES.

April	30	G. H. Sumner	$ 25.00
May	31	G. H. Sumner	25.00
June	30	G. H. Sumner	25.00
			$ 75.00

PRINTING AND STATIONERY.

April	2	The Homestead Printing Co.	$ 177.00
June	5	The Homestead Printing Co.	5.70
June	5	The Homestead Printing Co.	60.00
June	5	The Homestead Printing Co.	215.75
			$ 458.45

SUBSCRIPTIONS.

April	2	Sub. to N. Am. Conf. Emb.	$ 10.00

EXPRESS.

April	2	American Express Co.	$ .45
April	2	Adams Express Co.	.55
			$ 1.00

MISCELLANEOUS.

April	2	Capital City Commercial College	$ 4.50

POSTAGE.

L. C. Kurtz	$ 17.33
	$ 631.78
Balance on hand March 30, 1912	$ 550.78
Paid State Treasurer May 21, 1912	81.00
	$ 631.78
Total expense of quarter ending June 30, 1912	631.78

NURSES.

SUMMARY FOR QUARTER ENDING SEPTEMBER 30, 1910.

July	No expense.	
August	No expense.	
Members' expense		$ 173.22
Printing and stationery		14.00
		$ 187.22

MEMBERS' EXPENSE.

September		Miss M. E. Nesbitt	$ 42.97
September		A. P. Hanchett	56.00
September		Geo. E. Decker	74.25
			$ 173.22

PRINTING AND STATIONERY.

September		J. H. Welch Printing Co.	$ 4.00
September		Geo. A. Miller Printing Co.	10.00
			$ 14.00
August	1	Paid State Treasurer	$ 260.00
August	18	Paid State Treasurer	1.00
		Total	$ 261.00
		Expense of quarter ending September 30	187.22
		Balance on hand September 30, 1910	$ 73.78

NURSES.

SUMMARY OF EXPENSES ENDING DECEMBER, 1910.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 112.00
Printing and stationery	49.75
Express	.60
Miscellaneous	8.29
Postage	40.00
	$ 210.64

MEMBERS' EXPENSE.

October	Sister Mary Mechtildes	$ 60.00
October	M. E. Nesbitt	52.00
		$ 112.00

PRINTING.

October	Geo. A. Miller Printing Co.	$ 3.75
November	Kenyon Printing Co.	46.00
		$ 49.75

EXPRESS.

October	U. S. Express Co.	$ .30
October	U. S. Express Co.	.30
		$ .60

MISCELLANEOUS.

October	C. C. C. College	$ 6.37
November	Addressograph Co.	1.92
		$ 8.29

POSTAGE.

November	J. I. Myerly	$ 40.00
Balance on hand September 30, 1910		$ 73.78
Paid State Treasurer November 16		51.00
Paid State Treasurer February 20, 1911		335.00
Total		$ 459.78
Expense of second quarter		210.64
Balance on hand December 30		$ 249.14
		$ 249.14

NURSES.

SUMMARY OF EXPENSES FOR QUARTER ENDING MARCH 31, 1911.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 227.32
Extra help	3.00
Printing and stationery	23.24
Miscellaneous	10.95
Express	3.26
	$ 267.77

MEMBERS' EXPENSE.

March	Miss Nesbitt	$ 51.57
March	Miss Nesbitt	4.00
March	A. P. Hanchett	81.50
March	Geo. E. Decker	90.25
		$ 227.32

EXTRA HELP.

March	Mabel Martin	$ 3.00

PRINTING AND STATIONERY.

February	Iowa Lith. Co.	$ 16.00
February	The Homestead Printing Co.	1.56
February	The Homestead Printing Co.	5.68
		$ 23.24

MISCELLANEOUS.

March	Baker Trisler Co.	$ 10.95

EXPRESS.

March	U. S. Express Co.	$ 1.91
March	American Express Co.	1.35
		$ 3.26
Balance on hand December 31, 1910		$ 249.14
Return to nurses' account by auditor		1,350.96
Total		$ 1,600.10
Expense of quarter		267.77
Balance on hand March 31, 1911		$ 1,332.33

NURSES' DEPARTMENT.

SUMMARY OF EXPENSES FOR QUARTER ENDING JUNE 30, 1911.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 72.00
Printing and stationery	48.25
Postage	96.00
Express	.90
Miscellaneous	17.58
	$ 234.73

MEMBERS' EXPENSE.

April	Mary Mechtildes	$ 48.00
April	Mary E. Nesbit	24.00
		$ 72.00

PRINTING AND STATIONERY.

June	Homestead Printing Co.	$ 48.25

POSTAGE.

June	L. C. Kurtz, postmaster	$ 96.00

EXPRESS.

April	U. S. Express Co.	$ .90

MISCELLANEOUS.

April	C. C. C. College	$ 8.38
June	Underwood Typewriting Co.	9.20
		$ 17.58

Balance on hand March 31, 1911	$ 1,332.33
Total expenses for quarter	234.73
Balance on hand June 30, 1911	$ 1,097.60

NURSES' DEPARTMENT.

SUMMARY OF EXPENSES FOR QUARTER ENDING SEPTEMBER 30, 1911.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 162.72
Printing and stationery	3.75
Express	.39
	$ 166.86

July	No expense.
August	No expense.

MEMBERS' EXPENSE.

September	1	Sister Mary Mechtildes	$ 48.00
September	1	Mary E. Nesbit	52.72
September	21	Mary E. Nesbit	44.00
September	21	G. A. Smith	18.00
			$ 162.72

PRINTING AND STATIONERY.

September	1	The Homestead Printing Co.	$ 3.75

EXPRESS.

September	1	Wells Fargo Express Company	$ .39
June	30	Balance on hand	$ 1,097.60
August	9	Paid State Treasurer	439.00
			$ 1,536.60
Expense of quarter ending September 30, 1911			166.86
September	30	Balance on hand	$ 1,369.74

STATE BOARD OF HEALTH.

NURSES' DEPARTMENT.

SUMMARY OF EXPENSES FOR QUARTER ENDING DECEMBER 30, 1911.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 171.00
Other official	1.75
Printing and binding	6.45
Express	.65
Miscellaneous	12.83
	$ 192.68

MEMBERS' EXPENSE.

October	G. A. Smith	$ 75.00
October	G. A. Huntoon	96.00
		$ 171.00

OTHER OFFICIAL.

October	G. A. Huntoon	$ 1.75

PRINTING AND BINDING.

November	The Homestead Printing Co.	$ 6.45

EXPRESS.

November	American Express Co.	$ .35
November	U. S. Express Co.	.30
		$ .65

MISCELLANEOUS.

November		McNamara-Kenworthy Co.	$ 3.83
November		Capital City Com. College	9.00
			$ 12.83
Balance on hand Sept. 30, 1911			$ 1,369.74
Paid Treasurer of State Nov. 6, 1911			66.00
			$ 1,435.74
Expenses of quarter ending Dec. 30, 1911			192.68
Balance on hand Dec. 30, 1911			$ 1,243.06

STATE BOARD OF HEALTH.

NURSES' DEPARTMENT.

SUMMARY OF EXPENSES FOR QUARTER ENDING MARCH 30, 1912.

CLASSIFIED SUMMARY OF EXPENSES.

Other official	$ 170.00
Printing and binding	8.70
Extra clerk hire	5.00
Express	.95
Special investigation	25.00
	$ 209.65

OTHER OFFICIAL.

February	22	G. A. Smith	$ 98.00
February	22	A. de Bey	72.00
			$ 170.00

PRINTING AND BINDING.

February	22	The Homestead Printing Co.	$ 2.70
February	22	The Homestead Printing Co.	2.65
February	22	The Homestead Printing Co.	2.05
February	22	H. P. Oggle	1.30
			$ 8.70

EXTRA CLERK.

February	22	Mrs. J. A. Tracy	$ 5.00

EXPRESS.

February	22	Adams Express Co.	$ .40
February	22	American Express Co.	.55
			$ .95

SPECIAL INVESTIGATION.

February	22	Mills & Perry	$ 25.00
Balance on hand Dec. 30, 1911			$ 1,243.06
Paid State Treasurer February 28, 1912			324.00
			$ 1,567.06
Expense of quarter ending March, 1912			209.65
Balance on hand March 30, 1912			$ 1,357.41

STATE BOARD OF HEALTH.

NURSES' DEPARTMENT.

SUMMARY OF EXPENSES FOR QUARTER ENDING JUNE 30, 1912.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 32.00
Other official expense	8.46
Postage	104.00
Miscellaneous	8.00
	$ 152.46

MEMBERS' EXPENSE.

April	2	Millicent Schaar	$ 32.00

OTHER OFFICIAL EXPENSE.

May	17	B. L. Elker	$ 8.46

POSTAGE.

August	1	L. C. Kurtz	$ 104.00

MISCELLANEOUS.

May	1	C. C. C. College	$ 8.00
			$ 152.46
Balance on hand, March 30, 1912			$ 1,357.41
Paid State Treasurer, May 11, 1912			56.00
			$ 1,413.41
Expense of fourth quarter ending June 30, 1912			152.46
Balance on hand			$ 1,260.95

STATE BOARD OF HEALTH.

ANTITOXIN DEPARTMENT.

CLASSIFIED SUMMARY OF EXPENSES ENDING SEPTEMBER 30, 1911.

Salaries and clerk hire	$ 365.00
Stationery, printing and binding	173.25
Telegraph	1.43
Miscellaneous	295.21

Postage		121.00
		$ 955.89

SALARIES AND CLERK HIRE.

May	Isabel Sumner	$ 75.00
June	Isabel Sumner	75.00
July	Isabel Sumner	75.00
August	Isabel Sumner	75.00
September	Gail Andrews	65.00
		$ 365.00

PRINTING, STATIONERY AND BINDING.

May	The Homestead Printing Co.	$ 112.00
June	J. H. Welch Printing Co.	6.25
July	The Homestead Printing Co.	17.50
July	The Homstead Printing Co.	7.00
July	The Homestead Printing Co.	2.00
July	Pratt Mendsen Co.	6.00
September	Iowa Lithographing Co.	22.50
		$ 173.25

TELEGRAPH.

June	Western Union Tel. Co.	$ 1.10
July	Western Union Tel. Co.	.33
		$ 1.43

MISCELLANEOUS.

June	S. Davidson Co.	$ 105.64
June	Baker Trisler Co.	75.54
September	Underwood Typewriter Co.	83.03
September	S. Davidson Co.	29.60
September	McNamara-Kenworthy Co.	1.40
		$ 295.21

POSTAGE.

June	L. C. Kurtz, P. M.	$ 121.00
April 11, 1911, appropriation for department, pro rata		$ 445.05
July 1, 1911, appropriation for department		2,000.00
		$ 2,445.05
Expenses for five months		955.89
Balance on hand September 30th		$ 1,489.16

STATE BOARD OF HEALTH.

ANTITOXIN DEPARTMENT.

CLASSIFIED SUMMARY OF EXPENSES ENDING DECEMBER 30, 1911.

SALARIES.

Salaries			$ 225.00

CLASSIFIED.

October	31	W. Gail Andrews	$ 75.00
November	29	W. Gail Andrews	75.00
December	30	W. Gail Andrews	75.00
			$ 225.00
Balance on hand September 30, 1911			$ 1,489.16
Expense for quarter ending December 30, 1911			225.00
Balance on hand December 30, 1911			$ 1,264.16

STATE BOARD OF HEALTH.

ANTITOXIN DEPARTMENT.

CLASSIFIED SUMMARY OF EXPENSES ENDING MARCH 30, 1912.

SALARIES.

January	31	W. Gail Andrews	$ 75.00
February	29	W. Gail Andrews	75.00
March	30	W. Gail Andrews	75.00
			$ 225.00

TELEGRAPH.

February	22	Western Union Telegraph Co.	$ 1.13
February	22	Western Union Telegraph Co.	.43
			$ 1.56

MISCELLANEOUS.

January	2	Frank S. Betz Co.	$ 4.50
Balance on hand December 30, 1911			$ 1,264.16
Expense of quarter			231.06
Balance on hand March 30, 1912			$ 1,033.10

STATE BOARD OF HEALTH.

ANTITOXIN DEPARTMENT.

CLASSIFIED SUMMARY OF EXPENSES ENDING JUNE 30, 1912.

Salaries	$ 225.00
Members' expense	223.78
Postage	131.00
Telegrams	2.84
	$ 582.62

SALARIES.

April		W. G. Andrews	$ 75.00
May		W. G. Andrews	75.00
June		W. G. Andrews	75.00
			$ 225.00

MEMBERS' EXPENSE.

May	1	G. A. Smith	$ 220.78
May	17	G. A. Smith	1.75
June	19	E. E. Richardson	1.25
			$ 223.78

POSTAGE.

June	27	L. C. Kurtz	$ 131.00

TELEGRAMS.

May	1	Western Union Tel. Co.	$ 2.04
July	2	Western Union Tel. Co.	.80
			$ 2.84
On hand March 30, 1912			$ 1,033.10
Expense fourth quarter			582.62
Amount charged off to general revenue fund			$ 450.48

BACTERIOLOGICAL LABORATORY.

QUARTERLY REPORTS FROM LABORATORY, JULY 1, 1910, TO JUNE 30, 1912.

July 1, 1910	Annual appropriation	$ 6,000.00
June 30, 1910	Overdrawn	5.74
July 1, 1910	Balance	$ 5,994.26

EXPENSES BY QUARTERS.

Sept. 30, 1910	Report from laboratory	$ 1,354.39
Dec. 31, 1910	Report from laboratory	1,727.03
Mar. 31, 1911	Report from laboratory	1,472.35
June 30, 1911	Report from laboratory	1,394.56
	Total expense for year	$ 5,948.33
	Balance forward	$ 45.93
July 1, 1911	Annual appropriation	6,000.00
July 1, 1911	Amount on hand	$ 6,045.93
Sept. 30, 1911	Report from laboratory	$ 1,432.54
Dec. 31, 1911	Report from laboratory	1,590.80
Mar. 31, 1912	Report from laboratory	1,430.83
June 30, 1912	Report from laboratory	1,591.76
	Total expense for year	$ 6,045.93

EXPENDITURES OF BACTERIOLOGICAL LABORATORY OF THE STATE BOARD OF HEALTH, DURING JULY 1, 1910—JULY 1, 1911.

			Voucher No.	
July	19, 1910	Henry Albert, salary July	8284	$ 100.00
July	19, 1910	Jessie B. Hudson, salary July	8285	116.66
July	19, 1910	Anna Stach, salary July	8286	40.00
July	19, 1910	Leo Musgrove, salary July	8287	53.00
July	19, 1910	Emory Wescott, P. M., stamps	8288	30.00
July	19, 1910	U. S. Express Co., expressage	8289	13.20
July	19, 1910	American Express Co., expressage	8290	11.75
July	19, 1910	D. F. Rosenkrantz, laboratory supplies	8291	2.45
July	19, 1910	Bausch & Lomb Opt. Co., supplies	8292	1.48
July	19, 1910	G. D. Barth, laboratory supplies	8293	1.60
July	19, 1910	Randall-Faichney Co., supplies	8294	13.01
July	19, 1910	Noyes Bros. & Cutler, soap jars	8295	4.50
July	19, 1910	J. T. Ries, desk supplies	8296	8.32
July	19, 1910	Johannes Andersen, hauling blood, etc.	8397	20.00
July	19, 1910	Claire Swain, keeping animals	8398	5.00
July	19, 1910	Parke Davis & Co., culture	8399	.75
July	19, 1910	Henry Albert, travel expense, Des Moines	8300	10.42
				$ 431.14
Aug.	16, 1910	Henry Albert, salary August	8301	$ 100.00
Aug.	16, 1910	Jessie B. Hudson, salary August	8302	116.66
Aug.	16, 1910	Anna Stach, salary August	8303	40.00
Aug.	16, 1910	Lee Musgrove, salary August	8304	53.00
Aug.	16, 1910	Emery Wescott, stamps	8305	30.00
Aug.	16, 1910	U. S. Express Co., expressage	8306	7.50
Aug.	16, 1910	American Express Co., expressage	8307	12.10
Aug.	16, 1910	Truax Green & Co., supplies	8308	7.60
Aug.	16, 1910	Katzenmeyer Bros., animal food	8309	4.10
Aug.	16, 1910	Johannes Andersen, hauling, etc.	8310	7.55
Aug.	16, 1910	Geo. D. Barth, supplies	8311	4.10
Aug.	16, 1910	W. U. Telegraph Co., three telegrams	8312	1.80
Aug.	16, 1910	Noyes Bros. & Cutler, sterilizer	8313	3.25
Aug.	16, 1910	Merck & Co., supplies	8314	3.18
Aug.	16, 1910	Smith & Cilek, supplies	8315	2.85
Aug.	16, 1910	G. M. Bissel, guinea pigs	8316	6.00
Aug.	16, 1910	Frederick Stearns & Co., guinea pigs	8317	3.00
Aug.	16, 1910	C. A. Webber Printing Co., printing	8318	52.00
Aug.	16, 1910	Carsons Quality Shop, animal feed	8319	.87
Aug.	16, 1910	Henry Albert, travel expense, Des Moines	8320	7.47
				$ 460.53

			Voucher No.		
Sept.	20, 1910	Henry Albert, salary September	8321	$	100.00
Sept.	20, 1910	Jessie B. Hudson, salary September	8322		116.66
Sept.	20, 1910	Anna Stach, salary September	8323		40.00
Sept.	20, 1910	Leo Musgrove, salary September	8324		53.00
Sept.	20, 1910	Emory Wescott, stamps	8325		30.00
Sept.	20, 1910	American Express Co., expressage	8326		18.45
Sept.	20, 1910	U. S. Express Co., expressage	8327		13.05
Sept.	20, 1910	Johannes Andersen, hauling, etc.	8328		9.50
Sept.	20, 1910	Noyes Bros. & Cutler, supplies	8329		2.00
Sept.	20, 1910	W. U. Telegraph Co., messages	8330		.80
Sept.	20, 1910	Iowa Telephone Co., rent and toll	8331		17.00
Sept.	20, 1910	Parke Davis & Co., two cultures	8332		1.35
Sept.	20, 1910	Katzenmeyer Bros., animal feed	8333		4.80
Sept.	20, 1910	Churchill Drug Co., supplies	8334		19.76
				$	426.37
Oct.	20, 1910	Henry Albert, salary October	8335	$	100.00
Oct.	20, 1910	Jessie B. Hudson, salary October	8336		116.66
Oct.	20, 1910	Anna Stach, salary October	8337		40.00
Oct.	20, 1910	Leo Musgrove, salary October	8338		53.00
Oct.	20, 1910	Emory Wescott, stamps	8339		30.00
Oct.	20, 1910	American Express Co., expressage	8340		12.13
Oct.	20, 1910	U. S. Express Co., expressage	8341		12.55
Oct.	20, 1910	Columbus Pharmacal Co., supplies	8342		1.80
Oct.	20, 1910	Merck & Co., supplies	8343		3.61
Oct.	20, 1910	Katzenmeyer Bros., animal feed	8344		2.70
Oct.	20, 1910	Frederick Stearns & Co., guinea pigs	8345		4.50
Oct.	20, 1910	W. S. Thomas, hardware	8346		1.50
Oct.	20, 1910	Webber Printing Co., printing	8347		19.45
Oct.	20, 1910	Ernst Leitz, supplies	8348		50.35
Oct.	20, 1910	W. P. Hohenschuh, supplies	8349		54.00
Oct.	20, 1910	Iowa Telephone Co.	8350		2.95
Oct.	20, 1910	Hurd Co., cabinet, etc.	8351		44.59
Oct.	20, 1910	George Hummer Mer. Co.	8352		1.75
Oct.	20, 1910	J. W. Andersen, hauling, etc.	8353		7.20
Oct.	20, 1910	Henry Albert, travel expense	8354		11.17
				$	569.91
Nov.	19, 1910	Henry Albert, salary November	8355	$	100.00
Nov.	19, 1910	Jessie B. Hudson, salary November	8356		116.66
Nov.	19, 1910	Anna Stach, salary November	8357		40.00
Nov.	19, 1910	Leo Musgrove, salary November	8358		53.00
Nov.	19, 1910	Emory Wescott, postage	8359		30.00
Nov.	19, 1910	American Express Co., expressage	8360		16.70
Nov.	19, 1910	U. S. Express Co., expressage	8361		16.65
Nov.	19, 1910	Parsons Transfer, hauling	8362		7.76
Nov.	19, 1910	Maresh Bros., supplies	8363		26.46

			Voucher No.		
Nov.	19, 1910	J. F. Dougherty, pasteurize	8364		4.00
Nov.	19, 1910	Fox, Hutejinsen & Lake, supplies	8365		1.95
Nov.	19, 1910	C. A. Webber Printing Co.	8366		55.00
Nov.	19, 1910	Codmans & Shurtleff	8367		1.60
Nov.	19, 1910	Parke Davis & Co., culture	8368		.75
Nov.	19, 1910	Hillside Poultry Yards, guinea pigs	8369		1.00
Nov.	19, 1910	Ernst Leitz, supplies	8370		38.36
Nov.	19 1910	Frederick Stearns Co., guinea pigs	8371		7.00
Nov.	19, 1910	Seamless Rubber Co., gloves	8372		9.50
Nov.	19, 1910	Illinois Glass Co., test tubes	8373		52.34
Nov.	19, 1910	Columbus Pharmacal Co., supplies	8374		5.40
Nov.	19, 1910	Geo. Barth, animal feed, etc.	8375		10.55
Nov.	19, 1910	Osgood & Blodgett Co., boxes	8376		80.80
Nov.	19, 1910	J. Andersen, hauling	8377		6.25
Nov.	19, 1910	Iowa Telephone Co., rent	8378		3.25
Nov.	19, 1910	Henry Albert, travel expense	8379		7.17
				$	691.15
Dec.	21, 1910	Henry Albert, salary December	8380	$	100.00
Dec.	21, 1910	Jessie B. Hudson, salary December	8381		116.66
Dec.	21, 1910	Anna Stach, salary December	8382		40.00
Dec.	21, 1910	Leo Musgrove, salary December	8383		53.00
Dec.	21, 1910	Emory Wescott, postage	8384		30.00
Dec.	21, 1910	Bausch & Lomb Opt. Co., supplies	8385		12.04
Dec.	21, 1910	Iowa Telephone Co., rent and toll	8386		3.15
Dec.	21, 1910	W. W. Willis & Co., supplies	8388		9.48
Dec.	21, 1910	The Valzahn Co., chain saw	8389		5.14
Dec.	21, 1910	Truax Greene Co., supplies	8390		5.91
Dec.	21, 1910	D. F. Rosenkrans, aprons	8391		55.00
Dec.	21, 1910	B. W. Abbott, animal feed	8392		2.90
Dec.	21, 1910	Ia. City Gas & Electrical Co.	8393		1.50
Dec.	21, 1910	Katzenmeyer Bros., animal feed	8394		2.35
Dec.	21, 1910	J. Hanson & VanWinkle Co., supplies	8395		9.12
Dec.	21, 1910	Wasserman Laboratory, supplies	8396		7.00
Dec.	21, 1910	Postal Telegraph Co., messages	8397		.65
Dec.	21, 1910	H. A. Strub Co., cotton	8398		3.00
Dec.	21, 1910	Smith & Cilek, hardware	8399		6.20
Dec.	21, 1910	J. Anderson, hauling blood	8400		8.05
Dec.	21, 1910	American Express Co., expressage	8401		16.45
Dec.	21, 1910	U. S. Express Co., expressage	8402		15.75
Dec.	21, 1910	A. C. McClurg Co.	8403		2.55
				$	455.90
Jan.	24, 1911	Henry Albert, salary December	8404	$	100.00
Jan.	24, 1911	Jessie B. Hudson, salary December	8405		116.66
Jan.	24, 1911	Anna Stach, salary December	8406		40.00
Jan.	24, 1911	Leo Musgrove, salary December	8407		53.00

			Voucher No.		
Jan.	24, 1911	Emory Wescott, postage	8408		30.00
Jan.	24, 1911	U. S. Express Co., expressage	8409		13.45
Jan.	24, 1911	American Express Co., expressage	8410		15.15
Jan.	24, 1911	C. A. Webber, printing	8411		18.65
Jan.	24, 1911	Ernst Leitz, supplies	8412		44.20
Jan.	24, 1911	W. U. Telegraph, messages	8413		2.90
Jan.	24, 1911	C. Parrott, rabbits	8414		6.00
Jan.	24, 1911	Parsons Transfer, hauling	8415		21.11
Jan.	24, 1911	Geo. Hummer Mer. Co., supplies	8416		6.51
Jan.	24, 1911	B. & L. Opt. Co., supplies	8417		36.51
Jan.	24, 1911	Carson, Pirie Scott Co., cotton	8418		40.00
Jan.	24, 1911	G. D. Barth, supplies	8419		10.88
Jan.	24, 1911	Williams, Brown Earle Co., supplies	8420		27.00
Jan.	24, 1911	Parke Davis Co., pure culture	8421		1.20
Jan.	24, 1911	J. Anderson, hauling	8422		7.90
Jan.	24, 1911	Spencer Lens Co., supplies	8423		10.80
Jan.	24, 1911	Henry Albert, travel expense	8424		10.07
				$	598.99
Feb.	24, 1911	Henry Albert, salary January	8425	$	100.00
Feb.	24, 1911	Jessie B. Hudson, salary January	8426		116.66
Feb.	24, 1911	Anna Stach, salary January	8427		40.00
Feb.	24, 1911	Leo Musgrove, salary January	8428		55.00
Feb.	24, 1911	H. G. Walker, postage	8429		30.00
Feb.	24, 1911	U. S. Express Co., expressage	8430		17.45
Feb.	24, 1911	American Express Co., expressage	8431		18.45
Feb.	24, 1911	H. A. Strub Co., shades	8432		12.40
Feb.	24, 1911	Geo. D. Barth	8433		5.58
Feb.	24, 1911	Weber Bros.	8434		1.25
Feb.	24, 1911	Byron Stillwell, supplies	8435		3.00
Feb.	24, 1911	Williams, Brown & Earle	8436		12.15
Feb.	24, 1911	B. & L. Opt. Co., petri dishes	8437		36.00
Feb.	24, 1911	J. Andersen, hauling blood, etc.	8438		6.50
Feb.	24, 1911	Parsons Transfer Co., hauling	8439		1.35
Feb.	24, 1911	Henry Albert, travel expense	8440		14.32
Feb.	24, 1911	Henry Albert, travel expense	8441		6.97
				$	475.08
Mar.	30, 1911	Henry Albert, salary March	8442	$	100.00
Mar.	30, 1911	Jessie B. Hudson, salary March	8443		116.66
Mar.	30, 1911	Anna Stach, salary March	8444		40.00
Mar.	30, 1911	Leo Musgrove, salary March	8445		53.00
Mar.	30, 1911	H. G. Walker, postage	8446		30.00
Mar.	30, 1911	U. S. Express Co., expressage	8447		14.00
Mar.	30, 1911	American Express Co., expressage	8448		10.50
Mar.	30, 1911	Spencer Lens Co., supplies	8449		9.40
Mar.	30, 1911	B. W. Abbott, animal feed	8450		8.75

			Voucher No.		
Mar.	30, 1911	Maresh Bros., supplies	8451		4.34
Mar.	30, 1911	Smith & Cilek, supplies	8452		6.85
Mar.	30, 1911	W. U. Telegraph Co., messages	8453		2.40
Mar.	30, 1911	Johannes Andersen, hauling	8454		4.00
Mar.	30, 1911	G. D. Barth, supplies	8455		7.70
Mar.	30. 1911	Iowa Telephone Co., rental	8456		6.75
				$	414.35
Apr.	18, 1911	Henry Albert, salary April	8457	$	100.00
Apr.	18, 1911	Jessie B. Hudson, salary April	8458		116.66
Apr.	18, 1911	Anna Stach, salary April	8459		40.00
Apr.	18, 1911	Leo Musgrove, salary April	8460		53.00
Apr.	18, 1911	H. G. Walker, postage	8461		30.00
Apr.	18, 1911	U. S. Express Co., expressage	8462		20.15
Apr.	18, 1911	American Express Co., expressage	8463		10.45
Apr.	18, 1911	Hartz & Bahnsen Co., supplies	8464		16.33
Apr.	18, 1911	Binney & Smith, glue	8465		2.40
Apr.	18, 1911	Illinois Glass Co., supplies	8466		113.73
Apr.	18, 1911	Ernst Leitz, supplies	8467		2.16
Apr.	18, 1911	Churchill Drug Co., rubber bands	8468		6.80
Apr.	18, 1911	Parsons Transfer Co., hauling	8469		1.30
Apr.	18, 1911	B. & L. Opt. Co., supplies	8470		5.17
Apr.	18, 1911	J. Andersen, hauling blood	8471		8.00
Apr.	18, 1911	Henry Albert, travel expense	8472		8.97
				$	535.12
May	20, 1911	Henry Albert, salary May	8472	$	100.00
May	20, 1911	Jessie B. Hudson, salary May	8473		116.66
May	20, 1911	Anna Stach, salary June	8492		40.00
May	20, 1911	Leo Musgrove, salary May	8475		53.00
May	20, 1911	H. G. Walker, postage	8476		15.00
May	20, 1911	U. S. Express Co., expressage	8477		16.43
May	20, 1911	American Express Co., expressage	8478		15.45
May	20, 1911	Univ. Typewriter Co., repair	8479		4.50
May	20 1911	W. P. Hohenschuh, filing cases	8480		14.40
May	20, 1911	Coast & Sons, grip	8481		1.25
May	20, 1911	Lea & Febiger	8482		4.75
May	20, 1911	Fox Hutchinson & Lake, supplies	8483		1.63
May	20, 1911	Longmans Green & Co., supplies	8484		4.20
May	20, 1911	J. Andersen, hauling blood	8485		8.40
May	20, 1911	C. R. & Ia. City R.	8486		1.30
May	20, 1911	Henry Albert, postage and box rent	8487		11.75
May	20, 1911	W. U. Telegraph Co., messages	8488		.60
May	20, 1911	Telephone Co., rent and toll	8489		9.90
				$	419.22

		Voucher No.	
June 10, 1911	Henry Albert, salary June	8490	$ 100.00
June 10, 1911	Jessie B. Hudson, salary June	8491	116.66
June 10, 1911	Anna Stach, salary June	8492	40.40
June 10, 1911	Leo Musgrove, salary June	8493	53.00
June 10, 1911	H. G. Walker, postage	8494	25.00
June 10, 1911	U. S. Express Co., expressage	8495	11.90
June 10, 1911	American Express Co., expressage	8496	7.65
June 10, 1911	G. D. Barth, city supplies	8497	6.88
June 10, 1911	Postal Telegraph Co., supplies	8498	.35
June 10, 1911	Parsons Transfer Co., drayage	8499	.45
June 10, 1911	Davenport Bag & Paper Co., paper	8500	6.99
June 10, 1911	West Disinfecting Co.	8501	12.50
June 10, 1911	J. Anderson, hauling blood	8502	4.00
June 10, 1911	Students Supply Co., aprons	8503	5.20
June 10, 1911	Becton Dickinson & Co	8504	18.37
June 10, 1911	F. S. Betz Co., supplies	8505	10.05
June 10, 1911	Illinois Glass Co., test tubes	8506	19.79
June 10, 1911	Burroughs-Wellcome & Co	8507	.63
			$ 440.22

General support fund for laboratory for year July 1st, 1911, to July 1st, 1912 ..... $6,000.00

Warrants drawn on support fund July:—

Acting director, salary, July	$100.00	
1st Ass't Bact., salary July	120.83	
2nd Ass't Bact., salary, July	25.00	
Clerk and stenographer, salary, July	45.00	
Attendant, salary, July	58.00	
		$348.83
H. G. Walker, P. M.—stamps	$ 29.00	
Overdraft	3.65	
		32.65
		381.48
Amount in laboratory fund available after payment of above		$5,618.52
Amount in fund October 1st		$4,613.39
J. B. Hudson, salary, October	$ 120.83	
M. F. Boyd, salary, October	25.00	
Anna Stach, salary, October	45.00	
Leo Musgrove, salary, October	58.00	
H. G. Walker, postage	25.00	
G. D. Barth, animal feed	8.53	
Western Union Telegraph Co., message	.60	
American Express Co.	12.90	
U. S. Express Co., expressage	4.95	

Johannes Andersen, hauling blood	8.00	
W. P. Hohenschuh, supplies, (index cards)	2.15	
University Press Co., 10,000 labels	6.00	
Economy Ad. Co., envelopes and diag. blanks	18.00	
Henry Louis, gloves and cement	2.50	
Bausch & Lomb Opt. Co., handle for microtome knives	.95	
W. H. Kemp Co., two pounds aluminum foil	2.60	
Parsons Transfer Co., drayage	.60	
I. C. Gas & Electric Co., bracket	2.10	
Iowa Telephone, rent and tolls	7.70	
Smith & Cilek, tools	11.85	
Henry Albert, travel expense, B. of H. meeting	12.07	
	$ 375.33	375.33
Amount in fund after payment of above		$4,247.06
Amount in fund November 1st		$4,247.06
Jessie B. Hudson, salary, November	$ 120.83	
M. F. Boyd, salary, November	25.00	
Anna Stach, salary, November	45.00	
Leo Musgrove, salary, November	58.00	
H. G. Walker, stamps	15.00	
U. S. Express Co., expressage	12.80	
American Express Co., expressage	24.22	
Martin Gerber, repair cages, etc.	15.64	
Bausch & Lomb Opt. Co., laboratory supplies	155.35	
Paul M. Boyd, 10 guinea pigs	5.00	
Geo. Hummer Mer. Co., twine 65 3-4 lbs.	25.65	
Henry Albert, stamps	5.00	
Improved Mailing Case Co., 5,000 diph. cases	225.00	
Geo. Barth, animal feed	3.55	
Mercer Transfer Co., drayage	6.17	
Smith & Cilek, hardware, kettles	8.85	
Columbus Phar. Co., 18 boxes applicators	5.40	
W. D. Bradley, 8 guinea pigs	4.00	
J. Anderson, hauling blood, etc.	4.44	
		764.90
Amount in fund after payment of above		$3,473.16

IOWA STATE BOARD OF HEALTH BACTERIOLOGICAL LABORATORY.

Henry Albert, Director.

		Voucher No.	
Dec. 13, 1911	Jessie B. Hudson, salary December	8588	$ 120.83
Dec. 13, 1911	M. F. Boyd, salary December	8589	25.00
Dec. 13, 1911	Anna Stach, salary December	8590	45.00
Dec. 13, 1911	Leo Musgrove, salary December	8591	58.00
Dec. 13, 1911	U. S. Express Co., expressage	8592	15.19
Dec. 13, 1911	American Express Co., expressage	8593	23.94

			Voucher No.	
Dec.	13, 1911	A. C. Lehman, 12 guinea pigs @ 60 cents.	8594	72.20
Dec.	13, 1911	W. H. Kemp Co., 21 lbs. alum, foil.....	8595	27.30
Dec.	13, 1911	Smith & Cilek, one wrench.....	8596	1.00
Dec.	13, 1911	West Disinfecting Co., 32 gallons (Chloro-naptholeum)	8597	32.00
Dec.	13, 1911	Geo. D. Barth, animal feed	8598	4.45
Dec.	13, 1911	Mercer Transfer Co., hauling.....	8599	.97
Dec.	13, 1911	Carson, Pirie, Scott & Co., wadding.....	8600	10.75
Dec.	13, 1911	W. J. Welch, 6 mantles.....	8601	.88
Dec.	13, 1911	Clinton Sugar Refining Co., 6 g.p.....	8602	4.50
Dec.	13, 1911	W. S. Thomas, hardware.....	8603	1.00
Dec.	13, 1911	Davenport Bag & Paper Co., bags.....	8604	9.90
Dec.	13, 1911	Bausch & Lomb Opt. Co., repairing objective	8605	6.50
Dec.	13, 1911	Frederick Sterns Co., 22 g.p. (used)...	8606	5.50
Dec.	13, 1911	Johannes Anderson, hauling blood, etc..	8607	10.25
Dec.	13, 1911	Iowa Telephone Co., toll service.....	8608	11.36
Dec.	13, 1911	R. S. Salyards, 39 hrs. work at 20 cents.	8609	7.80
Dec.	13, 1911	Mr. Holt, 35 1-4 hrs. work at 20 cents.	8610	7.05
Dec.	13, 1911	Henry Albert, (receipts attached).....	8611	14.20
				$ 450.57

IOWA STATE BOARD OF HEALTH BACTERIOLOGICAL LABORATORY.
Henry Albert, Director.

Jan.	10, 1912	Jessie B. Hudson, salary December.....	8612	$ 120.83
Jan.	10, 1912	M. F. Boyd, salary December.....	8613	25.00
Jan.	10, 1912	Anna Stach, salary December.....	8614	45.00
Jan.	10, 1912	Leo Musgrove, salary December.....	8615	58.00
Jan.	10, 1912	U. S. Express Co., expressage.....	8616	6.82
Jan.	10, 1913	American Express Co., expressage.....	8617	9.31
Jan.	10, 1912	C. A. Webber Printing Co., printing.....	8618	111.15
Jan.	10, 1912	Bausch & Lomb Opt. Co., stains.....	8619	3.27
Jan.	10, 1912	W. S. Thomas, supplies.....	8620	1.01
Jan.	10, 1912	Ia. City Gas & Elec. Co., 1 lamp (ruby)	8621	.50
Jan.	10, 1912	Whitall Tatum Co., hypodermic needles.	8622	4.51
Jan.	10. 1912	Illinois Glass Co., 10,123 test tubes, caps.	8623	103.76
Jan.	10, 1912	Spencer Lens Co., supplies	8624	10.09
Jan.	10, 1912	Bennison's, 33 wads cotton.....	8625	.99
Jan.	10, 1912	W. P. Hohenschuh, index and blank cards.	8626	2.65
Jan.	10, 1912	Henry Albert, stamps ($10.00) and paid for labor	8627	17.34
Jan.	10, 1912	Johannes Anderson, hauling blood.....	8628	4.00
				$ 524.03

IOWA STATE BOARD OF HEALTH BACTERIOLOGICAL LABORATORY.
Henry Albert, Director.

			Voucher No.	
Feb.	12, 1912	Jessie B. Hudson, salary February.....	8629	$ 120.83
Feb.	12, 1912	M. F. Boyd, salary February.....	8630	25.00
Feb.	12, 1912	Anna Stach, salary February.....	8631	45.00
Feb.	12, 1912	Leo Musgrove, salary February.....	8632	58.00
Feb.	12, 1912	U. S. Express Co., expressage.....	8633	17.24
Feb.	12, 1912	American Express Co., expressage.....	8634	8.62
Feb.	12, 1912	H. C. Wienske, two rubber stamps.....	8635	.75
Feb.	12, 1912	R. C. Christiansen, 6 guinea pigs.....	8636	3.00
Feb.	12, 1912	Illinois Glass Co., 70 gr. test tubes.....	8637	58.45
Feb.	12, 1912	W. P. Hohenschuh, 1 M 4x6 cards.....	8638	2.15
Feb.	12, 1912	Improved Mailing Case Co., 1000 bac. cases	8639	25.00
Feb.	12, 1912	Iowa City Gas & Elec. Co., two mantles.	8640	.40
Feb.	12, 1912	D. F. Rosenkranz, three aprons.....	8641	1.50
Feb.	12, 1912	Stone & Forsyth, three rls. hyg. towel and fixture	8642	4.25
Feb.	12, 1912	Students & Physicians Supply Co., needles and nine aprons.....	8643	11.10
Feb.	12, 1912	University Book Store, type-ribbon and paper	8644	1.90
Feb.	12, 1912	Bausch & Lomb Opt. Co., stains and repair	8645	6.56
Feb.	12, 1912	Iowa elephone TCo., rent and toll.....	8646	11.19
Feb.	12, 1912	Geo. D. Barth, animal feed.....	8647	5.55
Feb.	12, 1912	Mercer Transfer Co., hauling.....	8648	2.38
Feb.	12, 1912	Louis Schump, hauling.....	8649	25.05
Feb.	12, 1912	Iowa City Printing Co., 8 M. envelopes.	8650	21.50
Feb.	12, 1912	Henry Albert, stamps.....	8651	30.00
Feb.	12, 1912	Johannes Anderson, rabbits and supplies.	8652	1.30
				$ 486.71

STATE BOARD OF HEALTH BACTERIOLOGICAL LABORATORY.
Henry Albert, Director.

Mar.	12, 1912	Jessie B. Hudson, salary March.....	8654	$ 120.83
Mar.	12, 1912	Mark F. Boyd, salary March.....	8655	25.00
Mar.	12, 1912	Anna Stach, salary March	8656	45.00
Mar.	12, 1912	Leo Musgrove, salary March	8657	58.00
Mar.	12, 1912	U. S. Express Co., expressage	8658	9.06
Mar.	12, 1912	American Express Co., expressage	8659	8.97
Feb.	14, 1912	Martin Gerber, repair work and labor....	8660	4.55
Feb.	6, 1912	B. W. Abbott, animal feed.....	8661	7.10
Feb.	6, 1912	T. L. Matthes, 2 rabbits at 75c.....	8662	1.50
Feb.	1, 1912	Maresh Bros., repair and labor.....	8663	12.71
Feb.	7, 1912	Bennison's—66 wads cotton at 3c.....	8664	1.98
Feb.	1, 1912	Geo. D. Barth, animal feed.....	8665	12.80

			Voucher No.	
Feb.	6, 1912	Mercer Transfer Co., drayage	8666	9.46
Feb.	23, 1912	Onion Paper Co., mailing cases (4975)	8667	41.05
Feb.	23, 1912	W. P. Hohenschuh, 1 dozen files and cards	8668	4.75
Feb.	14, 1912	Iowa City Iron Works, work on sterilizer	8669	10.15
Feb.	29, 1912	Iowa City Gas & Electric Co., 1 miniature arc	8670	3.00
Mar.	12, 1912	Henry Albert, postage	8671	25.00
Mar.	6, 1912	Johannes Andersen, hauling blood	8672	2.00
Feb.	15, 1912	C. A. Webber Printing Co., diph. blanks	8673	4.45
				$ 407.36

IOWA STATE BOARD OF HEALTH BACTERIOLOGICAL LABORATORY
Henry Albert, Director.

Apr.	12, 1912	Jessie B. Hudson, 9 days salary	8674	$ 32.22
Apr.	12, 1912	A. C. Echternacht, 21 days salary	8675	88.61
Apr.	12, 1912	M. F. Boyd, salary April	8676	25.00
Apr.	12, 1912	Anna Stach, salary April	8677	45.00
Apr.	12, 1912	Leo Musgrove, salary April	8678	58.00
Apr.	12, 1912	U. S. Express Co., expressage	8679	8.87
Apr.	12, 1912	American Express Co., expressage	8680	10.05
Mar.	30, 1912	Iowa City Gas & Electric Co. mantles	8681	2.40
Apr.	9, 1912	Edward Bartow, regulators, etc.	8682	26.50
Feb.	10, 1912	State University of Iowa, ice box, work	8683	33.62
Mar.	26, 1912	H. C. Wieneke, rubber stamps and pad	8684	1.50
Apr.	12, 1912	W. P. Hohenschuh, 1,000 index cards	8685	2.15
Apr.	12, 1912	Davenport Bag & Paper Co., 3 rolls	8686	6.93
Apr.	5, 1912	Geo. D. Barth, animal feed	8687	5.73
Apr.	12, 1912	Mercer Transfer Co., drayage	8688	5.68
Apr.	12, 1912	Whitall Tatum Co., jars and corks	8689	198.70
Apr.	12, 1912	Frank S. Betz Co., 10 syringes	8690	10.50
Apr.	12, 1912	Johannes Andersen, hauling blood	8691	2.00
Apr.	12, 1912	Henry Albert, postage	8692	25.00
Apr.	12, 1912	University Book Store, supplies	8693	.65
				$ 589.11

IOWA STATE BOARD OF HEALTH BACTERIOLOGICAL LABORATORY
Henry Albert, Director.

May	13, 1912	A. C. Echternacht, May salary	8695	$ 120.83
May	13, 1912	M. F. Boyd, May salary	8696	25.00
May	13, 1912	Anna Stach, May salary	8697	45.00
May	13, 1912	Leo Musgrove, May salary	8698	58.00
May	13, 1912	U. S. Express Co., expressage	8699	9.26
May	13, 1912	Iowa Telephone Co., rent	8700	6.75

			Voucher No.	
May	13, 1912	Miller Drug Sundry Co., 12 prs. gloves	8701	19.00
May	13, 1912	Mercer Transfer Co., drayage	8702	12.13
May	13, 1912	Geo. D. Barth, animal feed	8703	5.10
May	13, 1912	H. C. Wieneke, 3 rubber stamps	8704	.65
May	13, 1912	Bausch & Lomb. Opt. Co., supplies	8705	57.69
May	13, 1912	Improved Mailing Case Co., tin cans	8706	171.12
May	13, 1912	W. S. Thomas, supplies	8707	2.99
May	13, 1912	Johannes Andersen, hauling blood	8708	6.00
May	13, 1912	American Express Co., expressage	8709	9.84
May	13, 1912	Henry Albert, postage	8710	20.00
				$ 569.36
Amount in fund				992.28
Amount in fund after expenditure of bills as listed above				$ 422.92

IOWA STATE BOARD OF HEALTH BACTERIOLOGICAL LABORATORY
Henry Albert, Director.

June	13, 1912	A. C. Echternacht, salary June	8711	$ 120.83
June	13, 1912	M. F. Boyd, salary June	8712	25.00
June	13, 1912	Anna Stach, salary June	8713	45.00
June	13, 1912	Leo Musgrove, salary June	8714	58.00
June	13, 1912	American Express Co., expressage	8715	11.70
June	13, 1912	U. S. Express Co., expressage	8716	7.91
June	13, 1912	Postal Telegraph Co., message	8717	.25
June	13, 1912	Johannes Andersen, hauling blood, etc.	8718	11.90
June	13, 1912	Smith & Cilek, 2 brass hangers	8719	.30
June	13, 1912	John T. Ries, supplies	8720	16.87
June	13, 1912	Bausch & Lomb Opt. Co., 2 objectives	8721	7.20
June	13, 1912	W. P. Hohenschuh, supplies	8722	8.30
June	13, 1912	Jour. of Public Health, book	8723	1.25
June	13, 1912	H. A. Strub & Co., linen for cover glasses	8724	.85
June	13, 1912	C. I. Anderson, awning complete	8725	9.15
June	13, 1912	International Instrument Co., tags	8726	2.38
June	13, 1912	Iowa City Printing Co., mailing slips	8727	14.00
June	13, 1912	Iowa Telephone Co., toll	8728	5.25
June	13, 1912	G. D. Barth, animal feed	8729	1.65
June	13, 1912	Henry Albert, stamps	8730	35.00
June	13, 1912	The Citizens Printing House, printing	8731	13.00
June	13, 1912	University Book Store, supplies	8732	.85
				$ 396.64

$422.92 less $396.64 leaves $26.28.

IOWA STATE BOARD OF HEALTH BACTERIOLOGICAL LABORATORY.

Henry Albert, Director.

Amount in fund after payment of June bills			$ 26.28
June 18, 1912	Ernst Leitz, double ocular	8433	$ 19.50
June 18, 1912	Henry Albert, postage	8434	6.78
			$ 26.28
Amount in fund after payment of above bills			$

IOWA STATE BOARD OF MEDICAL EXAMINERS.

SUMMARY FOR QUARTER ENDING SEPTEMBER 30, 1910.

Receipts for the quarter	$ 925.00
Expenditures for quarter	569.98
Balance on hand Sept. 30, 1910	$ 355.02

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 466.00
Salaries and clerk hire	75.00
Expressage	3.30
Miscellaneous	25.68
	$ 569.98

MEMBERS' EXPENSE.

September	17	A. C. Moerke	$ 32.00
September	17	T. U. McManus	12.25
September	17	E. E. Richardson	16.00
September	17	E. E. Richardson	28.00
September	17	A. P. Hanchett	40.00
September	17	A. de Bey	76.00
September	17	G. E. Decker	28.25
September	17	A. C. Moerke	28.25
September	17	T. U. McManus	28.00
September	17	A. P. Hanchett	32.00
September	19	G. E. Decker	18.25
September	19	E. E. Richardson	27.00
September	19	B. L. Elker	28.00
September	19	B. L. Elker	32.00
September	19	A. de Bey	40.00
			$ 466.00

SALARIES AND CLERK HIRE.

July	30	G. H. Sumner, secretary, salary for July	$ 25.00
August	31	G. H. Sumner, secretary, salary for August	25.00
September	30	G. H. Sumner, secretary, salary for September	25.00
			$ 75.00

EXPRESS.

September	17	U. S. Express Co.	$ 2.35
September	17	Adams Express Co.	.45
September	17	Wells Fargo & Co., express	.50
			$ 3.30

MISCELLANEOUS.

September	17	Baker-Trisler Co.	$ .43
September	17	Underwood Typewriter Co.	9.00
September	17	Capital City Commercial College	16.25
			$ 25.68

IOWA STATE BOARD OF MEDICAL EXAMINERS.

SUMMARY OF EXPENSES FOR QUARTER ENDING DECEMBER 31, 1910.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 519.25
Printing	46.00
Salaries and clerk hire	75.00
Postage	60.00
Express	4.50
Miscellaneous	32.24
	$ 736.99

MEMBERS' EXPENSE.

October	7	Geo. E. Decker	$ 24.25
October	7	B. L. Elker	17.75
October	8	E. E. Richardson	12.00
October	8	E. E. Richardson	20.00
October	8	A. C. Moerke	41.75
October	8	A. P. Hanchett	35.00
October	8	Albert de Bey	24.00
October	8	Albert de Bey	32.00
November	1	B. L. Elker	24.25
November	1	B. L. Elker	32.00
November	1	E. E. Richardson	28.00
November	1	A. C. Moerke	28.00
November	1	T. U. McManus	44.00
November	1	T. U. McManus	28.00
November	18	A. de Bey	32.00
November	18	A. P. Hanchett	56.00
November	18	G. E. Decker	32.25
December	31	E. E. Richardson	8.00
			$ 519.25

PRINTING AND BINDING.

November	1	Kenyon Printing Co.	$ 46.00

MISCELLANEOUS.

November	1	Baker-Trisler Co.	$ 7.02
November	1	W. H. Zaiser Co.	1.60
November	1	Capital City Commercial College	1.00
November	1	Addressograph Co.	2.00
December	2	Baker-Trisler Co.	12.50
December	2	Des Moines Rubber Stamp Works	4.50
December	2	Capital City Commercial College	3.62
			$ 32.24

SALARIES AND CLERK HIRE.

October	31	G. H. Sumner, salary for October	$ 25.00
November	30	G. H. Sumner, salary for November	25.00
December	31	G. H. Sumner, salary for December	25.00
			$ 75.00

POSTAGE.

December	2	J. I. Myerly, P. M.	$ 60.00

EXPRESS.

November	1	U. S. Express Co.	$ 1.50
November	1	American Express Co.	2.10
December	2	Wells Fargo & Co. Express	.35
December	2	U. S. Express Co.	.55
			$ 4.50

Balance on hand September 30, 1910	$ 355.02
Total receipts for quarter	810.00
	$1,165.02
Total expenses for quarter	736.99
Balance on hand December 31, 1910	$ 428.03

IOWA STATE BOARD OF MEDICAL EXAMINERS.

SUMMARY FOR QUARTER ENDING MARCH 31, 1911.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$379.08
Salaries	75.00
Printing and stationery	61.05
Expressage	1.42
Miscellaneous	34.76
	$551.31

MEMBERS' EXPENSE.

January	3	E. E. Richardson	$ 3.58
March	1	A. de Bey	24.00
March	1	A. de Bey	48.00
March	1	E. E. Richardson	27.00
March	1	E. E. Richardson	36.00
March	1	G. E. Decker	36.25
March	1	A. C. Moerke	36.00
March	1	A. P. Hanchett	24.00
March	1	B. L. Eiker	36.25
March	17	A. C. Moerke	41.75
March	17	G. E. Decker	42.25
March	17	A. de Bey	24.00
Total			$379.08

SALARIES AND CLERK HIRE.

January	31	G. H. Sumner, secretary, salary for January	$ 25.00
February	28	G. H. Sumner, secretary, salary for February	25.00
March	31	G. H. Sumner, secretary, salary for March	25.00
			$ 75.00

PRINTING AND STATIONERY.

January	3	Geo. A. Miller Printing Co.	$ 13.50
February	2	Iowa Lithographing Co.	25.75
March	1	Homestead Printing Co.	17.50
March	1	Iowa Lithographing Co.	4.30
			$ 61.05

EXPRESSAGE.

March	1	American Express Co.	$ .80
March	1	U. S. Express Co.	.46
March	1	Adams Express Co.	.16
			$ 1.42

MISCELLANEOUS.

January	3	Baker-Trisler Co.	$ .43
January	3	Des Moines Rubber Stamp Works	1.50
February	2	Baker-Trisler Co.	28.73
March	1	Baker-Trisler Co.	.85
March	1	Capital City Commercial College	3.25
			$ 34.76

Balance on hand January 1, 1911	$ 428.03
Paid Treasurer of State March 4, 1911	1,283.00
Total	$1,711.03
Total expenditures for quarter	551.31
Balance on hand March 31, 1911	$1,159.72

IOWA STATE BOARD OF MEDICAL EXAMINERS.

SUMMARY FOR QUARTER ENDING JUNE 30, 1911.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 565.00
Salaries and clerk hire	75.00
Other official	33.59
Drawing and engraving	19.38
Printing and stationery	507.12
Books and periodicals	78.25
Postage	113.00
Express	7.55
Telegraph	2.24
Miscellaneous	179.22
	$1,580.35

SALARIES AND CLERK HIRE.

April	G. H. Sumner, secretary	$ 25.00
May	G. H. Sumner, secretary	25.00
June	G. H. Sumner, secretary	25.00
		$ 75.00

MEMBERS' EXPENSE.

April	A. P. Hanchett	$ 24.00
April	E. E. Richardson	24.00
May	B. L. Eiker	24.00
May	T. U. McManus	64.00
May	E. E. Richardson	20.00
May	A. de Bey	32.00
May	G. E. Decker	24.00
May	A. C. Moerke	12.00
May	A. P. Hanchett	24.00
June	A. C. Moerke	32.00
June	A. C. Moerke	141.00
June	G. E. Decker	144.00
		$ 565.00

OTHER OFFICIAL.

May	B. L. Eiker	$ .25
May	T. U. McManus	.25
May	G. E. Decker	.25
May	G. H. Sumner	21.27
May	H. W. Grefe	11.32
May	G. E. Decker	.25
		$ 33.59

DRAWING AND ENGRAVING.

May		Des Moines Engraving Co.	$ 19.38

PRINTING AND STATIONERY.

April	3	Homestead Printing Co.	$ 15.00
May	17	Homestead Printing Co.	80.00
May	17	Sioux County Herald	4.50
June	1	Homestead Printing Co.	86.66
June	1	Pratt Mendsen Paper Co.	51.71
June	1	Homestead Printing Co.	27.50
June	1	H. P. Oggel	3.00
June	1	C. A. Webber	7.00
June	1	Homestead Printing Co.	125.00
June	1	Homestead Printing Co.	80.00
June	1	Pratt-Mendsen Paper Co.	12.75
June	1	Homestead Printing Co.	14.00
			$ 507.12

BOOKS AND PERIODICALS.

June		J. P. Lippencott	$ 62.00
June		A. C. Webster	16.25
			$ 78.25

POSTAGE.

June		L. C. Kurtz	$ 113.00

EXPRESS.

April		American Express Co.	$ 1.20
April		Adams Express Co.	.64
April		Adams Express Co.	.38
May		U. S. Express Co.	.30
June		Pacific Express Co.	1.53
June		Wells Fargo Express Co.	3.50
			$ 7.55

TELEGRAPH.

June	1	Western Union Telegraph Co.	$ 2.24

MISCELLANEOUS.

April		Baker Trisler Co.	$ 6.27
April		Pratt Mendsen Co.	8.40
April		Pratt Mendsen Co.	.90
May		Baker Trisler Co.	1.25
May		Baker Trisler Co.	1.01
May		Younker Brothers	1.39
June		Cap. City Com. College	4.00
June		Baker Trisler Co.	36.48
June		Pratt Mendsen Co.	14.50

June	Baker Trisler Co.	7.92
June	Am. Med. Association	5.00
June	Davidson Brothers	92.10
		$ 179.22
Balance on hand March 31, 1911		$1,159.72
Paid Treasurer, June 2, 1911		855.00
Total		$2,014.72
Total expense for quarter		1,580.35
Balance on hand, June 30, 1911, charged off		$ 434.37

IOWA STATE BOARD OF MEDICAL EXAMINERS.

SUMMARY FOR QUARTER ENDING SEPTEMBER 30, 1911.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 892.00
Other official expense	79.39
Salaries	75.00
Printing and stationery	1.75
Express	5.75
Miscellaneous	3.05
Total	$ 1,056.94

MEMBERS' EXPENSE.

September 6	A de Bey	$ 40.00
September 21	A. de Bey	120.00
September 21	A. de Bey	24.00
September 6	A. C. Moerke	12.00
September 6	G. A. Smith	40.00
September 6	B. L. Eiker	12.00
September 6	T. U. McManus	32.00
September 6	T. U. McManus	120.00
September 21	T. U. McManus	48.00
September 21	E. E. Richardson	184.00
September 21	B. L. Eiker	92.00
September 21	B. L. Eiker	32.00
September 21	G. A. Huntoon	96.00
September 21	G. E. Decker	40.00
		$ 892.00

OTHER OFFICIAL EXPENSE.

September 6	A. de Bey	$ 33.74
September 6	A. C. Moerke	.25
September 21	T. U. McManus	17.80
September 21	T. U. McManus	2.50
September 21	T. U. McManus	5.25
September 21	E. E. Richardson	6.00

September 21	B. L. Eiker	3.25
September 21	G. A. Huntoon	6.35
September 21	G. E. Decker	4.25
		$ 79.39

SALARIES.

July 31	G. H. Sumner	$ 25.00
August 31	G. H. Sumner	25.00
September 30	G. H. Sumner	25.00
		$ 75.00

PRINTING AND STATIONERY.

September 8	H. P. Oggle	$ 1.75

EXPRESS.

September 8	American Express Co.	$ 2.80
September 8	United States Express Co.	2.00
September 8	Wells Fargo Express Co.	.50
September 8	Am. Express Co.	.45
		$ 5.75

MISCELLANEOUS.

September 8	Des Moines Stationery Co.	$ 2.00
September 8	Smith Premier Type Co.	1.05
		$ 3.05
		$ 1,056.94
August 11	Paid State Treasurer	$ 2,132.00
September 27	Paid State Treasurer	178.00
		$ 2,310.00
Total expense for quarter ending Sept. 30, 1911		$ 1,056.94
Balance on hand Sept. 30, 1911		$ 1,253.06

IOWA STATE BOARD OF MEDICAL EXAMINERS.

SUMMARY FOR QUARTER ENDING DECEMBER 30, 1911.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 662.00
Other official	225.44
Salaries	75.00
Printing and stationery	130.70
W. U. Telegraph Co.	2.59
Express	4.18
Miscellaneous	43.21
	$ 1,143.12

MEMBERS' EXPENSE.

October	2	G. A. Huntoon	$ 104.00
October	2	B. L. Eiker	16.00
October	17	T. U. McManus	24.00
November	2	G. A. Smith	66.00
November	2	E. E. Richardson	56.00
November	2	B. L. Eiker	20.00
November	2	E. E. Richardson	28.00
November	2	B. L. Eiker	28.00
November	2	A. de Bey	40.00
November	2	A. de Bey	80.00
November	29	T. U. McManus	44.00
November	29	A. de Bey	48.00
November	29	G. A. Smith	40.00
December	15	G. F. Severs	40.00
December	15	G. F. Severs	28.00
			$ 662.00

OTHER OFFICIAL EXPENSE.

October	2	G. A. Huntoon	$ .25
October	2	B. L. Eiker	1.75
October	17	T. U. McManus	2.75
November	2	E. E. Richardson	3.00
November	2	E. E. Richardson	23.91
November	2	B. L. Eiker	18.20
November	2	A. de Bey	28.27
November	29	T. U. McManus	12.04
November	29	A. de Bey	55.41
November	29	G. A. Smith	23.52
December	15	G. F. Severs	41.65
December	15	G. F. Severs	14.69
			$ 225.44

SALARIES.

October	31	G. H. Sumner, secretary	$ 25.00
November	30	G. H. Sumner, secretary	25.00
December	30	G. H. Sumner, secretary	25.00
			$ 75.00

PRINTING AND STATIONERY.

October	2	McNamara-Kenworthy	$ 12.22
November	2	American Lith. Co.	53.40
November	2	Lea Febiger Co. (book)	9.50
November	29	The Homestead Printing Co.	55.58
			$ 130.70

TELEGRAPH.

November	29	Western Union Telegraph Co.	$ 2.59

EXPRESS.

October	2	U. S. Express Co.	$ .75
November	2	American Express Co.	1.27
November	2	Wells Fargo Express Co.	.71
November	2	U. S. Express Co.	.55
November	2	U. S. Express Co.	.30
November	29	American	.60
			$ 4.18

MISCELLANEOUS.

October	2	Capital City Commercial College	$ 13.00
October	2	McNamara-Kenworthy Co.	1.45
October	2	McNamara-Kenworthy Co.	6.00
October	2	McNamara-Kenworthy Co.	.40
November	2	McNamara-Kenworthy Co.	14.50
November	2	McNamara-Kenworthy Co.	4.61
November	29	Cap. City Com. College	3.25
			$ 43.21

	$ 1,143.12
Balance on hand Sept. 30, 1911	$ 1,253.06
Paid Treasurer, Nov. 3	1,207.00
Total	$ 2,460.06
Expense for quarter ending Dec. 30, 1911	1,143.12
Balance on hand Dec. 30, 1911	$ 1,316.94

IOWA STATE BOARD OF MEDICAL EXAMINERS.

SUMMARY FOR QUARTER ENDING MARCH 30, 1912.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 520.00
Other official	187.41
Salaries and clerk hire	75.00
Printing and stationery	92.10
Books and periodicals	3.50
Express	.82
Miscellaneous	10.75
	$ 889.58

MEMBERS' EXPENSE.

February	23	G. F. Severs	$ 32.00
February	23	T. U. McManus	108.00
February	23	E. E. Richardson	28.00
February	23	G. A. Huntoon	24.00

February	23	G. A. Smith	40.00
February	23	A. de Bey	16.00
February	23	A. de Bey	48.00
February	23	B. L. Eiker	16.00
February	23	B. L. Eiker	28.00
February	23	G. A. Huntoon	140.00
March	1	G. F. Severs	40.00
			$ 520.00

OTHER OFFICIAL EXPENSE.

February	23	G. F. Severs	$ 16.98
February	23	T. U. McManus	29.40
February	23	E. E. Richardson	15.56
February	23	G. A. Smith	25.08
February	23	A. de Bey	33.70
February	23	B. L. Eiker	2.75
February	23	B. L. Eiker	15.94
February	23	G. A. Huntoon	46.10
March	1	G. F. Severs	1.90
			$ 187.41

SALARIES AND CLERK HIRE.

January		G. H. Sumner, secretary	$ 25.00
February		G. H. Sumner, secretary	25.00
March		G. H. Sumner, secretary	25.00
			$ 75.00

PRINTING AND STATIONERY.

January		H. P. Oggel	$ 4.75
February	23	Homestead Printing Co.	7.35
February	23	Homestead Printing Co.	80.00
			$ 92.10

BOOKS AND PERIODICALS.

January	17	Iowa Demical Journal	$ 3.50

EXPRESS.

January	17	United States Express Co.	$ .62
February	23	Adams	.20
			$ .82

MISCELLANEOUS.

February	1	Underwood Typewriter Co.	$ 9.00
February	23	Cap. City Com. College	1.75
			$ 10.75
			$ 889.58
Balance on hand December 30, 1911			$ 1,316.94
Paid State Treasurer, Feb. 28			843.00
			$ 2,159.94
Total expenditures for quarter			889.58
Balance on hand March 30, 1912			$ 1,270.36

IOWA STATE BOARD OF MEDICAL EXAMINERS.

SUMMARY FOR QUARTER ENDING JUNE 30, 1912.

CLASSIFIED SUMMARY OF EXPENSES.

Members' expense	$ 1,088.00
Other official expense	362.57
Salaries and clerk hire	75.00
Printing and stationery	118.70
Books and periodicals	6.00
Express	2.13
Postage	113.00
Legal instruments	6.50
Telegrams	4.63
Miscellaneous	103.83
	$ 1,880.36

MEMBERS' EXPENSE.

April	2	A. de Bey	$ 20.00
April	2	G. A. Smith	88.00
April	18	T. U. McManus	36.00
May	1	B. L. Eiker	32.00
May	17	T. U. McManus	32.00
May	17	G. F. Severs	32.00
May	17	G. A. Smith	40.00
May	17	B. L. Eiker	32.00
June	5	A. de Bey	40.00
June	5	G. A. Huntoon	88.00
June	6	E. E. Richardson	84.00
June	19	T. U. McManus	36.00
June	19	G. F. Severs	16.00
June	19	A. de Bey	32.00
June	19	G. A. Smith	80.00
July	2	E. E. Richardson	60.00
July	2	B. L. Eiker	8.00
July	2	B. L. Eiker	32.00
July	2	G. A. Smith	16.00
July	2	A. de Bey	24.00
July	17	T. U. McManus	128.00
July	2	G. F. Severs	12.00
July	2	G. A. Smith	104.00
July	2	G. F. Severs	88.00
			$ 1,160.00

OTHER OFFICIAL EXPENSE.

April	2	G. A. Smith	$ 4.00
April	2	A. de Bey	5.25
April	18	T. U. McManus	29.70
May	1	B. L. Eiker	1.25
May	17	T. U. McManus	17.44

May	17	G. F. Severs	17.26
May	17	G. A. Smith	28.14
May	17	B. L. Eiker	15.43
June	5	A. de Bey	30.74
June	6	E. E. Richardson	19.26
June	19	T. U. McManus	.25
June	19	G. F. Severs	1.54
July	2	E. E. Richardson	13.56
July	2	B. L. Eiker	9.97
July	2	B. L. Eiker	3.00
July	2	G. H. Sumner	11.70
July	2	H. W. Grefe	11.37
July	2	G. A. Smith	8.80
July	2	G. A. Smith	16.70
July	2	A. de Bey	19.27
July	17	T. U. McManus	17.34
July	17	G. F. Severs	8.24
July	17	G. F. Severs	.36
			$ 290.57

SALARIES AND CLERK HIRE.

April	30	G. H. Sumner	$ 25.00
May	31	G. H. Sumner	25.00
June	29	G. H. Sumner	25.00
			$ 75.00

PRINTING AND STATIONERY.

May	1	H. P. Oggle & Son	$ 1.30
July	2	Homestead Printing Co.	60.00
August	5	H. P. Oggle & Son	3.00
August	5	Pratt Paper Co.	32.00
August	5	Homestead Printing Co.	22.40
			$ 118.70

BOOKS AND PERIODICALS.

July	6	American Medical Association	$ 6.00

EXPRESS.

April	2	American Express Co.	$ .70
April	2	Adams Express Co.	.58
April	2	Wells Fargo Express Co.	.20
May	1	American Express Co.	.25
June	2	Adams Express Co.	.20
June	2	American Express Co.	.20
			$ 2.13

POSTAGE.

August	5	L. C. Kurtz, P. M.	$ 113.00

LEGAL INSTRUMENTS.

July	2	Dudley & Weaver	$ 3.00
July	2	T. S. Petitt	3.50
			$ 6.50

TELEGRAPH.

April	2	Western Union Tel. Co.	$ .65
June	3	Western Union Tel. Co.	2.23
July	2	Western Union Tel. Co.	1.75
			$ 4.63

MISCELLANEOUS.

May	1	McNamara-Kenworthy Co.	$ 6.50
June	3	H. W. Grefe	5.00
June	3	Capital City Commercial College	3.50
July	2	D. M. Stationery Co.	67.77
July	2	D. M. Stationery Co.	10.35
August	5	McNamara-Kenworthy Co.	10.71
			$ 103.83

Balance on hand March 30, 1912	$ 1,270.36
Paid State Treasurer, May 21, 1912	610.00
	$ 1,880.36
Expense of fourth quarter	$ 1,880.36

OPTOMETRY BOARD OF EXAMINERS.

SUMMARY OF FINANCIAL STANDING FOR BIENNIAL PERIOD, JULY 1, 1910, TO JUNE 30, 1912.

RECEIPTS.

Appropriation by 34th General Assembly	$ 300.00
Exemption fee received (one)	10.00
Examination fees received (eight) at $15 each	120.00
Total receipts	$ 430.00

EXPENDITURES.

Members' expense	$ 285.66
Postage	15.00
Attorneys' and sheriffs' fees	4.10
Telephone and telegraph	.35
Expressage	.85
Miscellaneous	84.70
Total expenditures	$ 390.68
Amount charged off from appropriation June 30, 1911	5.00
Balance on hand June 30, 1912	$ 34.32

DEPARTMENT OF VITAL STATISTICS.

SUMMARY OF EXPENSES FOR QUARTER ENDING SEPTEMBER 30, 1910.

CLASSIFIED SUMMARY OF EXPENSES.

Salaries and clerk hire	$	422.50
Printing and stationery		292.41
Total	$	714.91

SALARIES AND CLERK HIRE.

July	30	Mae Valentine	$ 75.00
July	30	Emma Valentine	75.00
August	31	Mae Valentine	75.00
August	31	Emma Valentine	75.00
September	29	Mae Valentine (21 days)	52.50
September	29	Emma Valentine (21 days)	52.50
September	29	Addie McQuiston (5 days)	10.00
September	29	Pauline Mueller (5 days)	7.50
			$ 422.50

PRINTING AND STATIONERY.

July	20	J. H. Welch Ptg. Co.	$ 24.50
July	20	J. H. Welch Ptg. Co.	47.75
July	20	J. H. Welch Ptg. Co.	49.00
July	20	J. H. Welch Ptg. Co.	27.41
July	20	J. H. Welch Ptg. Co.	13.50
July	20	J. H. Welch Ptg. Co.	26.50
July	20	J. H. Welch Ptg. Co.	1.75
July	20	G. A. Miller Ptg. Co.	2.00
July	20	G. A. Miller Ptg. Co.	1.50
July	20	J. H. Welch Ptg. Co.	19.50
September	15	J. H. Welch Ptg. Co.	35.00
September	15	J. H. Welch Ptg. Co.	34.50
			$ 292.41

Appropriation for 1910-1911	$	2,000.00
Amount overdrawn last quarter		75.08
	$	1,924.92
Total expense for first quarter		714.91
Balance on hand September 30, 1910	$	1,210.01

DEPARTMENT OF VITAL STATISTICS.

SUMMARY OF EXPENSES FOR QUARTER ENDING DECEMBER 31, 1910.

CLASSIFIED SUMMARY OF EXPENSES.

Salaries and clerk hire	$	340.00
Postage		54.84
Printing and stationery		105.50
Express		.25
	$	500.59

SALARIES AND CLERK HIRE.

October	31	Addie McQuiston	$ 60.00
October	31	Pauline Mueller	50.00
November	30	Addie McQuiston	60.00
November	30	Pauline Mueller	55.00
December	31	Addie McQuiston	60.00
December	31	Pauline Mueller	55.00
			$ 340.00

PRINTING AND STATIONERY.

October	18	J. H. Welch Printing Co.	$ 35.00
November	18	Homestead Printing Co.	19.00
December	17	Homestead Printing Co.	51.50
			$ 105.50

EXPRESS.

October	18	Wells Fargo & Co., express	$ .25

POSTAGE.

October	18	G. H. Sumner	$ 2.84
November	30	J. I. Myerly	52.00
			$ 54.84

Balance on hand September 30, 1910	$	1,210.01
Expenses for quarter ending December 30, 1910		500.59
Balance on hand December 31, 1910	$	709.42

DEPARTMENT OF VITAL STATISTICS.

SUMMARY OF EXPENSES FOR QUARTER ENDING MARCH 31, 1911.

CLASSIFIED SUMMARY OF EXPENSES.

Salaries and clerk hire	$	202.50
Printing and stationery		240.23
Express		2.62
	$	445.35

SALARIES AND CLERK HIRE.

January	31	Pauline Mueller	$ 55.00
February	28	Pauline Mueller	55.00
March	31	Pauline Mueller	55.00
May	31	B. H. Rasch	37.50
			$ 202.50

PRINTING AND STATIONERY.

January	20	Iowa Lithographing Co.	$ 25.75
January	20	Homestead Printing Co.	19.00
February	23	Homestead Printing Co.	124.98
March	28	J. H. Welch Printing Co.	51.50
March	28	Homestead Printing Co.	19.00
			$ 240.23

EXPRESS.

January	20	American Express Co	$ .30
February	23	Adams Express Co	.22
February	23	Wells Fargo & Co., express	.10
March	28	U. S. Express Co	2.00
			$ 2.62

Balance on hand January 1, 1911	$ 709.42
Total expense for quarter	445.35
Balance on hand March 31, 1911	$ 264.07

DEPARTMENT OF VITAL STATISTICS.

SUMMARY OF EXPENSES FOR QUARTER ENDING JUNE 30, 1911.

CLASSIFIED SUMMARY OF EXPENSES.

Salaries and clerk hire	$ 210.00
Printing and stationery	38.00
Express	.16
L. C. Kurtz, P. M.	15.91
	$ 264.07

SALARIES AND CLERK HIRE.

April	30	Pauline Mueller	$ 55.00
April	30	B. H. Rasch	50.00
May	31	Pauline Mueller	55.00
March	31	B. H. Rasch	50.00
			$ 210.00

PRINTING AND STATIONERY.

April	29	The Homestead Ptg. Co	$ 19.00
May	22	The Homestead Ptg. Co	19.00
			$ 38.00

EXPRESS.

April	30	Wells Fargo Express Co	$ .16

POSTAGE.

June	30	L. C. Kurtz, P. M.	$ 15.91

Balance on hand March 31, 1911	$ 264.07
Expense for fourth quarter	264.07

DEPARTMENT OF VITAL STATISTICS.

SUMMARY OF EXPENSES FOR QUARTER ENDING SEPTEMBER 30, 1911.

CLASSIFIED SUMMARY OF EXPENSES.

Salaries	$ 385.00
Printing and stationery	254.50
Binding	72.90
Express	2.35
	$ 714.75

SALARIES AND CLERK HIRE.

July	31	Pauline Mueller	$ 75.00
August	31	Pauline Mueller	75.00
August	31	Ed Marke	75.00
September	30	Mrs. Isabel Sumner	85.00
September	30	Pauline Mueller	75.00
			$ 385.00

PRINTING, STATIONERY AND BINDING.

August	16	E. D. Chassell	$ 72.90
August	16	The Homestead Printing Co	214.50
September	13	The Homestead Printing Co	40.00
			$ 327.40

EXPRESS.

September	13	Wells Fargo Express Co	$ .70
September	13	United States Express Co	.35
September	13	United States Express Co	.65
September	13	Adams Express Company	.65
			$ 2.35

	$ 714.75
July 1st, amount of appropriation	$ 2,000.00
Amount of clerk hire	900.00
	$ 2,900.00
Total expenses for quarter ending September 30, 1911	714.75
Balance on hand September 30, 1911	$ 2,185.25

DEPARTMENT OF VITAL STATISTICS.

SUMMARY OF EXPENSES FOR QUARTER ENDING DECEMBER 30, 1911.

CLASSIFIED SUMMARY OF EXPENSES.

Salaries	$ 480.00
Printing and stationery	20.00
	$ 500.00

SALARIES.

October	31	Isabel Sumner	$ 85.00
October	31	Pauline Mueller	75.00
November	29	Isabel Sumner	85.00
November	29	Pauline Mueller	75.00
December	30	Isabel Sumner	85.00
December	30	Pauline Mueller	75.00
			$ 480.00

PRINTING AND STATIONERY.

November	29	The Homestead Printing Co.	$ 20.00
Balance on hand September 30, 1911			$2,185.25
Total expense for quarter ending December, 1911			500.00
Balance on hand December 30, 1911			$ 1,685.25

DEPARTMENT OF VITAL STATISTICS.

SUMMARY OF EXPENSES FOR QUARTER ENDING MARCH 30, 1912.

CLASSIFIED SUMMARY OF EXPENSES.

Salaries	$ 495.00
Printing and stationery	169.43
Express	17.04
	$ 681.47

SALARIES.

January	31	Mrs. I. Sumner	$ 90.00
January	31	Pauline Mueller	75.00
February	29	Mrs. I. Sumner	90.00
February	29	Pauline Mueller	75.00
March	30	Mrs. I. Sumner	90.00
March	30	Pauline Mueller	75.00
			$ 495.00

PRINTING AND STATIONERY.

January	2	The Homestead Printing Co.	$ 20.00
January	15	The Homestead Printing Co.	20.00
February	22	The Homestead Printing Co.	20.00
March	25	The Homestead Printing Co.	72.63
March	25	The Homestead Printing Co.	36.80
			$ 169.43

EXPRESS.

January	2	U. S. Express Co.	$ .45
March	25	American Express Co.	8.41
March	25	Adams Express Co.	8.02
March	25	Adams Express Co.	.16
			$ 17.04
			$ 681.47
Balance on hand December 30, 1911			$ 1,685.25
Expense for quarter ending March 30, 1912			681.47
Balance on hand March 30, 1912			$ 1,003.78

DEPARTMENT OF VITAL STATISTICS.

SUMMARY OF EXPENSES FOR QUARTER ENDING JUNE 29, 1912.

CLASSIFIED SUMMARY OF EXPENSES.

Salaries	$ 495.00
Printing and stationery	470.39
Postage	33.50
Express	4.89
	$ 1,003.78

SALARIES.

April	30	Isabel Sumner	$ 90.00
April	30	Pauline Mueller	75.00
May	31	Isabel Sumner	90.00
May	31	Pauline Mueller	75.00
June	29	Isabel Sumner	90.00
June	29	Pauline Mueller	75.00
			$ 495.00

PRINTING AND STATIONERY.

April	19	The Homestead Printing Co.	$ 59.15
April	19	The Homestead Printing Co.	58.50
June	21	The Homestead Printing Co.	156.65
June	29	The Homestead Printing Co.	140.00
June	29	The Homestead Printing Co.	56.09
			$ 470.39

POSTAGE.

June	29	L. C. Kurtz, P. M.	$ 33.50

EXPRESS.

April	19	Wells Fargo Express Co.	$ 4.89
Total expenses of quarter			$ 1,003.78
Balance on hand March 30, 1912			$ 1,003.78
Expense fourth quarter			1,003.78

VITAL STATISTICS FEES TURNED INTO THE STATE AND NOT USED BUT TURNED INTO THE GENERAL FUND OF THE STATE.

June 30, 1912. 473 certified copies of death certificates have been issued to this date, at 35c each, making a total of..... $ 165.55

This amount has been turned into the general fund of the state, as the Department of Vital Statistics has no authority to use any money appropriated or obtained in this way. The appropriation for this department is as follows:

Appropriation	$ 2,000.00
One clerk	900.00
Total	$ 2,900.00

It will be seen that the above $165.55 has been turned into the state for the use of the General Fund.

RULES AND REGULATIONS ADOPTED BY THE IOWA STATE BOARD OF HEALTH.

CHAPTER I.

QUARANTINE REGULATIONS.

Rule I.—The following diseases are subject to quarantine: scarlet fever, (including scarletina and scarlet rash), diphtheria, (including membranous croup), smallpox, epidermic cerebro-spinal meningitis, anterior poliomyelitis, cholera, leprosy and bubonic plague.

Rule II.—Quarantine shall be established by serving a written notice signed by the Mayor of the city or town, or the Clerk of the township, upon the head of the family or occupants of the premises and by posting in a conspicuous place upon each building, hall, lodging room, or place wherein exists or is suspected to exist a communicable disease, the following described sign: A yellow card not less than twelve inches square, having printed thereon in large letters the word "Quarantine," followed by the name of the disease and the words: "Notice! No person shall be permitted to enter or leave these premises except as provided by the Rules and Regulations of the State Board of Health."

Signed.....
Mayor or Township Clerk.

Rule III.—All cases of diseases listed in Rule I shall be immediately reported to the Mayor of the city or town, or Clerk of the township, by the physician, if any be in attendance, otherwise by the householder of the premises wherein such disease exists.

In every case a written notice shall also be sent within twenty-four (24) hours to the Mayor of the city or town or to the Township Clerk.

Rule IV.—Section 1.—It shall be the duty of the Mayor or Township Clerk, upon receiving notice of the existence of any case of scarlet fever, (including scarletina or scarlet rash), diphtheria, (including membranous croup), smallpox, epidemic cerebro-spinal meningitis, anterior poliomyelitis, cholera, leprosy or bubonic plague, to forthwith quarantine the premises as provided for in Rule 2 of this Chapter, and to take such other measures as may be necessary and proper for the restriction and suppression of such disease.

Sec. 2.—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, of every case of quarantinable 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.

REPORT OF QUARANTINABLE DISEASES.

DEPARTMENT OF PUBLIC HEALTH.

County_____

Date_____19____

To the Secretary, State Board of Health:

The following cases of quarantinable diseases were reported to this office today:

For Quarantine	No.	Total for month to date	For Quarantine	No.	Total for month to date
Scarlet Fever			Leprosy		
Diphtheria			Bubonic Plague		
Smallpox					
Cerebro-spinal Meningitis					
Anterior Poliomyelitis					
Cholera					
Total			Total		

_____M. D.
Health Officer

_____
Mayor-Clerk

City or Township of_____

TERMINATION OF QUARANTINE.

DEPARTMENT OF PUBLIC HEALTH.

County _____

Date_____19____

To the Secretary, State Board of Health:

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

	Recovery	Deaths
Scarlet Fever		
Diphtheria		
Smallpox		
Cerebro-spinal Meningitis		
Anterior Poliomyelitis		
Cholera		
Leprosy		
Bubonic Plague		
Total		

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

_____
Mayor-Clerk.

_____M. D.
Health Officer.

City or Township _____

Local Boards of Health must furnish the foregoing cards and comply with Rule IV. Section 2.

Sec. 3.—The Mayor of each city or town, and the Clerk of each township shall designate and detail certain peace officers as Sanitary Police.

Sec. 4.—Sanitary Police Officers shall visit all quarantined premises within their jurisdiction at least once in every twenty-four (24) hours to see that Quarantine is properly observed, and shall make daily report thereof to the Mayor or Clerk of the township.

Rule V.—If any person shall wilfully or maliciously, or without written authority, remove or deface or cause to be removed or defaced any quarantine sign or signal of danger, officially posted upon the quarantined premises, as provided by the Regulations of the State Board of Health, he shall be deemed to have violated the Regulations of the State Board of Health, and shall be prosecuted accordingly.

Rule VI.—Section 1.—Upon the termination of any of the diseases named in Rule 1, the attending physician or Health Officer shall report the fact in writing to the Mayor or Township Clerk who shall order the infected persons and infected premises, together with all persons, furniture, bedding, clothing and all other articles therein contained to be disinfected according to the Regulations of the State Board of Health and under the direction of the Local Board of Health, which shall direct the attending physician to superintend or perform the work. In case there be no attending physician or in case the attending physician refuses to perform the work or fails to perform it according to the Regulations of the State Board of Health, it shall be the duty of the Local Board of Health to provide some other suitable person to perform such work.

Sec. 2.—Any undertaker or person in charge of the funeral of any person, dying from tuberculosis, shall within forty-eight (48) hours after the death of such person report to the Mayor of the city or town, or to the Township Clerk, the name and residence of the deceased person, together with the cause of death. Upon receipt of the notice as herein provided, the Mayor of the city or town, or Clerk of the township shall cause said premises to be disinfected in accordance with the Regulations of the State Board of Health and the law as enacted by the Thirty-fourth General Assembly.

Sec. 3.—All bills and expenses incurred in carrying out the Rules and Regulations of the State Board of Health, and for all fumigating and disinfecting, must be provided for according to Chapter 156, Acts of the Thirty-third General Assembly and as amended by the Thirty-fourth General Assembly.

Rule VII.—Whenever any premises are quarantined, special attention must be given to all pet animals kept thereon. Cats and dogs shall be excluded from the house, and prevented from running at large. Before the quarantine is raised all such animals shall be thoroughly washed in a disinfecting solution. Special precautions must be taken to destroy all mice and rats. When flies are present, all doors and windows shall be securely screened and fresh fly paper placed in each room daily.

Rule VIII.—Quarantine shall be released only upon order of the Mayor or Township Clerk after receipt of a written report from the attending physician or Health Officer stating that the disease has terminated and that the premises and all infected persons have been properly disinfected in strict accordance with Rule 6, Chapter I. This report shall state the number of persons on the premises, the number who have suffered from the disease, their names, ages, when the disease appeared in each case and how it terminated.

When all regulations pertaining to quarantine and disinfection have been complied with the quarantine shall be released.

Rule IX.—No letters or other articles coming from quarantined premises shall under any circumstances be placed in any postoffice, letter box or rural delivery. If on account of carelessness or neglect, any such infected article shall have been placed in a postoffice, letter box or rural delivery, all such letters or articles together with such other articles as have come in contact therewith, shall be detained and immediately disinfected by the Health Officer, without unnecessary delay or removal from the custody of the postmaster. This rule is in accordance with the United States postal laws.

Rule X.—No person except the attending physician shall be permitted to enter or leave any premises while the same are under quarantine, except as specifically provided for by the Regulations of the State Board of Health and in strict accordance therewith. The Secretary or members of the State Board of Health may enter any premises under quarantine whenever, in their opinion, it is necessary for purposes of investigation or to enforce the Regulations of the State Board of Health.

CHAPTER II.

SPECIAL REGULATIONS.

Rule I.—Scarlet Fever.—Section 1. Quarantine shall be maintained in Scarlet Fever until the complete recovery of the patient, including complete desquamation, and this shall be certified to in writing by the attending physician or Health Officer.

Sec. 2.—In case the disease terminates either by death or recovery, quarantine may be released unless there are other children on the premises who have not had the disease, in which case the quarantine shall be maintained for 10 days after the date of death or recovery.

Sec. 3.—Quarantine shall not be released in any case until the infected persons and infected premises have been properly disinfected according to Rule 6, Chapter I.

Rule II.—Diphtheria.—Section 1. The period of quarantine for diphtheria shall be determined by release cultures whenever possible and the following rules shall be rigidly observed:

1. Each culture for release shall be taken by the attending physician from both nose and throat of the patient.

2. No culture for release shall be taken until five days after the disappearance of all membrane or inflammation of the nose or throat.

3. Second and subsequent cultures shall not be taken within twenty-four hours of the preceding culture.

4. All examinations of cultures for release shall be made by a bacteriologist appointed by the Director of the State Bacteriological Laboratory.

5. Quarantine shall not be released until two consecutive negative cultures are reported by the bacteriologist to the Mayor or Township Clerk.

6. The Local Health Officer may in any case take cultures and send them to the Bacteriological Laboratory for verification.

Sec. 2.—In case the culture method for release is not used quarantine shall be maintained for twenty-eight days from the beginning of the last case on the premises, provided however, that antitoxin was administered within the first twenty-four hours from the initial symptoms and the patient has made a complete recovery, and these facts are certified to in writing by the attending physician or Health Officer.

Sec. 3.—If the disease terminates by death, quarantine may be released unless there are other children on the premises, in which case quarantine must be maintained for ten days longer. In case the surviving children have been recently protected by immunizing doses of antitoxin and one negative culture has been made from the nose and throat of each, in accordance with the rules for release cultures, the quarantine may be released immediately.

Sec. 4.—Quarantine shall not be released in any case until the infected persons and infected premises have been properly disinfected according to Rule 6, Chapter I.

Rule III.—Smallpox.—Section 1.—Quarantine shall be maintained in smallpox until the complete recovery of the patient and until after complete desquamation, as certified to in writing by the attending physician or Health Officer.

Sec. 2.—In case of the termination of the disease by death quarantine may be released unless there are persons on the premises who are unprotected from smallpox, either by vaccination or having previously had smallpox, in which case the quarantine shall be continued for fourteen days longer.

Sec. 3.—Any person who has been vaccinated within three years, or who has had smallpox, may be released from quarantine upon proper disinfection of his person and clothing.

Sec. 4.—Quarantine shall not be released in any case until the infected persons and infected premises have been properly disinfected according to Rule 6, Chapter I.

Rule IV.—Vaccination.—Section 1.—Vaccination for smallpox is the introduction by scarification of the bovine vaccine virus through the skin.

Sec. 2.—In addition the Iowa courts have held that the administration by mouth of a proper preparation of variolinum constitutes a legal method of vaccination.

Rule V.—Meningitis.—Section 1.—In case of epidemic cerebro-spinal meningitis, quarantine shall be maintained until the recovery of the patient from the acute symptoms and this shall be certified to in writing by the attending physician or Health Officer.

Sec. 2.—In case the disease terminates by death, quarantine may be released after ten days from date of death.

Sec. 3.—Quarantine shall not be released in any case until the infected persons and infected premises have been properly disinfected according to Rule 6, Chapter I.

Rule VI.—Infantile Paralysis.—Section 1. Quarantine shall be maintained in anterior poliomyelitis (infantile paralysis or epidemic motor paralysis) for a period of twenty-one days from the beginning of the disease.

Sec. 2.—Disinfection of urine, feces, throat and nasal discharges shall be required in accordance with Chapter 3 of the Rules and Regulations for disinfection.

Sec. 3.—When the disease terminates either by death or recovery, quarantine may be released unless there are other persons on the premises who have not had the disease, in which case the quarantine shall be maintained for ten days after the date of death or recovery.

Sec. 4.—Quarantine shall not be released in any case until the infected persons and infected premises have been properly disinfected according to Rule 6, Chapter I.

Rule VII.—The breadwinner of the family quarantined for scarlet fever, diptheria, smallpox or anterior poliomyelitis may be permitted to pursue his usual avocation in the discretion of the Local Board of Health, but no person from the infected premises shall be permitted to attend any public gathering or school in any capacity or to travel upon any public conveyance. To obtain permission from the Local Board of Health to leave the premises, the breadwinner shall agree not to enter the sick room and he shall change his clothing upon leaving and entering the infected house and shall wash his face and hands in a disinfecting solution.

Rule VIII.—Cholera.—Section 1.—Quarantine shall be maintained in case of cholera until the complete recovery of the infected person and this shall be certified to in writing by the attending physician or Health Officer.

Sec. 2.—In case the disease terminates by death, quarantine shall be maintained for fourteen days from date of death.

Sec. 3.—Quarantine shall not be released in any case until the infected persons and infected premises have been properly disinfected according to Rule 6, Chapter I.

Rule IX.—Leprosy.—Section 1. All persons affected with leprosy shall be continuously confined upon their home premises. It shall be the duty of the Health Officer of the Local Board of Health to report to the Secretary of the State Board of Health the name, age, social condition and residence of all persons affected with this disease within the community over which he has jurisdiction, and the Local Board shall keep a record of the particulars required herein.

Rule X.—Bubonic Plague.—Section 1.—Quarantine shall be maintained in Bubonic plague until complete recovery of the infected person or persons.

Sec. 2.—In case the disease terminates by death, quarantine shall be be maintained for fourteen days from date of death.

Sec. 3.—Quarantine shall not be released in any case until the infected persons and infected premises have been properly disinfected according to Rule 6, Chapter I. In addition all pet animals and, in so far as possible, all rats and mice shall be destroyed.

Rule XI.—Dairy Products.—Section 1.—The sale of milk or dairy products from any quarantined premises is prohibited.

Sec. 2.—However, if the dairy and barn are situated a safe distance from the quarantined dwelling and if no person, utensil or water from the infected premises comes in contact with such dairy products, the Local Board of Health shall satisfy themselves of these facts and then may allow the said products to leave the premises.

Sec. 3.—But such products as have been exposed to infection shall not be sold or allowed to leave the premises.

Rule XII.—Release of Healthy Persons from Quarantine.—Any adult living on premises under quarantine or any child who has previously had the disease for which the quarantine has been established may be released from quarantine, after proper disinfection, by written order of the Local Board of Health, but persons so released shall not re-enter the premises until the quarantine is released. (In quarantine for smallpox, no unvaccinated person shall be released before the end of the quarantine period.)

Rule XIII.—All persons suffering from any disease subject to quarantine or residing upon premises infected with any such disease, shall be excluded from the public schools. The superintendent, teacher or other official in charge of any school, shall be held personally responsible for the enforcement of this regulation, and under no circumstances shall such superintendent, teacher or official allow any person so excluded to re-enter such school, except upon the presentation of a written permit, showing that such person has been properly disinfected and regularly released from quarantine. All such permits must be signed by the Mayor or Township Clerk, and by the Health Officer of the Local Board of Health. This regulation shall also apply to Academies, Seminaries and Colleges.

Rule XIV.—Section 1.—No person suffering from tuberculosis shall be permitted to attend any public or private school as a pupil, neither shall any such person be employed in any school in any capacity.

Sec. 2.—Whenever any person shall have reason to believe that this rule is being violated he shall so inform the Mayor or Township Clerk and it shall be the duty of the Local Board of Health to investigate the case and exclude said pupil or employe from school unless the Board is fully satisfied that said pupil or employe is not tubercular.

Sec. 3.—The Local Board of Health shall cause the Health Officer to procure from the suspected individual a sample of sputum or other discharge and shall forward this to the State Bacteriological Laboratory for examination, and shall use such other means as are usual and customary to determine the presence or absence of tuberculosis.

Sec. 4.—All examinations made by or for the Local Board of Health shall be free of expense to the patient.

CHAPTER III.

RULES FOR DISINFECTION.

Rule I.—Disinfection of Individuals.—Before being released from quarantine, all persons shall be subject to the following requirements:

Section 1.—They shall be removed to a room that has been properly disinfected.

Sec. 2.—The entire body, including the hair, shall be washed with a solution of bichloride of mercury (1 part to 3,000 parts of water) or a 2½% solution of carbolic acid.

Sec. 3.—They shall then be subjected to a full bath with soap and hot water, after which they shall be provided with clothing that has been disinfected or that has not been on the premises.

Rule II.—Disinfection of Premises.—For every 1,000 cubic feet of space to be disinfected the following materials and quantities shall be used:

Formalin (40% solution of formaldehyde).....11 ounces
Water .....11 ounces
Potassium permanganate (fine crystals)..... 9 ounces

Rule III.—Preliminary Preparations.—Before beginning disinfection, the requirements as prescribed in the following sections shall be complied with:

Section 1.—The person employed to do the disinfecting shall wear a cap and gown so constructed as to completely cover his clothing and shall cover his face with a piece of gauze. After all the arrangements have been completed, these garments shall be left on the premises to be disinfected in the same manner as other disinfected articles. The shoes worn by the operator should be covered with a pair of rubbers, otherwise they should also be disinfected with the other garments. This may be done by the use of Standard Disinfecting Solutions, 1 or 2, given in this chapter.

N. B.—See page 23, showing ilustration of cap and gown, and manner of covering the face. This is a simple method whereby one may properly prepare himself to enter a home where a contagious disease exists. Extreme care should be exercised in this regard.

Sec. 2.—All holes, cracks and other external apertures shall be sealed by pasting over them pieces of paper, or filling them with clean, damp cotton rags.

Sec. 3.—All bedding and other clothing, carpets and rugs should be hung on chairs, or upon lines streched across the room for that purpose. Books should be placed on edge or hung upon a line in such a manner as to spread the pages. Drawers, cupboards and trunks should be opened and while their contents need not be unnecessarily disarranged they should be loosened in such a manner as to give free access to the disinfecting gas. Windows should be securely closed, but left unlocked in order to admit of their being opened from the outside after the disinfection is complete.

Sec. 4.—When using formaldehyde, no open vessel containing water should be left in the room.

Sec. 5.—The temperature of the room shall in no case be below 60 degrees F. (preferably 70 deg. F. or above). If the atmosphere is unusually dry, the amount of moisture should be increased by boiling a kettle of water in the room, or by pouring boiling water from one vessel to another for five or ten minutes before beginning the disinfection.

Sec. 6.—A large washtub should be paced near the center of the room, conveniently situated so as to be seen through one of the windows. In this should be placed a tin or galvanized iron pail about twelve to sixteen inches deep. It is advisable to cover the outside of the pail with asbestos paper, leaving the top open.

Rule IV.—Mode of Operation.—Section 1.—When the room or house to be disinfected has been properly prepared in accordance with the above requirements, the proper quantity of potassium permanganate should be placed in the pail. The solution of 40 per cent formaldehyde mixed with water should be placed in a tin dipper or other vessel convenient for pouring rapidly, and when everything is in readiness, should be poured upon the crystals of permanganate of potash contained in the pail. The operator should immediately leave the room, closing the door and stopping all cracks in the manner indicated. This operation should be performed quickly, as the gas is generated very rapidly. The door should be locked in order to prevent accidents, and the room or building, as the case may be, kept closed for at least 8 hours. At the expiration of this time the windows should be opened from the outside, and in the space of 15 or 20 minutes the door may be opened, allowing the air to blow through the room. If the odor remaining is very strong, a little ammonia-water sprinkled upon the floor will soon neutralize the formaldehyde and hasten the disappearance of the odor.

Sec. 2.—After the fumigation as prescribed in this Rule has been completed, all bedding, clothing, etc., that will not be harmed by boiling,

should be boiled for at least half an hour. When possible, mattresses, rugs and heavy curtains should be sterilized by steam under pressure at 120 deg. C., for 30 minutes. When this is not possible, these articles should be taken out of doors and thoroughly aired and exposed to the rays of the sun for an hour or so.

Sec. 3.—Papers, cheap books, rags and other articles of little or no value should be burned.

In addition to the above requirements all woodwork and, if possible, the walls should be washed with a liquid disinfectant, such as a solution of bichloride of mercury, one part of bichloride of mercury to 1,000 parts of water. Where the wall paper is loose or dilapidated it should be removed and burned.

Rule V.—Disinfection of Vehicles.—Section 1.—All cabs, boats, hearses, and other vehicles used in the removal of a patient or the body of a person affected with, or who has died from any contagious or infectious disease, shall be disinfected in the manner defined in Section 2 of this Rule.

Sec. 2.—Remove all cushions, curtains and other accessories and place them in a small room or tight cupboard, and disinfect them in accordance with the requirements prescribed in Rule 4 of this Chapter. If the vehicle can be closed up, it should be fumigated in the same manner as prescribed in Rule 4 of this Chapter. If this is impracticable, it should be washed inside and out with a solution of bichloride of mercury, one part to 1,000 parts of water.

Rule VI.—Pet Animals.—All cats and dogs and other pet animals kept upon the premises infected with any contagious or infectiou diseases, shall be thoroughly washed with soap in a tub of hot water containing 5 per cent solution of carbolic acid.

Rule VII.—Additional Requirements.—When it is necessary to disinfect any premises and the presence of bedbugs or other vermin is suspected, sulphur must be used in addition to formaldehyde. The following is the most convenient and effective manner of using the same:

Place in the room a wash boiler containing about 6 to 8 inches of boiling water. Place a brick in the center of the water and upon this a sulphur candle. Light the candle and be sure that it is burning well before starting the formaldehyde fumigation. If possible the water in the wash boiler should be kept boiling by means of a stove or gas lamp.

N. B.—See illustration on page 20, and description connected therewith, showing a simple method of using sulphur. In this connection, it might be well to state that it is advisable that housekeepers read carefully the advice given on page 19, regarding home disinfection that is most thorough and far-reaching in its results as regards disease prevention.

Rule VIII.—Disinfection should always be done under the direction of the Local Board of Health, and under the personal supervision of the attending physician or the Health Officer. The person employed to do

the disinfecting should be one specially trained to understand the various methods to be used and the precautions to be observed, and should be held personally responsible to the Local Board of Health.

Rule IX.—Standard Disinfectants.—(All should be plainly labeled "POISON.")—Solution No. 1.—Carbolic Acid. Take 95 per cent carbolic acid, one-half pint; water, five quarts. May be used for sputum cups, washing furniture, metal surfaces, various secretions and exudates.

CAUTION.—This should not be used for the face or delicate skins.

Solution No. 2.—Carbolic Acid (2½ per cent solution). Mix one part of Sol. No. 1 with one part of water. May be used for washing hands, face or hair.

Solution No. 3.—Bichloride of Mercury Solution, 1 to 1,000.—Prepare by dissolving one drachm (60 grains) of corrosive sublimate in one gallon of boiled soft water. The ordinary solution of bichloride of mercury deteriorates in a very short time. A convenient way of using bichloride is by the use of specially prepared tablets which may be purchased at any drug store, or to have on hand a stock solution which will not deteriorate. This may be prepared as follows:

Bichloride of Mercury.....330½ grams
Citric Acid .....156 grams
Water .....20 liters or 5 gallons
A little coloring material.

M. Sig. One ounce of this solution mixed with one pint of water makes a solution of 1 to 1,000.

Prepare in a glass, earthen or wooden vessel (not in a metal vessel). It must not be used for disinfecting metal surfaces. Use for disinfecting hands, clothing, woodwork, discharges, etc. Good for sprinkling floors of offices and public buildings before sweeping.

Solution No. 4.—Bichloride of Mercury 1 to 3,000.—Mix one part of Sol. No. 3 with two parts of water. May be used for bathing entire body. Be careful about eyes.

Solution No. 5.—Chloride of Lime.—Dissolve six ounces of fresh chloride of lime (best quality) in one gallon of water. Especially useful for feces, urine and sputum.

NOTES.—Sunshine is Nature's best disinfectant, and should be utilized as much as possible. Let it enter the sick room freely.

Many of the so-called disinfectants that have been placed upon the market are absolutely worthless and should be avoided. Use the methods recommended by the State Board of Health.

CHAPTER IV.

SECRETARY OF THE STATE BOARD OF HEALTH SHALL SUPERVISE LOCAL BOARDS.

Rule I.—Section 1.—The Secretary of the State Board of Health is the Executive Officer of the Board. He shall have general supervision over

all Local Boards in the enforcement of quarantine and the prevention of infectious diseases. When he has reason to believe that the Regulations of this Board are not properly enforced by the Local Board of any city, town or township, and that the public health is endangered by reason of such neglect upon the part of any such Local Board, he shall instruct the officials of said Board regarding their duties, and in the event of their failure to conform to such instructions, shall notify the President of the State Board of Health, who may convene the State Board in special session, whereupon the said Board shall, if it deem necessary, immediately assume control within the territorial jurisdiction of such Local Board, and shall continue in control until such time as there is no further danger to the public. All expenses thus incurred by the State Board or its representatives, shall be paid as provided for in Section 2572 of the Code, as amended by Chapter 107, Acts of the 29th General Assembly.

Sec. 2.—The Secretary of the State Board of Health or any member thereof is hereby authorized to enter and leave any and all quarantined premises within the State, when necessary to make an investigation or to enforce the Regulations of the State Board of Health.

LOCAL BOARDS TO KEEP RECORD.

Rule II.—All Mayors of incorporated cities or towns, and all Township Clerks shall keep a complete record of all cases of communicable diseases reported within their jurisdiction; said record shall include the name of the disease, patient's name, age, sex, address, social condition, attending physician and nurse, together with the date quarantined, date released, date disinfected, person who disinfected the premises and such other information as may seem necessary. A copy of said record shall be forwarded to the Secretary of the State Board of Health by the 1st day of February in each year for the year ending January 1st preceding, and shall include all data up to and including December 31st preceding.

REPORT OF CONTAGIOUS DISEASES.

To Mayors and Township Clerks:

On page 2 of these Rules and Regulations will be found two postal card forms to be used in reporting Quarantinable Diseases to the Secretary of the State Board of Health. These postal card forms are very convenient and should be obtained at the expense of the city or township and kept on hand ready for use when a Quarantinable Disease makes its appearance in the community. It is hoped that Mayors and Township Clerks will obtain all of the forms given in these Rules and Regulations and use them according to the directions given by the State Board of Health. It is earnestly hoped that all health officials will put forth their best efforts to carry out all of the requirements as set forth in these pages.

A blank on page 14 is recommended to Mayors and Township Clerks, for the purpose of keeping a proper and complete record of all cases reported to them. These blanks should be printed and bound in book form. The leaves should be of two alternating colors, one for the original

and the other for the duplicate. The duplicate is made by placing a piece of carbon paper between the leaves. The original should be on white, while the duplicate can be on a light yellow, or any color that will make a good carbon copy.

REPORT OF CONTAGIOUS DISEASES.

.....Iowa.....19....

Disease .....
Patient .....
Age .....
Sex .....
Address .....
Social Condition .....
Attending Physician .....
Nurse .....
Date Quarantined .....
Date Released .....
Date Disinfection .....
Person who disinfected.....
Remarks .....
.....
.....
.....
.....

Signed.....
MAYOR OR TOWNSHIP CLERK.

HEALTH OFFICER, ELECTION, QUALIFICATIONS AND COMPENSATION.

Rule III.—Every Local Board of Health shall, at its first meeting in April of each year, elect a competent physician as Health Officer, whose term of office shall be one year, unless sooner removed by said Board or the acts of a body having superior jurisdiction. In the event of such removal, or if a vacancy occur from other causes, the Board shall immediately proceed to fill such vacancy. To be qualified for election as Health Officer, the person selected 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 of the county wherein he resides. The physician selected as Health Officer should be the most competent person available for this position. The salary of the Health Officer shall be determined by the Local Board of Health, and should be an amount sufficient to compensate him for the time and ability required to properly discharge the duties of his office.

DUTIES OF THE HEALTH OFFICER.

Rule IV.—The Health Officer shall be the sanitary adviser of the Local Board of Health, and in addition thereto shall personally inspect the schools and all public buildings and public utilities within the jurisdiction of the Local Board. He shall require the owners, managers, or superintendents of all such institutions to conduct and maintain the same in a proper sanitary condition, and order persons affected with any communicable disease or ailment excluded from the schools and other places used by the general public. All orders for the release of quarantine in incorporated cities or towns must have the approval of the Health Officer before such orders are valid. In cases of sickness where no physician is in attendance, the Health Officer shall investigate as to the character of such sickness, and report to the Mayor or Township Clerk, and in like circumstances, when the sickness is caused by a quarantinable disease, determine the fact of its termination. He shall also attend and represent his Local Board at the sanitary conferences called by the State Board of Health, his actual expenses therefor being allowed and paid by the Local Board of Health so represented.

REVOCATION OF PHYSICIAN'S CERTIFICATE.

Rule V.—If any physician or osteopath fail or neglect to conform to quarantine regulations or to report promptly to the Mayor or Township Clerk all cases of quarantinable disease to which he has been called professionally, that official shall make affidavit setting forth the facts and the names of witnesses thereto, and file same with the Secretary of the State Board of Health, whereupon the offender shall be cited to appear before the State Board of Medical Examiners and show cause why his certificate should not be suspended or revoked.

DISPOSAL OF NIGHT SOIL, SEWAGE, CREAMERY WASTES, FACTORY AND SHOP WASTES, AND GARBAGE.

Rule VI.—Section 1.—No privy vault, cesspool or reservoir into which a privy, water closet, sink or stable is drained, except it be water tight, shall be established or permitted in water-bearing strata or within one hundred (100) feet of any well, spring, or any other source of water used for drinking or culinary purposes.

Sec. 2.—All privy vaults, reservoirs or cesspools named in Section 1 shall be cleaned and emptied of their contents at least once every year, before the first day of May; and shall be kept thoroughly deodorized and disinfected by adding to the contents thereof, at least once each month or oftener if necessary, Calcium Hypochlorite as follows: Take the Calcium Hypochlorite in powder form and sprinkle over the contents until the odor is abated, stirring contents if necessary. All privy vaults within the limits of any city or town shall not be less than five (5) feet deep, and shall be constructed of brick set in cement, or of concrete construction, or two-inch tight lumber.

Sec. 3.—No privy vault, water closet, cesspool, sink or stable drain shall open into any ditch, stream or drain, except into the public sewers of the city or into disposal tanks equipped with aerated contact or trickling filters of ample area.

Sec. 4.—(a) All sewer drains leading to outfalls or disposal plants shall be constructed of standard vitrified sewer pipe, or standard cement sewer pipe, with the joints properly set in cement in such a manner as to make them water tight; and no sewer drain or outlet from any sewage disposal plant, except as hereinafter provided, shall empty into any lake, pond, creek, stream or open field.

(b) Septic tanks or other disposal tanks shall be made of water-tight concrete or masonry construction. The filters of disposal plants, except in isolated locations in non-water-bearing strata, shall be installed in basins with water-tight bottom and side walls.

All disposal plants not discharging their effluent into an established sewer system shall be provided with aerated filter beds constructed of proper filtering materials and of sufficient capacity to render the effluent clear and non-putrescible at all seasons of the year; provided, that in the case of country residences and other isolated locations, the effluent from septic tanks or cesspools, or other types of sewage disposal, need not be subjected to filtration if such effluent can be discharged in sufficient isolation to prevent the creation of a nuisance or a menace to health; and, in any case, the pollution of any source of domestic or public water supply must be avoided.

(c) Non-putrescibility of effluents may be determined by means of the following:

1. The Oxygen Absorbed Test.
2. The Organic Sulphur Method.
3. The Methylene Blue Test.
4. The method recommended by the Royal Commission on Sewage Disposal or by any of the standard chemical methods.*

(d) If the effluent from the filters shall be discharged into any water course, open drain, stream or pond, or source of water supply, or upon any low land, where, in any manner, by drinking the effluent or water polluted by it or by contact with the same, either by man or beast, pathogenic germs may be transmitted, such effluent shall be sterilized by Calcium Hypochlorite or other suitable and safe chemical means.

(e) The discharge of the effluent from septic disposal plants or any other type of disposal plant into abandoned wells or into creviced strata, reaching water-bearing strata, from which domestic or public water supply is drawn, is absolutely prohibited.

(f) The different methods of irrigation and intermittent filtration are not intended to be excluded by the above requirements, but are also permitted and recommended where the conditions and surroundings will allow such methods of sewage disposal to be safely employed without creating a nuisance or menace to health, and without polluting any source of domestic or public water supply.

Sec. 5.—(a) No offal, slops, or other wastes from any creamery, factory, shop, chicken house, slaughter house, tannery, hotel, boarding house,

restaurant, laundry, meat market or private residence, or any other source, shall be thrown or deposited, except in accordance with properly provided garbage disposal, upon any lot or land, or into any ravine or open ditch, stream or pond, or upon any land adjoining which is subject to overflow.

(b) Any of the wastes above mentioned, not properly disposed of as garbage and common sewage, shall be disposed of by independent disposal plants, which latter provision shall particularly apply to creameries, slaughter houses, factories and shops.

Sec. 6.—(a) All dead animals and all decomposed animal matter shall be deodorized and immediately removed to dump grounds provided by the city and there buried at least three (3) feet under ground.

(b) The dump grounds so used must be so located and of such a character as not to affect or contaminate any domestic or public water supply, either by overflow or percolation.

Sec. 7.—No slops, offal, garbage, manure or any other refuse shall at any time be deposited in any of the streets or alleys, or upon any lot in the city, except it be deposited in a regulation garbage box, as provided for in Section 8 of this rule. All property owners shall be held responsible for the sanitary condition of the alley abutting on their premises.

Sec. 8.—Each and all property owners within a city shall provide a suitable garbage box for each of his premises; said garbage box shall be so constructed as to be not more than three (3) feet wide, three (3) feet high and five (5) feet long, and shall be made of tight-matched lumber or galvanized iron, and shall stand at least nine (9) inches from the ground and shall be fitted with an attached cover which shall be fly proof and shall be kept closed.

Sec. 9.—All garbage boxes and their contents shall be kept thoroughly deodorized, and the contents of all such boxes shall be removed at least twice each week, and oftener if so ordered by the health officer.

Sec. 10.—All cellars, caves and outbuildings shall be cleansed and disinfected at least twice each year, and all cattle yards, chicken yards, barns or stables, when in use, shall be cleaned each day and at all times kept free from all offensive odors.

Sec. 11. No privy vault shall be allowed upon any premises where there is a possible connection to the city sewer.

Sec. 12.—A violation of any provision or section of this rule shall be deemed to be the commitment of a nuisance and shall subject the violator to the full penalty provided by statute and the ordinances of any city in Iowa having like regulations.

Sec. 13.—It shall be the duty of the city marshal and other sanitary police officers to enforce these regulations, as herein set forth, under the supervision of the health officer.

*Note.—According to recent conclusions reached by the best American investigators, affirmative results by all of these methods should be accepted; but, on the other hand, negative results, especially from Tests 1, 2 and 3, should be confirmed by exhaustive chemical analyses before the effluent should be condemned.

RECOMMENDATION.

The law as it now stands, and which relates to quarantine and disinfection, provides as follows: "But quarantine shall not be established or maintained except in cases of scarlet fever (including scarlet rash and scarletina), smallpox, diphtheria (including membranous croup), cholera, leprosy, cerebro-spinal meningitis, anterior poliomyelitis and bubonic plague."

In consequence of this, the Iowa State Board of Health, believing that erysipelas, typhoid fever, pneumonia and tuberculosis are dangerously communicable, recommends that all premises be thoroughly disinfected voluntarily at the termination of any of these diseases.

The law relating to quarantine, disinfection and the expenses incurred therefor is found on page 26 of these rules and regulations and should be carefully studied.

Certain forms are also given relating to establishing and releasing quarantine, together with notices to be issued by the mayor or township clerk to the principal or teacher of any school, giving notice of the existence or recovery of a communicable disease.

Local boards of health should have all blanks, given herein, printed at their own expense for the use of their mayors or clerks.

READ THE "HEALTH BULLETIN."

The "Iowa Health Bulletin" is the official organ of the state board of health. It is mailed quarterly to every mayor, health officer, township clerk, physician, registered nurse, embalmer, school superintendent, county auditor, county clerk, county attorney, judge and newspaper in the state. Every issue contains useful information to local boards of health, and the laity in general. It should be read and filed for future reference. Any family may secure the Iowa Health Bulletin by making application to the secretary of the Iowa State Board of Health, Des Moines, Iowa.

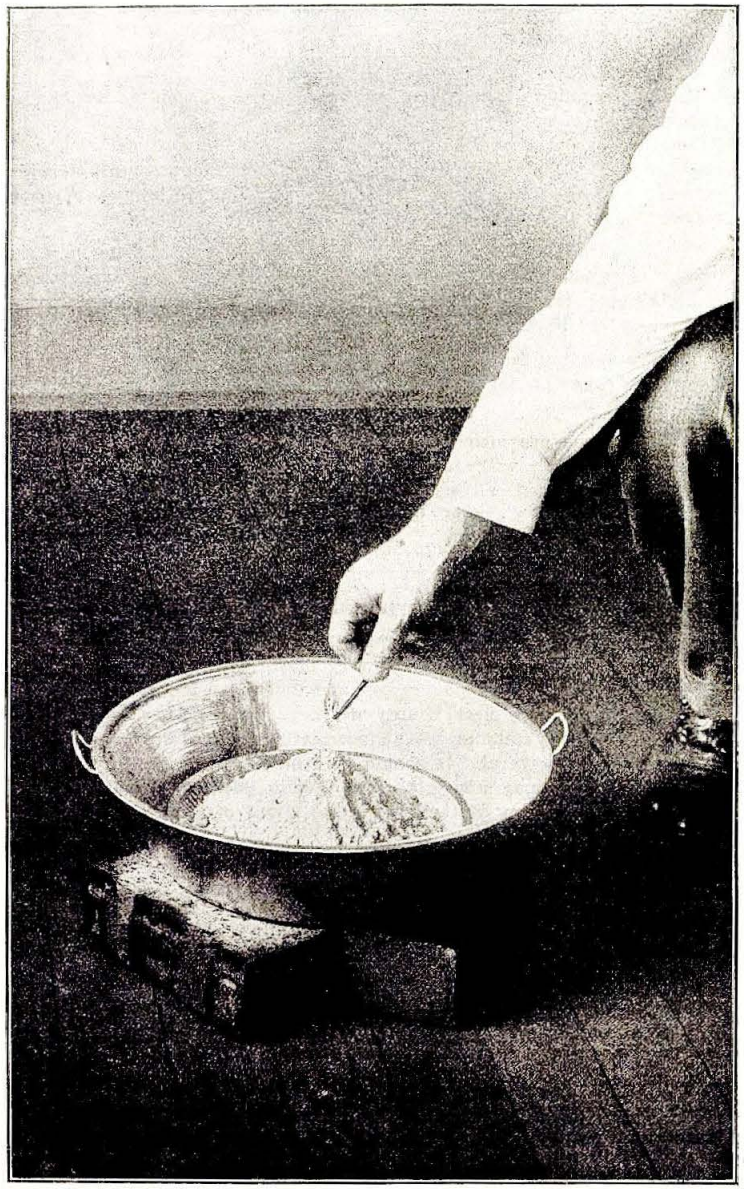
SECRETARY'S CERTIFICATE.

To the County Auditor of.....County,
State of Iowa:

I hereby certify that the foregoing rules and regulations pertaining to quarantine and disinfection were adopted by the Iowa State Board of Health at its regular meeting, held July 19th, 20th and 21st, 1911; and that the same will go into full force and effect on the fifteenth day of September, A. D. 1911.

GUILFORD H. SUMNER, M. D.
(Seal) Secretary, Iowa State Board of Health.

Dated at Des Moines, Iowa, this 1st day of August, A. D. 1911.



Home Disinfection that is Most Thorough and Far-reaching in its Results as Regards Disease Prevention. Not to be Substituted for Formaldehyde.

HOME DISINFECTION THAT IS MOST THOROUGH AND FAR-REACHING IN ITS RESULTS AS REGARDS DISEASE PREVENTION.

To health officers and all who are interested in house cleaning: The Iowa State Board of Health, having the interest of residents of this and other states at heart, and daily endeavoring by every possible, practical procedure embodying scientific principles to mitigate disease, misery, mental anguish and possible death through infectious conditions in the respective homes of Iowa as well as other states, and having received numerous requests to give a simple method whereby houses may be disinfected at house cleaning time, presents to the readers of these pages, to be used when the winter season has closed or any other time when house cleaning is a feature in many households, a photograph showing the possibilities, and a simple method of home disinfection that is most thorough and far-reaching in its results as regards disease prevention.

Obtain at any chemical or grocery store at a cost of a few cents, a pound of sublimated or common flour of sulphur. Pour this material within an iron pot in the form of a pyramidal or conical heap (an old frying pan will do very nicely for this purpose) and set this vessel within a dish pan, the bottom of the latter being covered with water to the depth of an inch or more. Place the dish pan holding the iron receptacle into which the sulphur is poured, upon two or three bricks laid flatwise upon the floor, as shown in the photograph.

Now remove from the room all colored fabrics, such as curtain hangings and draperies, and hang them upon the clothes line in the rear yard where the sunlight may destroy by its natural antiseptic functions tubercular and other disease germs. Remove any silverware that may be in the room to another part of the house, as the sulphur fumes are likely to tarnish it, though not otherwise injuring it. It is best not to leave the colored fabrics in the room on account of possible bleaching from the sulphur fumes.

Open all the bureau drawers, turn the mattress sidewise on the bed, close the hot-air furnace radiators, if there be any, put paper in the keyholes, and otherwise stop up cracks or crevices.

Pour about a teaspoonful of wood or grain alcohol on the top of the pile of sulphur, as shown in the photograph, apply a match, and retire from the room, closing the door tightly. Allow the pound of sulphur to be completely consumed and do not enter the room for at least six hours after such procedure. At the expiration of this time enter the room and throw wide all the windows. Replace your colored draperies or curtains upon the windows and you may sleep safe and sound in the room after the fumes have been dissipated, with the full knowledge that all disease germs, roaches, bugs and other vermin have been destroyed and the sleeping apartment rendered beneficial and safe from a health standpoint.

If the room should be a large one, it would be well to utilize two pounds of sulphur, but for the ordinary sleeping apartment a pound will suffice.

The pound of sulphur may well be likened unto the trite, old-fashioned proverb that a pound of prevention is worth a ton of cure.

In no case is this method of fumigation to be used instead of the formaldehyde method, recommended in chapter 3 of the rules and regulations of the State Board of Health, where quarantine has existed or where a death has occurred from tuberculosis.

This simple method is given in the belief that every housekeeper will use it to the extent that all sleeping apartments, closets where clothes are kept, and such other rooms as require fumigation at house cleaning time will be fumigated in this manner to prevent contagious and infectious diseases from entering the home. The formaldehyde method as given in chapter 3 of the rules and regulations of the State Board of Health should be used in all places where quarantine has existed or where a death has occurred from tuberculosis.

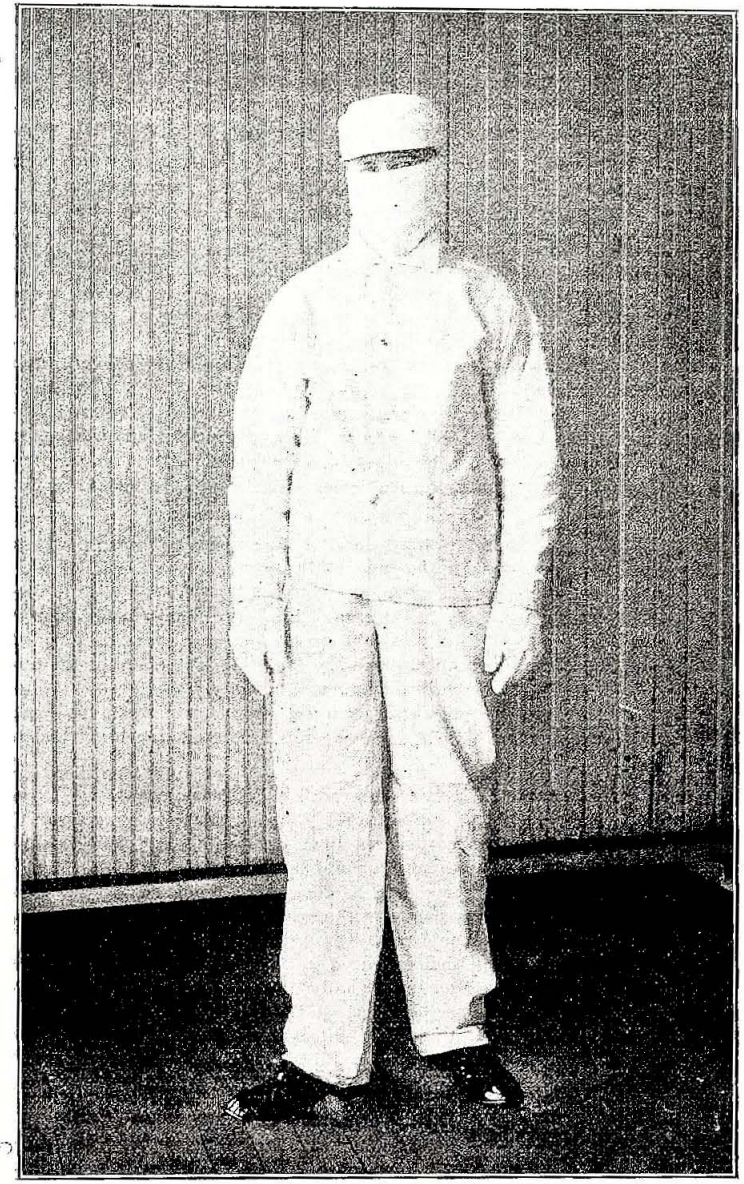
The photograph here given furnishes an excellent illustration of the plan to be pursued, and if no other method is adopted for fumigation and disinfection of second-hand clothing or goods offered at rummage sales, this method should be used; but in all cases, the formaldehyde method is far superior to any other method now known.

PREVENTION OF DISSEMINATION OF INFECTIOUS MATERIALS; PRACTICAL DISINFECTION.

Even with the best disinfectants available, and with the exercise of the greatest care in their application, practical disinfection is by no means always effective in preventing the transmission of infectious material to new fertile ground. Because of this condition, it is advisable and necessary to keep the infected area as small as possible and to prevent the accumulation of infectious material by destroying it continuously and as quickly as possible after it is thrown off by the body. With the exercise of due care, the waste products which act as vehicles for the infectious agents of our common and occasional scourges may be so effectively dealt with from hour to hour and from day to day as to make the after treatment of the room and its contents somewhat of a mere form, carried out as a matter of routine practice, or in order to make assurance doubly sure.

One of the simple means to be used, in the prevention of dissemination of infectious material, practical disinfection, is the care to be taken by the physician before he visits a home where a contagious disease exists. An illustration is herewith appended, showing a simple method whereby a physician may properly prepare himself to visit an infected home. Any physician can procure at any clothing store a small hand satchel, sufficiently large to carry a pair of common light rubbers, a pair of overalls, a blouse, a handkerchief and a cheap shop cap to be worn when coming in contact with contagion.

After using these articles they may be easily fumigated, satchel and contents, by placing them in a small closet or box, fitted for the purpose,



A Simple Method Whereby a Physician May Properly Prepare Himself to Visit a Home Where a Contagious Disease Exists.

and using the formaldehyde method. If it seems better, they may be left at the home where the contagion exists, and hung on a line in the air and sunlight, after which they may be placed in some outside room, readily accessible to the physician when he makes his next visit.

The illustration furnishes an idea which can be quickly put into practice, and should be employed by all physicians when visiting patients afflicted with contagious diseases. No harm can possibly come from using extreme care in all such visits.

In using precautions to prevent the spread of contagious material, it must be remembered that according to the nature of the disease, these agents reside in discharges from the mouth, nose and throat (diphtheria and whooping cough), in sputum (pulmonary tuberculosis, influenza and pneumonia), in discharges from the bowels (typhoid fever, cholera, dysentery and tuberculosis), in the urine (typhoid fever), and in matters thrown off by the skin (acute exanthemata, skin eruptions, essentially accompanied with fever as scarlet fever, etc.) From this knowledge, it should be remembered that the course to be pursued during the continuance of a sickness or convalescence varies according to the nature of the disease.

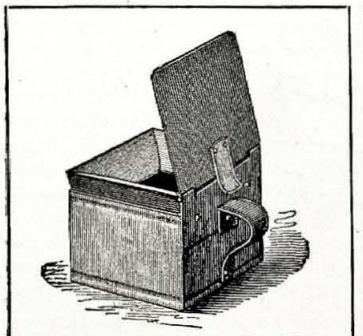
The limitation of the infected area and of the amount of material which may require disinfection on the termination of the disease should be a matter for immediate action on the discovery of the existence of the disease. The patient, especially in the case of the acute exanthemata, should be placed in a room which, if possible, may be isolated from the rest of the house, and from which all unnecessary furniture, especially of the upholstered kind, hangings, carpets and rugs have been removed. Disinfectants for the prompt treatment of infectious matter should be kept near at hand, together with a sufficient number of appropriate vessels and utensils.

In order to prevent or restrict the carriage of living organisms from the room, ingress should be denied to all whose presence is unnecessary; the wearing of other than cotton and linen dresses, that is, smooth-surfaced and washable, by attendants should be interdicted, and the physician should exercise the same care as those in attendance, by using a covering for his clothing, as shown in the accompanying illustration herewith; no food remainder should be taken away to be consumed by others; no used bed-linen or body-linen removed until after immersion in disinfectant solutions, and no discharges finally disposed of until after appropriate treatment. If it be necessary to use the broom, the dust should be kept down by the use of wet sawdust or tea leaves which, with the gathered dirt and dust, should be treated by a disinfectant and burned.

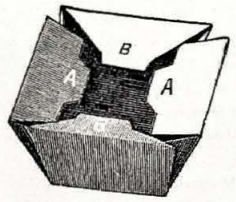
Under no circumstances should the process known as "dusting," which is merely the scattering of dust through the air from surfaces where it was at rest and upon which and elsewhere it will again be deposited, be allowed, but such surfaces should be wiped with cloths moistened with or wrung out in a disinfectant solution and afterward soaked and boiled. According to season, the windows should be provided with wire screens to

keep out flies, which not only are an annoyance but, through their habit of visiting all manner of excreta and other filth, act as carriers of infection.

Sputum.—In pneumonia and pulmonary tuberculosis, the sputum should be received in spit-cups partly filled with disinfectant solution, and kept covered when not in actual use. It may be treated with 5 per cent carbolic acid, or about 5 per cent of any of the cresol compounds or with 4 per cent of formalin. Milk of lime and chlorinated lime are also efficient. Corrosive sublimate should be considered as very uncertain. By reason of its consistency and adhesive properties, sputum is one of the most difficult materials to sterilize. It is especially dangerous, as it may contain large numbers of entangled bacteria which, on drying, may be disseminated by air currents.



Frame of Seabury & Johnson's Spitting Cup.



Folded Cardboard, to be Burned After Use.

Through the courtesy of Seabury & Johnson, we are able to show herewith an illustration of their metal frame for spitting cup. The metal frame is used as a container for the folded cardboard, which should be burned after use. It is not convenient to carry this cup when on the street, hence another one is here illustrated, which may be carried in the pocket, and burned after use. Complete instructions are printed on each cup of this kind. In any case it is well to have more than one of these pockets, or pouches, so that the patient is never without one. The pocket, or pouch, should not be used too long before burning. Of course, all invalids using handkerchiefs, rags, or Japanese paper as receptacles for expectoration, are in danger of infecting their hands, and should always wash them thoroughly before touching food. It is well to note here that the rooms occupied by a tuberculosis patient should be thoroughly disinfected at regular intervals, since it is possible that even with great care the furniture, floors, walls, etc., may have been infected.

Pulmonary tuberculosis is an exceedingly dangerous disease and it is absolutely necessary that the greatest precautions should be taken to pre-

vent patients, afflicted with this disease, from expectorating in a promiscuous manner. Sanitariums, hospitals, homes and wherever patients reside should see the necessity of preventing the spread of pulmonary tuberculosis by providing sanitary cuspidors. The facility with which they can be used and their reasonable price make them the ideal arrangement for sputum disposal and control, as they have been endorsed by leading bacteriologists and specialists throughout the world. In these days, with our present knowledge at hand, there is no excuse for the promiscuous expectoration of tuberculosis sputum to become dried and blown about in the air to be inhaled by those not afflicted.

Sanitary Spitting Cup, to be Carried in Pocket and Burned After Use.

CHAPTER 156, ACTS OF THE 33RD GENERAL ASSEMBLY AND AS AMENDED BY THE 34TH GENERAL ASSEMBLY.

QUARANTINE.

Section 1. Repeal—quarantine—care of infected person—expenses. "That the law as it appears in sections twenty-five hundred and seventy-a (2570-a), twenty-five hundred seventy-a-1 (2570-a-1), and twenty-five hundred and seventy-b (2570-b) and twenty-five hundred and seventy-one (2571) of the supplement to the code, 1907, are hereby repealed and the following enacted in lieu thereof:

"When any person shall be sick or infected with any contagious or infectious disease, dangerous to the public health, whether a resident or otherwise, the local board of health through the mayor or township clerk, shall make such provisions as are best calculated to protect the inhabitants therefrom, and may remove such persons to a separate house, a

house of detention or hospital, but quarantine shall not be established or maintained except in cases of scarlet fever (including scarlet rash and scarletina), smallpox, diphtheria (including membranous croup), cholera, leprosy, cerebro-spinal meningitis, anterior poliomyelitis and bubonic plague. In case any person or persons liable for the support of such person under quarantine or restrained under and by virtue of this act, shall be financially unable to secure the proper care, provisions or medical attendance, it shall be the duty of the mayor or township clerk to procure for such diseased person, proper care, provisions, supplies and medical attendance, while so quarantined or restrained. All bills for supplies furnished and services rendered by order of the mayor or township clerk as herein provided, for persons removed to a separate house, or house of detention, or hospital, or for persons financially unable to provide for their sustenance and care, shall be allowed and paid for, only on a basis of the local market price for such provisions, services and supplies in the locality in which such services and supplies may have been furnished. All services and supplies furnished to individuals or families under the provisions of this section must be authorized by the local board of health or by the mayor or township clerk acting under standing regulations of such local board, and a written order therefor designating the person or persons, employed to furnish such services or supplies, issued before said services or supplies were actually furnished, shall be attached to the bill when the same is presented for audit and payment. No bill for any expenses incurred for any person during quarantine or for disinfecting premises or effects shall be allowed or paid except in cases removed to a separate house, or house of detention unless it shall be found that such person is financially unable to pay said bill.

"Provided that nothing contained in this section shall be construed to prevent any person removed to a separate house or house of detention or hospital as herein provided, from employing, at his own expense, the physician or nurse of his choice, nor from providing such supplies and commodities as he may require. It is further provided that if the person receiving services or supplies be not a legal resident of the county in which such bills were incurred and paid, the amount so paid shall be certified to the board of supervisors of the county in which said party claims residence or owns property and the board of supervisors of such county shall reimburse the county from which such claim is certified, in the full amount originally paid by it.

"All fumigations and disinfections, for the protection of the public health, shall be done in accordance with the regulations of the State Board of Health and under the directions of the local board, which shall direct the attending physician to superintend or perform the work. In case there be no attending physician or in case the attending physician refuses to perform this duty, then it shall be the duty of the local board of health to provide some other suitable person to perform such work.

"The undertaker or person in charge of the funeral of any person, dying of tuberculosis, shall within forty-eight hours after the death of such person report to the mayor of the city or town, or to the township clerk,

the name and residence of the deceased person, together with the cause of death. Upon receipt of the notice as herein provided, the mayor of the city or town, or clerk of the township shall cause said premises to be disinfected in accordance with the regulations of the State Board of Health.

"All bills and expenses incurred in carrying out the provisions of this section and establishing, maintaining and raising quarantine and furnishing necessary detention hospitals shall be filed with the clerk of the local board of health. This board at its next regular meeting or special meeting called for the purpose shall examine and audit the same and if found correct, approve and certify the same to the county board of supervisors for payment. If the board of supervisors determine such bills payable, under the provisions of this act, it shall order the county auditor to draw warrant therefor upon the poor fund of said county. The board of supervisors shall not be bound by the action of the local board of health in approving such bill but may increase or diminish the same as may be just and reasonable. The forcible removal of infected persons as herein provided shall be effected by an application made to any civil magistrate in the manner provided in section twenty-five hundred and sixty-nine (2569) of the code, for the removal and abatement of nuisances, who shall issue the warrant as directed in such cases, to remove such person or persons to the place designated by the local board of health and to take possession of a condemned or infected house, lodging room, premises or effects. The officers designated by such magistrate shall be entitled to receive for such services such reasonable compensation as shall be determined by the local board of health. The amount so determined to be certified to and paid in the same manner as other expenses incurred under the provisions of this section."

Sec. 2. Meetings of Local Board—Rules and Regulations. "Local boards of health shall meet for the transaction of business on the first Monday of April and November in each year and at such other times as it may be deemed necessary. Local boards of health shall furnish to the State Board of Health reports of their proceedings at such times and in such form as may be reasonably required by the State Board of Health. They shall give notice of all regulations adopted by publication thereof in some newspaper of general circulation in the town, city or township, or by posting a copy thereof in five places therein. The secretary of the State Board of Health immediately after the adoption of any rules and regulations of said board in accordance with section one of this act, shall forward a certified copy of such rules to the county auditor of each county. Whenever such rules may be amended or changed, similar notice shall be forwarded to each county auditor.

"The State Board of Health shall cause to be printed such number of copies of the rules and regulations by it adopted as may be necessary to supply the needs of the several counties of the state and upon application forward the required number to the county auditors of the state for distribution to the several boards of health within the county.

"The clerk of each local board of health shall upon request furnish a copy of said rules to any resident, physician or citizen. It shall be the

duty of the official when establishing quarantine, to furnish to the person or persons quarantined a copy of the rules and regulations covering such quarantine."

Sec. 3. In effect. "This act being deemed of immediate importance shall take effect and be in force from and after its publication in the Register and Leader and Des Moines Capital, newspapers published in Des Moines, Polk county, Iowa."

Approved April 5, A. D. 1909.

Office of.....
(Mayor or Township Clerk.)
.....19....

To the Principal or Teacher of.....School:

Notice having been received of the prevalence of.....
.....in the family of.....
.....you are hereby notified to prohibit the further attendance at school of all children from said family, dwelling house or tenement, and forbid any of them to return until you receive official notification from this office. Such notice will be sent to you in due time after the recovery of the sick, and after the house has been thoroughly disinfected.

.....
Mayor or Township Clerk.

This blank is furnished as a "sample." Local Boards of Health should furnish it in quantities for the use of their Mayors or Clerks, one copy to be left with the family quarantined and one with the principal or teacher of the school.

Office of.....
(Mayor or Township Clerk.)
.....19...

To the Principal of the.....School;
.....has fully recovered from an attack of
..... at .....
.....
and the house and premises having been disinfected under the instructions from this office the patient may be allowed to return to school.

.....
Mayor or Township Clerk.

This blank is furnished as a "sample." Local Boards of Health should furnish it in quantities for the use of their Mayors or Clerks. One copy to be left with the family quarantined and one with the principal of the school.

OFFICIAL NOTICE OF QUARANTINE—FOR USE EITHER BY CITY OR TOWNSHIP BOARDS.

BOARD OF HEALTH.

City or Township of.....

County....., Iowa.

To..... You are hereby notified that your premises No.....Street, in City of .....Iowa, Sec..... .....Twp. ....County .....Iowa, and all persons and effects upon or within said premises have this day been placed in Quarantine, as provided by law.

You are further notified that all persons excepting the attending physician are prohibited from entering or leaving said premises except they be in possession of a written order signed by the mayor (or township clerk) and approved by the health officer of this board.

You are further notified that it is a misdemeanor for any person to remove or deface the official quarantine signs placed upon said premises, except upon the written order of the mayor (or township clerk), countersigned by the health officer.

You are further notified that upon failure to comply with any part of this notice or any regulation pertaining to quarantine, the full penalty, as provided by law, will be enforced against you, and in addition thereto you will render yourself liable for all damage resulting therefrom.

Signed:

Mayor of .....

or Twp. Clerk of .....

Date.....

NOTE—One copy of this should be left with the party notified, and one kept in the office of the Mayor or Township Clerk.

N. B.—Retain this notice until the quarantine is released.

The attending physician has no authority in matters pertaining to quarantine. Such authority is vested in the board of health and its officers.

This blank is furnished as a "sample." Local Boards of Health should furnish it in quantities for the use of their Mayors or Clerks. One copy should be left with the family quarantined.

RELEASE OF QUARANTINE—FOR USE EITHER BY CITY OR TOWNSHIP BOARDS.

BOARD OF HEALTH.

City or Township of.....

County....., Iowa.

Office of (Mayor or Township Clerk.)

To all Whom it May Concern:

To ....., No..... Street, in City of ....., Iowa, Sec....., Twp. ....., County....., Iowa.

Whereas, the above described premises, having been quarantined as provided by law, and the Regulations of the State Board of Health, for ....., which is a communicable disease; and, whereas the sick having fully recovered, and the premises having been thoroughly disinfected, and approved by the Health Officer, and there being no further danger from infection thereby, it is ordered that the quarantine of said premises be, and the same is, hereby released.

Dated....., 19...

.....

Mayor or Township Clerk.

NOTE—One copy of this should be left with the party notified, and one kept in the office of the Mayor or Township Clerk.

This blank is furnished as a "sample." Local boards of Health should furnish it in quantities for the use of their Mayors or Clerks. One copy should be left with the family quarantined.

BACTERIOLOGICAL LABORATORY.

All bacteriological examinations in the interest of the public health are made free of charge at the State Board of Health Bacteriological Laboratory at Iowa City.

Special outfits for the collection of material for the bacteriological diagnosis of diphtheria, tuberculosis and typhoid fever are kept in every city and town in the state for the convenience of physicians desiring to use them. If such are not available in your city, or if you have any other material requiring a bacteriological examination in the interest of the public health, write to Dr. Henry Albert, Director of the State Board of Health Laboratory, Iowa City.

N. B.—The diphtheria diagnosis outfits may, after a few years, be spoiled through drying or contaminations of the media. Whenever a dozen or more are thus spoiled, they may be returned to the laboratory. The tuberculosis bottles should be kept about one-fourth full of 5 per cent carbolic acid solution. If it has evaporated, the physician should replenish the same before sending a specimen to the laboratory.

WATER ANALYSIS.

Local boards of health, corporations or individuals desiring analysis of water should write the secretary for collection blank and directions.

Water or any other substance to be analyzed should be sent direct to the chemist of the State Board of Health, Prof. C. N. Kinney, Drake University, Des Moines.

PLUMBING AND SEWAGE.

Communications relative to plumbing, water supplies, disposal of sewage, etc., should be addressed to Lafayette Higgins, civil engineer of the State Board of Health, Des Moines.

REPORT OF QUARANTINABLE DISEASES FOR THE FISCAL YEAR ENDING JUNE 30, 1911.

	Scarlet fever	Diptheria	Smallpox	Cerebro-spinal meningitis	Anterior poliomyelitis	Total
1910						
July	41	54	24	------	52	171
August	30	37	20	1	145	233
September	44	62	9	5	211	331
October	94	90	17	1	112	314
November	108	94	51	1	38	292
December	119	82	155	4	7	367
1911						
January	165	47	58	1	12	283
February	225	72	65	------	3	365
March	191	66	90	5	------	352
April	147	48	124	------	5	324
May	99	44	186	1	1	330
June	47	38	96	2	2	185
Total	1,810	734	894	21	588	3,547

REPORT OF QUARANTINABLE DISEASES FOR THE FISCAL YEAR ENDING JUNE 30, 1912.

	Scarlet fever	Diptheria	Smallpox	Cerebro-spinal meningitis	Anterior poliomyelitis	Total
1911						
July	31	31	35	------	3	100
August	31	25	20	------	9	85
September	44	56	36	1	16	153
October	72	107	23	------	12	214
November	95	200	63	2	7	367
December	116	68	35	1	------	220
1912						
January	120	62	37	------	------	219
February	117	55	49	3	2	226
March	104	53	49	2	------	208
April	137	29	41	2	1	210
May	58	100	66	4	1	229
June	31	26	42	1	1	101
Total	959	812	496	16	52	2,332

TABLE NO. 1.

QUARANTINABLE DISEASES REPORTED TO THIS OFFICE FROM JULY 1, 1910, TO JANUARY 1, 1911, ARRANGED ACCORDING TO COUNTIES.

COUNTY	DISEASE	July	August	September	October	November	December	Total
Adair	Scarlet fever				1			1
	Anterior poliomyelitis			3	1			4
Adams	Scarlet fever				5			5
Allamakee	Smallpox				4			4
	Anterior poliomyelitis		2	5	1		1	9
Appanoose	Scarlet fever	1	4		8	9	1	23
	Diphtheria			5	9	22	5	41
Audubon	Scarlet fever			1				1
	Cerebrospinal meningitis		1					1
Benton	Scarlet fever	7					2	9
	Diphtheria		1	3		2		6
	Smallpox	2						2
	Anterior poliomyelitis		3	1	1			5
Black Hawk	Scarlet fever				2			2
	Anterior poliomyelitis	2	6	4	1	1		14
Boone	Scarlet fever						2	2
	Diphtheria				5	1		6
	Anterior poliomyelitis						1	1
Bremer	(No report)							
Buchanan	Scarlet fever	1					4	5
	Anterior poliomyelitis			1				1
Buena Vista	Scarlet fever						1	1
	Smallpox						1	1
	Anterior poliomyelitis			1	3			4
Butler	Diphtheria			2				2
	Anterior poliomyelitis			4				4
Calhoun	Diphtheria	2						2
	Anterior poliomyelitis			5				5
Carroll	Scarlet fever			2				2
	Anterior poliomyelitis		2	1				3
Cass	Scarlet fever		3		1		1	5
	Diphtheria					1		1
	Smallpox				2			2
Cedar	Anterior poliomyelitis				5	5		10
	Scarlet fever					5	3	8
	Diphtheria		5	2	2			9
	Smallpox	1						1
	Anterior poliomyelitis		2	3	3			8
Cerro Gordo	Diphtheria			2	1			3
	Anterior poliomyelitis	27	15	4				46
Cherokee	Scarlet fever				1		5	6
	Diphtheria	1			1	2		4
	Smallpox						23	23
	Anterior poliomyelitis			2	1			3
Chickasaw	Anterior poliomyelitis		4					4
Clarke	Scarlet fever				1	14		15
	Anterior poliomyelitis			2				2
Clay	Diphtheria			1	1			2
	Anterior poliomyelitis		6	1	1			8
Clayton	Diphtheria			1	1		8	10
	Cerebrospinal meningitis					1		1
	Anterior poliomyelitis		4					4
Clinton	Scarlet fever				2		1	3
	Diphtheria						5	5
	Anterior poliomyelitis			3	1			4
Crawford	Anterior poliomyelitis	1	1	1				3
Dallas	Anterior poliomyelitis		1					1
Davis	Scarlet fever					3	4	7
	Diphtheria			4	3			7
	Anterior poliomyelitis					2		2
Decatur	Scarlet fever	1						1
Delaware	Diphtheria					2		2
	Anterior poliomyelitis		2		2		1	5
Des Moines	Diphtheria	2						2

TABLE No. 1—Continued.

COUNTY	DISEASE	July	August	September	October	November	December	Total
Dickinson	Anterior poliomyelitis			1				1
	Anterior poliomyelitis		1	3	1			5
Dubuque	Scarlet fever	1			1			2
	Diphtheria			2	1			3
	Anterior poliomyelitis		1		1			2
Emmet	Diphtheria						1	1
	Anterior poliomyelitis		1	4	2			7
Fayette	Scarlet fever		1	1	3	4	3	12
	Diphtheria	1				1		2
	Anterior poliomyelitis		1	2				3
Floyd	Scarlet fever	1						1
	Smallpox			2				2
	Anterior poliomyelitis	1	3	4	2			10
Franklin	Scarlet fever					2		2
	Diphtheria						1	1
	Cerebrospinal meningitis			1				1
	Anterior poliomyelitis	1	7	1	6	1		16
Fremont	Anterior poliomyelitis		1	1				2
Greene	Scarlet fever		1					1
	Diphtheria				6	2		8
	Anterior poliomyelitis		1	2	1		1	5
Grundy	Anterior poliomyelitis	9	19	14	13		8	50
Guthrie	Scarlet fever							8
	Diphtheria	2						2
	Anterior poliomyelitis		4	3	1	1		9
Hamilton	Scarlet fever				1		1	2
	Diphtheria						1	1
	Anterior poliomyelitis			4				4
Hancock	Scarlet fever	2						2
	Diphtheria		1					1
	Anterior poliomyelitis	2	4	3		2		11
Hardin	Cerebrospinal meningitis			1				1
Harrison	Anterior poliomyelitis		2		1			3
Henry	Diphtheria						4	4
Howard	Diphtheria	1			2		1	4
	Anterior poliomyelitis			2				2
Humboldt	Scarlet fever						1	1
Ida	Anterior poliomyelitis	4		12	2			18
Iowa	Scarlet fever		2					2
	Anterior poliomyelitis			1	1			2
Jackson	Scarlet fever	1						1
	Diphtheria			2			1	3
Jasper	Anterior poliomyelitis		5	1	5			11
Jefferson	(No report)							
Johnson	Diphtheria	1		1				2
	Anterior poliomyelitis			2				2
Jones	Diphtheria						7	7
	Anterior poliomyelitis			1				1
Keokuk	Scarlet fever					1	1	2
	Diphtheria					1	1	2
	Anterior poliomyelitis			1	1			2
Kossuth	Diphtheria			2		6		8
	Anterior poliomyelitis		1	1				2
Lee	Scarlet fever	1			1		1	3
	Smallpox						1	1
	Anterior poliomyelitis		2	3	2			7
Linn	Scarlet fever	1	4	1	2	1	1	10
	Diphtheria	6	5	4	9	7	10	41
	Smallpox	11	5	1	4	9	21	51
	Cerebrospinal meningitis						1	1
	Anterior poliomyelitis			1	6	4	1	12
Louisa	Scarlet fever					1	3	4
	Diphtheria						2	2
	Anterior poliomyelitis				1			1
Lucas	Scarlet fever						3	3
	Diphtheria					1	1	2
	Anterior poliomyelitis				2		2	4

TABLE No. 1—Continued,

COUNTY	DISEASE	July	August	September	October	November	December	Total
Lyon	Scarlet fever	2				1		3
	Diphtheria	13		1				14
	Smallpox						3	3
Madison	Diphtheria					1		1
	Anterior poliomyelitis			1				1
Mahaska	Scarlet fever			3	1		6	10
	Diphtheria				10			10
	Anterior poliomyelitis				1	1		2
Marion	Scarlet fever		1	2	4	4	1	12
	Diphtheria					2		2
	Anterior poliomyelitis		2	1				3
Marshall	Scarlet fever		1	1	2	3	4	11
	Diphtheria	2	5	8	2	1	5	23
	Smallpox						2	2
	Anterior poliomyelitis		1	4	3			8
Mills	Scarlet fever					1		1
	Diphtheria					2		2
	Anterior poliomyelitis	1						1
Mitchell	Scarlet fever			1				1
	Diphtheria			1		1	1	3
	Anterior poliomyelitis		2	1				3
Monona	Diphtheria					1		1
	Anterior poliomyelitis				2	1		3
Monroe	Scarlet fever	2		1				3
	Diphtheria	2		2	3	1	2	10
	Anterior poliomyelitis	1	1					2
Montgomery	Scarlet fever	1			15	12	2	30
	Diphtheria			9	1		2	12
Muscatine	Scarlet fever	1	1			1	6	9
	Diphtheria	3		1	1	3	3	11
	Anterior poliomyelitis		1	1	1	1	1	5
O'Brien	Scarlet fever	1			1	3		5
	Cerebrospinal meningitis						2	2
	Anterior poliomyelitis	1	1					2
Osceola	Anterior poliomyelitis		2	5				7
Page	Scarlet fever	1				1	3	5
	Diphtheria			1		1		2
	Smallpox					41	19	60
Palo Alto	Scarlet fever					2		2
	Diphtheria			1	1		1	3
	Anterior poliomyelitis			2				2
Plymouth	Scarlet fever						1	1
	Diphtheria	5	1	1				7
	Smallpox		1		2			3
	Anterior poliomyelitis		3	23	1			27
Pocahontas	Scarlet fever			1			4	5
	Diphtheria				1			1
	Anterior poliomyelitis		1					1
Polk	Scarlet fever		1	3	5	1	2	12
	Diphtheria	4	1	3	4	6	4	22
	Smallpox	6		1	4		3	14
	Anterior poliomyelitis		1	1	3	1		6
Pottawattamie	Scarlet fever	2					8	10
	Diphtheria	1	3		1	2	4	11
	Smallpox	1	4					5
	Scarlet fever			1	1		3	5
Poweshiek	Diphtheria					1		1
	Anterior poliomyelitis		1					1
	Scarlet fever					2		2
Ringgold	Diphtheria		1	1	1		2	5
	Scarlet fever			1				1
Sac	Diphtheria					1		1
	Anterior poliomyelitis					1		1
	Scarlet fever	12	9	10	4	2	1	38
Scott	Diphtheria	3	5	11	13	9	7	48
	Smallpox	1					1	2
	Anterior poliomyelitis	1	2	6	9	5		22

TABLE No. 1—Continued.

COUNTY	DISEASE	July	August	September	October	November	December	Total
Shelby	Scarlet fever			1		1	2	4
	Diphtheria					1	1	2
Sioux	Scarlet fever		1	1	2	5	8	17
	Diphtheria	2						2
	Anterior poliomyelitis			9	11	5	1	26
Story	Anterior poliomyelitis		1	2	5	1		9
Tama	Diphtheria		1					1
	Cerebrospinal meningitis			3	1		1	5
	Anterior poliomyelitis		1	5				6
Taylor	Scarlet fever						9	9
	Diphtheria				1		1	2
	Smallpox						64	64
	Anterior poliomyelitis			3	1			4
Union	Scarlet fever					2	4	6
	Diphtheria	2				1		3
	Anterior poliomyelitis		1					1
Van Buren	Diphtheria			1	1	3	1	6
Wapello	Scarlet fever				3		1	4
	Diphtheria		1					1
	Anterior poliomyelitis		1		1			2
Warren	Scarlet fever				3			3
	Diphtheria					1		1
	Smallpox		7	7			1	15
Washington	Diphtheria		4		5			9
Wayne	Scarlet fever						1	1
	Diphtheria	1				2	1	4
Webster	Scarlet fever	2	1	1	5	16	1	26
	Diphtheria			1		1	2	4
	Smallpox	1					10	11
	Anterior poliomyelitis	1	4	4	1			10
Winnebago	Anetrior poliomyelitis		1	5				6
Winneshiek	Anterior poliomyelitis	1	4	11	1			17
Woodbury	Scarlet fever			3	14	6	13	36
	Diphtheria		1		1	5		7
	Smallpox	1	1		1	1	6	10
	Anterior poliomyelitis	2		9	8	4	1	24
Worth	Scarlet fever				1			1
	Anterior poliomyelitis		2	1	1			4
Wright	Scarlet fever					2		2
	Anterior poliomyelitis	2	10	2		3		17
Total		171	283	331	314	292	367	1,708

TABLE NO. 2.

QUARANTINABLE DISEASES REPORTED TO THIS OFFICE FROM JANUARY 1, 1911, TO JULY 1, 1911, ARRANGED ACCORDING TO COUNTIES.

COUNTY	DISEASE	January	February	March	April	May	June	Total
Adair	Scarlet fever	3	12	3	1			19
	Diphtheria		1					1
Adams	Scarlet fever					1	1	2
	Diphtheria					1		1
	Smallpox					5	18	23
Allamakee	Scarlet fever		1	1				2
	Diphtheria	1					4	5
Appanoose	Scarlet fever	3		3				6
	Diphtheria	3	2					5
	Smallpox						1	1
Audubon	Scarlet fever		2	1	4			7
	Diphtheria			6		2	2	10
	Smallpox					1		1
Benton	Scarlet fever	4		4				8
	Diphtheria			1				1
	Smallpox	1	1	7	4			13
	Anterior poliomyelitis	1						1
Black Hawk	Scarlet fever		17	21	15	6	4	63
	Diphtheria			1	1	2		4
	Smallpox		1	4	23	37	4	69
	Cerebrospinal meningitis					1		1
Boone	Scarlet fever			2	1			3
	Diphtheria	1	2		1			4
	Smallpox		1					1
Bremer	(No report)							
Buchanan	Scarlet fever		1			3		4
	Diphtheria					1	2	3
Buena Vista	Scarlet fever	2	1	1				4
Butler	Scarlet fever	3	1	1	3		1	9
	Diphtheria	1	1	1	1			4
Calhoun	Scarlet fever	2		4				6
Carroll	Scarlet fever		2	1	2			5
	Smallpox			3		1	1	5
Cass	Scarlet fever	8		1		2		11
	Diphtheria	3	4	4	9	1	2	23
Cedar	Scarlet fever	1	1	7	2	3	2	16
	Diphtheria			2				2
Cerro Gordo	Scarlet fever			1	1		1	3
	Anterior poliomyelitis	2						2
Cherokee	Scarlet fever	1		7				8
	Diphtheria	2	2	6	1			11
	Smallpox			1				1
	Anterior poliomyelitis	1						1
Chickasaw	Scarlet fever				2	1		3
Clarke	Scarlet fever	10						10
	Diphtheria				1			1
Clay	Scarlet fever		1				2	3
	Diphtheria	1	1				1	3
	Smallpox					1		1
Clayton	Scarlet fever		21	2		7		30
	Anterior poliomyelitis				1			1
Clinton	Scarlet fever	1						1
	Diphtheria	1						1
Crawford	Scarlet fever		3			2		5
	Diphtheria	1	2					3
	Smallpox					1		1
Dallas	Scarlet fever	2		3		1		6
	Diphtheria		1			1		2
	Smallpox		1	2				3
Davis	Scarlet fever		1					1
	Smallpox	1					3	3
Decatur	Scarlet fever					2		3
	Diphtheria		3					3
	Smallpox			4		1	1	6

TABLE No. 2—Continued.

COUNTY	DISEASE	January	February	March	April	May	June	Total
Delaware	Scarlet fever					4		4
	Diphtheria		1					1
	Anterior poliomyelitis	1						1
Des Moines	(No report)							
Dickinson	(No report)							
Dubuque	Scarlet fever		2	2	3			7
	Diphtheria			4	6			10
	Smallpox		1					1
Emmet	(No report)							
Fayette	Scarlet fever	3		1	3			7
	Diphtheria	1	2	3	1			7
	Smallpox				2			2
Floyd	Scarlet fever				11	3		14
	Diphtheria				1			1
Franklin	Scarlet fever	2						2
Fremont	Scarlet fever		1					1
	Smallpox	3	7	1		24	11	46
	Anterior poliomyelitis		1					1
Greene	Diphtheria				1			1
Grundy	Scarlet fever		2		1		5	8
	Diphtheria			1	1	1		3
	Smallpox				1			1
Guthrie	Scarlet fever	3					1	4
	Diphtheria			1	1	1		3
	Smallpox	2	2	3	1	1		9
Hamilton	Scarlet fever	1		14	7			22
	Cerebrospinal meningitis	1						1
Hancock	Scarlet fever				1			1
	Smallpox	3						3
Hardin	Scarlet fever	1	5	4	3	9	3	25
	Diphtheria	1	1	2	1			5
	Anterior poliomyelitis					1		1
Harrison	Scarlet fever	1						1
Henry	Scarlet fever	1	2	2				5
	Smallpox							1
Howard	Scarlet fever			3	1			4
Humboldt	Scarlet fever		2					2
	Diphtheria			1				1
Ida	Scarlet fever	6	4	1				11
	Cerebrospinal meningitis			4				4
Iowa	Scarlet fever		2	2	2			6
	Smallpox				1			1
Jackson	Scarlet fever	3						3
Jasper	Scarlet fever	1				1		2
	Smallpox				3	1		4
Jefferson	Scarlet fever			1				1
	Diphtheria		1					1
Johnson	Scarlet fever	1						1
	Smallpox	1				2	4	7
Jones	Diphtheria		2	3	5			10
	Smallpox				1			1
Keokuk	Scarlet fever				1			1
	Diphtheria	1						1
	Smallpox				1	1		2
Kossuth	Diphtheria	1	2	2	5			10
Lee	Scarlet fever		1					1
	Diphtheria		5					5
	Smallpox						1	1
Linn	Scarlet fever	3	6	6	6	1	1	23
	Diphtheria	2	1	1	1		1	6
	Smallpox	19	21	40	24	29	4	137
Louisa	Scarlet fever	2	1					3
	Diphtheria		1					1
Lucas	Scarlet fever	1	1				1	3
	Diphtheria					1		1
	Smallpox	1						1

TABLE No. 2—Continued.

COUNTY	DISEASE	January	February	March	April	May	June	Total
Lyon	Scarlet fever	1	4	12	2			19
	Diphtheria	4						4
	Smallpox			1	1	3		5
Madison	Scarlet fever			1		1		2
	Diphtheria		2					2
	Smallpox				7	5		12
Mahaska	Scarlet fever	2			1	3		6
	Smallpox		1					1
	Anterior poliomyelitis	1						1
Marion	Scarlet fever	1				1	1	3
	Diphtheria		1					1
Marshall	Scarlet fever	4	1	4	7	1	1	18
	Diphtheria	1	2	1		7	2	13
	Smallpox	7			9	7	4	27
Mills	Scarlet fever	1			2			3
	Smallpox				3	10	1	14
Mitchell	Scarlet fever			2	1			3
Monona	Scarlet fever					1		1
	Diphtheria	2			1	1		4
Monroe	Scarlet fever			4		1		5
	Diphtheria	1		3	1			5
Montgomery	Scarlet fever		24					24
	Diphtheria		2	1				3
	Smallpox				3			3
	Anterior poliomyelitis						1	1
Muscatine	Scarlet fever	7	4		2			13
	Smallpox			1				1
O'Brien	Scarlet fever					4	1	5
Osceola	Diphtheria	3						3
Page	Scarlet fever			2	1	3		6
	Diphtheria	1	1					2
	Smallpox	3	12	2				17
Palo Alto	Scarlet fever			2	1	1		4
	Diphtheria					1		1
	Anterior poliomyelitis		1		1		1	3
Plymouth	Scarlet fever	1				1		2
	Diphtheria					1		1
	Smallpox			1	1			2
Pocahontas	Scarlet fever	2	2		3	3		10
Polk	Scarlet fever	9	9	7	11	4	2	42
	Diphtheria	4	8	6	2	1	1	22
	Smallpox	3	4	12	16	22	11	68
	Cerebrospinal meningitis			1				1
Pottawattamie	Anterior poliomyelitis	1						1
	Scarlet fever	6	16	8	6	4	1	41
	Diphtheria			5		3	1	9
	Smallpox	8	7	4	6	15	8	42
Poweshiek	Scarlet fever	2	4	1		1	2	10
	Diphtheria		2		1			3
Ringgold	Diphtheria	1						1
Sac	Smallpox				16	7		23
Scott	Scarlet fever	4	7	8	12	8	14	53
	Diphtheria	4	10	5	1	6	6	31
	Smallpox	3	3			8	3	17
Shelby	Anterior poliomyelitis	3						3
	Scarlet fever		2					2
	Diphtheria				3	1	1	5
	Smallpox					1		1
Sioux	Scarlet fever	9	20	5	5	11		50
	Diphtheria	1		1				2
	Smallpox		1	1			6	8
Story	Scarlet fever	1		4	6			11
Tama	Diphtheria	1	1	1				3
	Scarlet fever	1						1
	Diphtheria	1		1			1	3
	Smallpox			1				1
	Cerebrospinal meningitis						1	1

TABLE No. 2—Continued.

COUNTY	DISEASE	January	February	March	April	May	June	Total
Taylor	Scarlet fever	14	14	7	2			37
	Smallpox					2	11	13
Union	Smallpox	1	2					3
	Anterior poliomyelitis	1						1
Van Buren	Scarlet fever	1						1
Wapello	Scarlet fever		1		3		2	6
	Diphtheria						1	1
	Smallpox						2	2
	Cerebrospinal meningitis						1	1
	Scarlet fever	1				1		2
Warren	Smallpox				2			2
	Anterior poliomyelitis	1						1
Washington	Scarlet fever		10	3				13
Wayne	Scarlet fever		1	2				3
	Diphtheria		1			3		4
Webster	Scarlet fever	20	6	8	11	1	1	47
	Diphtheria		1		1	4	14	20
Winnebago	Scarlet fever		1					1
	Diphtheria		1			2		3
	Smallpox	1						1
Winneshiek	Scarlet fever	4			1	2		7
	Diphtheria					1		1
Woodbury	Scarlet fever	2	4	11				17
	Diphtheria	3	3	3			1	10
	Smallpox	7	2	2				11
	Anterior poliomyelitis		1		3			4
Worth	Scarlet fever					1		1
	Diphtheria					2		2
Wright	Scarlet fever	2		1				3
	Diphtheria		2					2
	Smallpox						1	1
Total		283	365	352	324	330	185	1839

TABLE NO. 3.

QUARANTINABLE DISEASES REPORTED TO THIS OFFICE FROM JULY 1, 1911, TO JANUARY 1, 1912, ARRANGED ACCORDING TO COUNTIES.

COUNTY	DISEASE	July	August	September	October	November	December	Total
Adair	Scarlet fever			1		1		2
Adams	Smallpox	1					1	2
Allamakee	Diphtheria	1						1
Appanoose	Scarlet fever				6	5	5	16
	Diphtheria		1			1	1	3
	Smallpox						1	1
	Anterior poliomyelitis	1	1					2
Audubon	Scarlet fever					1		1
Benton	Scarlet fever		2				1	3
Black Hawk	Scarlet fever	4	1	2		9	10	26
	Diphtheria					2		2
	Anterior poliomyelitis				1			1
Boone	Diphtheria					2		2
Bremer	Diphtheria				8			8
Buchanan	Diphtheria			2				2
	Smallpox					2	1	3
Buena Vista	Scarlet fever	2						2
	Diphtheria		1					1
Butler	Scarlet fever				1		1	2
	Smallpox				2	13	1	16
Calhoun	Scarlet fever						3	3
	Smallpox					13	1	14
	Anterior poliomyelitis			5				5
Carroll	Smallpox					3	2	5
	Anterior poliomyelitis				1			1
Cass	Scarlet fever					2	3	5
	Diphtheria		1			1		2
Cedar	Scarlet fever				1		1	2
	Diphtheria					1	1	2
	Anterior poliomyelitis			1				1
Cerro Gordo	Diphtheria					6		6
	Smallpox						1	1
Cherokee	Scarlet fever					1		1
	Anterior poliomyelitis				2			2
Chickasaw	(No report)							
Clarke	Scarlet fever			1				1
Clay	Scarlet fever		1		1		4	6
	Diphtheria	3			1			4
Clayton	Scarlet fever	1	1	1	2		7	12
	Diphtheria	1				1		2
	Smallpox					4		4
Clinton	Scarlet fever					1		1
	Diphtheria	1				5		6
	Anterior poliomyelitis				1			1
Crawford	(No report)							
Dallas	Scarlet fever						2	2
	Anterior poliomyelitis				1			1
Davis	Scarlet fever			1	2		1	4
	Diphtheria			1				1
Decatur	Diphtheria						1	1
	Smallpox	1						1
Delaware	Scarlet fever	4		2	6	5		17
	Diphtheria				3			3
Des Moines	Scarlet fever			3	1	1		5
	Diphtheria					3	3	6
	Smallpox						1	1
Dickinson	Anterior poliomyelitis	1						1
Dubuque	Scarlet fever	1	1		1			3
	Diphtheria				1	2		3
Emmet	(No report)							
Fayette	Scarlet fever				1	1	3	5
Floyd	(No report)							
Franklin	Scarlet fever				1			1
	Diphtheria						1	1

TABLE No. 3—Continued.

COUNTY	DISEASE	July	August	September	October	November	December	Total
Fremont	Smallpox			1				1
Greene	Scarlet fever		3	3	1		3	10
Grundy	(No report)							
Guthrie	Scarlet fever	2				1		3
Hamilton	Scarlet fever	2						2
	Cerebrospinal meningitis					1		1
Hancock	Scarlet fever						1	1
	Anterior poliomyelitis				1			1
Hardin	Scarlet fever	1				1	1	3
	Diphtheria		4			4	1	9
	Anterior poliomyelitis	1						1
Harrison	Scarlet fever			3	8	2	1	14
	Diphtheria	1						1
Henry	Smallpox				1	1		2
Howard	Scarlet fever						1	1
Humboldt	Scarlet fever		1			1	1	3
Ida	Diphtheria						1	1
	Smallpox						1	1
Iowa	Anterior poliomyelitis					3		3
Jackson	(No report)							
Jasper	Diphtheria					3	1	4
	Anterior poliomyelitis				1			1
Jefferson	Scarlet fever						3	3
	Smallpox					7	3	10
	Anterior poliomyelitis		1					1
Johnson	Scarlet fever					1	1	2
	Smallpox	9						9
Jones	Scarlet fever		1					1
	Diphtheria				1			1
	Anterior poliomyelitis					1		1
Keokuk	Scarlet fever						2	2
	Diphtheria		1					1
Kossuth	Scarlet fever						1	1
	Diphtheria				7	3	1	11
Lee	Scarlet fever						2	2
	Diphtheria					2		2
Linn	Scarlet fever	1			2	1	2	6
	Diphtheria						2	2
	Smallpox	2	3		2	1	1	9
	Anterior poliomyelitis		1					1
Louisa	(No report)							
Lucas	Diphtheria					2		2
Lyon	Scarlet fever				3	2	1	6
	Diphtheria					1	1	2
Madison	Scarlet fever				2		1	3
	Smallpox			1	1	2	1	5
Mahaska	Scarlet fever		1				2	3
	Diphtheria				3			3
	Anterior poliomyelitis			3				3
Marion	Scarlet fever					3		3
	Diphtheria				4	3	5	12
	Anterior poliomyelitis		1					1
Marshall	Scarlet fever		1	2	1	1		5
	Diphtheria	6				1	2	9
	Smallpox	4	1					5
	Anterior poliomyelitis		3	1	1			5
Mills	Scarlet fever					1	1	2
	Diphtheria					1	3	4
Mitchell	Smallpox						1	1
Monona	Scarlet fever						1	1
	Anterior poliomyelitis			1				1
Monroe	Scarlet fever					3	2	5
	Diphtheria	1			3	2	2	8
Montgomery	Scarlet fever			3	2	2		7
	Diphtheria					1		1
Muscatine	Scarlet fever	1						1
	Diphtheria				1			1

TABLE No. 3—Continued.

COUNTY	DISEASE	July	August	September	October	November	December	Total
O'Brien	Scarlet fever	4		1	4	3	4	16
Osceola	Diphtheria		4			8		12
	Scarlet fever	1		1	3	1		6
	Diphtheria	5						5
	Smallpox						1	1
	Anterior poliomyelitis				1			1
Page	Scarlet fever			1	1	1		3
	Anterior poliomyelitis		1					1
Palo Alto	Scarlet fever	1		1		2		4
	Diphtheria			1	6	14	2	23
Plymouth	Diphtheria	1	1	3				5
Pocahontas	Scarlet fever						2	2
Polk	Scarlet fever			6	9	14	10	39
	Diphtheria		1	6	7	13	2	29
	Smallpox	2		1				3
	Cerebrospinal meningitis			1				1
	Anterior poliomyelitis					3		3
Pottawattamie	Scarlet fever					1	2	3
	Diphtheria			5	11	9	1	26
	Smallpox	6	11	32	17	12	3	81
Poweshiek	Scarlet fever				1			1
Ringgold	Diphtheria		1		3			4
Sac	Scarlet fever					1	2	3
	Smallpox						9	9
Scott	Scarlet fever	4		2	2		4	12
	Diphtheria	4	1		10	95	3	113
	Smallpox	3		1		1		5
Shelby	Anterior poliomyelitis		1					1
Sioux	Scarlet fever		2		1	4		7
	Diphtheria					1	1	2
	Smallpox	3	2			4	4	13
	Anterior poliomyelitis			1	2			3
Story	Scarlet fever					1	1	2
	Diphtheria			1	6			7
	Anterior poliomyelitis			4				4
Tama	Scarlet fever					2		2
	Diphtheria	1					1	2
Taylor	Scarlet fever				1	1		2
	Smallpox	3						3
Union	Diphtheria					1	3	4
Van Buren	Scarlet fever	1	1	1	1		3	7
	Diphtheria						17	17
Wapello	Scarlet fever		9	5	2	4	12	32
	Diphtheria						1	1
	Smallpox		3					3
	Cerebrospinal meningitis						1	1
Warren	Scarlet fever						1	1
Washington	Scarlet fever	1						1
	Diphtheria	1						1
Wayne	Diphtheria						2	2
	Cerebrospinal meningitis					1		1
Webster	Scarlet fever			1	1	3	1	6
	Diphtheria	5	9	19	20	1		54
Winnebago	Scarlet fever					5		5
Winneshiek	Scarlet fever		1					1
	Diphtheria						1	1
Woodbury	Scarlet fever		5	3	3	5	5	21
	Diphtheria			17	12	11	8	48
	Smallpox	1					2	3
Worth	Scarlet fever				1			1
	Diphtheria			1				1
Wright	Scarlet fever					1	1	2
Total		100	85	153	214	367	220	1,139

TABLE NO. 4.

QUARANTINABLE DISEASES REPORTED TO THIS OFFICE FROM JANUARY 1, 1912, TO JULY 1, 1912, ARRANGED ACCORDING TO COUNTIES.

COUNTY	DISEASE	January	February	March	April	May	June	Total
Adair	Scarlet fever	4	3					7
Adams	(No report)							
Allamakee	Scarlet fever				2	3		5
	Diphtheria					1		1
Appanoose	Scarlet fever	3	2		2	1		8
	Diphtheria	1	1					2
	Smallpox			25	17	2		44
Audubon	Diphtheria	2				1		3
	Smallpox			1				1
	Cerebrospinal meningitis					1		1
Benton	Scarlet fever			1				1
	Diphtheria				1			1
Black Hawk	Scarlet fever	16	3					19
	Diphtheria	1	2			1	1	5
	Smallpox			1				1
Boone	Scarlet fever	5			1			6
	Diphtheria		1					1
	Smallpox				1			1
Bremer	Scarlet fever	7		1				8
Buchanan	Scarlet fever					1		1
Buena Vista	Diphtheria				4	8		12
	Smallpox						1	1
Butler	Scarlet fever		3		4	2		9
	Smallpox	3			6	5	1	15
Calhoun	Scarlet fever	1						1
Carroll	Scarlet fever	1	2					
	Smallpox	1	13	8		1		23
Cass	Scarlet fever					1	1	2
Cedar	Scarlet fever		6	1				7
	Diphtheria				1			1
Cerro Gordo	Scarlet fever				1		1	2
	Diphtheria		2	4				6
	Smallpox	4			2	2		8
Cherokee	Smallpox						24	24
Chickasaw	(No report)							
Clarke	(No report)							
Clay	Scarlet fever		4	1				5
	Diphtheria	3					3	6
	Smallpox					1		1
Clayton	Scarlet fever	2	8	8	6	3		26
	Diphtheria	1			1			2
Clinton	Scarlet fever		1					1
	Diphtheria	10						10
Crawford	Diphtheria			1				1
Dallas	(No report)							
Davis	Scarlet fever				1			1
	Smallpox					2		2
Decatur	Scarlet fever	1	1	1				3
	Diphtheria		1					1
Delaware	Scarlet fever			6	1		1	8
Des Moines	Scarlet fever	1	5	5	11	1		23
	Diphtheria					1		1
Dickinson	Scarlet fever			2				2
	Diphtheria			1				1
Dubuque	Scarlet fever			2		2	1	5
	Diphtheria	2	2	1	1	2	2	10
Emmet	Scarlet fever				2			2
	Smallpox				1			1
Fayette	Scarlet fever		2					2
	Diphtheria	1		1				2
	Cerebrospinal meningitis			2				2
Floyd	Smallpox		1					1
Franklin	Scarlet fever				1			1

TABLE No. 4—Continued.

COUNTY	DISEASE	January	February	March	April	May	June	Total
Fremont	Scarlet fever	1	1					2
	Diphtheria	1						1
Greene	Scarlet fever		1					1
Grundy	Scarlet fever	1			3	1		5
	Diphtheria				1			1
	Anterior poliomyelitis		2					2
Guthrie	Scarlet fever	7						7
	Smallpox	1						1
Hamilton	Scarlet fever	3						3
Hancock	Scarlet fever				2			2
	Smallpox					1		1
Hardin	Scarlet fever			1				1
Harrison	Scarlet fever	2	3					5
	Smallpox		1	2	2			5
Henry	Scarlet fever				4			4
Howard	Scarlet fever	1	1					2
	Diphtheria						1	1
	Smallpox						3	3
Humboldt	Smallpox			1				1
Ida	Smallpox		1					1
Iowa	Scarlet fever		2	1	1	2		6
	Diphtheria					1		1
	Anterior poliomyelitis					1		1
Jackson	Scarlet fever			1				1
	Diphtheria		1					1
Jasper	Scarlet fever	1	2					3
	Diphtheria						1	1
	Smallpox						1	1
Jefferson	Scarlet fever			3	2	3		8
Johnson	Scarlet fever		1					1
	Cerebrospinal meningitis		1					1
Jones	Scarlet fever		1					1
	Diphtheria	1						1
Keokuk	Scarlet fever		5	1	1			7
	Diphtheria		1					1
Kossuth	Diphtheria	1	2					3
	Smallpox					1		1
Lee	Scarlet fever	1	2	8	9			20
	Diphtheria		1					1
	Smallpox			1				1
Linn	Scarlet fever	9	3	5	16	3	7	43
	Diphtheria		1		1		2	4
	Smallpox	3	2	1	1	22	4	33
	Cerebrospinal meningitis				2	2		4
Louisa	Anterior poliomyelitis				1			1
	Scarlet fever		1	8				9
	Diphtheria		2					2
	Smallpox		1					1
Lucas	(No report)							
Lyon	Scarlet fever							
	Diphtheria			1	2			3
Madison	(No report)						1	1
Mahaska	Scarlet fever							
Marion	Scarlet fever	4	1	2		1	1	9
	Diphtheria	3			1			4
Marshall	Scarlet fever	3	1	3			2	9
	Diphtheria	1		2		1	1	5
	Smallpox		2	1		2		5
	Cerebrospinal meningitis	5	1					6
Mills	Scarlet fever						1	1
Mitchell	Scarlet fever	1	4	2				7
	Diphtheria		1					1
Monona	Scarlet fever	1	1					2
	Diphtheria	2	1	8				11
Monroe	Scarlet fever		1	1				2
	Diphtheria	1						1
Montgomery	Scarlet fever		1					1
	Diphtheria	1			3			4
	Smallpox			2				2
					1			1

TABLE No. 4—Continued.

COUNTY	DISEASE	January	February	March	April	May	June	Total
Muscatine	Scarlet fever	2		1	1			4
	Diphtheria	1			2	66		69
	Smallpox			1				1
O'Brien	Scarlet fever		5	4	8	1	2	20
Osceola	Diphtheria			1	1			2
Page	(No report)							
	Scarlet fever	1			1			2
	Diphtheria	1	1		1			3
	Smallpox	1						1
Palo Alto	Diphtheria	8		8				16
Plymouth	Diphtheria	1	1		1	4		7
Pocahontas	Diphtheria						1	1
	Smallpox				1			1
Polk	Scarlet fever	6	4	3	1			14
	Diphtheria	2	3	5	3	3	3	19
	Smallpox					3		3
	Cerebrospinal meningitis		1			1		2
Pottawattamie	Scarlet fever			4	15	16	5	46
	Diphtheria		6	3			1	10
	Smallpox	3	3	4		11	4	25
Poweshiek	Scarlet fever	1	3				1	5
	Diphtheria		1			2	1	4
	Smallpox			1				1
Ringgold	Diphtheria			1				1
Sac	Smallpox	7	6	1		8	2	24
Scott	Scarlet fever	3	8	5	15	7	6	44
	Diphtheria	11	12	15	6	1	2	47
	Smallpox		11		2			13
Shelby	Scarlet fever	3	2	1		1		7
Sioux	Scarlet fever	2	2	3	2			9
	Diphtheria					1		1
	Smallpox		5					5
Story	Scarlet fever	1			2			3
	Diphtheria	2				1		3
	Smallpox						1	1
Tama	Scarlet fever		2					2
Taylor	Scarlet fever	3						3
Union	Scarlet fever		1					1
Van Buren	Scarlet fever		1	2			1	4
	Diphtheria	1						1
	Smallpox	2						2
	Anterior poliomyelitis						1	1
Wapello	Scarlet fever	7	6	2				15
	Diphtheria		1					1
Warren	Scarlet fever	3	6		6			15
	Cerebrospinal meningitis		1					1
Washington	Scarlet fever		3			6		9
	Smallpox		1					1
Wayne	Scarlet fever			2	6		2	10
	Diphtheria					3	5	8
	Smallpox					3		3
Webster	Scarlet fever	1		2	2	1		6
	Diphtheria			2				2
	Smallpox	2						2
Winnebago	(No report)							
Winneshiek	Diphtheria	1						1
Woodbury	Scarlet fever	7	2	4	2			15
	Diphtheria	6	7	6				19
	Smallpox	3	3	2				8
Worth	Scarlet fever		2				1	3
	Diphtheria				2	2		4
Wright	Smallpox	2			4	4		10
	Scarlet fever				1	1		2
	Smallpox				3		1	4
Total		219	226	208	210	220	101	1,193

TABLE NO. 1.

REPORT OF DEATHS FROM JULY 1, 1910, TO JANUARY 1, 1911, CLASSIFIED WITH REFERENCE TO DISEASES.

	July	August	September	October	November	December	*Delinquents
Typhoid fever	22	37	54	49	35	49	14
Malarial fever	2	2					1
Smallpox						1	
Measles	8	2	2	3	1	1	1
Scarlet fever	6	4	3	3	10	16	7
Whooping cough	15	17	2	9	14	7	8
Diphtheria and croup	10	14	14	19	23	13	11
Influenza	1	1				12	4
Erysipelas	3		1	2	4	10	1
Cholera infantum	109	291	192	97	28	14	39
Septicemia and pyaemia	6	8	13	9	8	12	12
Pellagra							1
Tuberculosis of lungs	95	113	96	125	97	119	84
Other forms of tuberculosis	8	3	6	3	7	3	3
Premature birth	24	45	48	29	49	54	31
Cancer and other malignant tumors	117	122	147	122	113	114	73
Rheumatism	4	19	6	9	5	8	7
Diabetes	17	16	18	18	19	30	7
Anemia	18	6	11	18	7	15	4
Alcoholism	6	6	1	4	6	4	4
Other general diseases	3	3	17	27	48	56	67
Simple meningitis	16	5	11	10	9	15	8
Cerebrospinal meningitis	6	16	8	8	2	6	4
Cerebral hemorrhage and softening of the brain	40	38	62	58	40	68	52
Paralysis	44	59	41	38	36	53	41
Apoplexy	50	47	56	44	66	63	37
Convulsions (under 5 years)	15	4	9	8	11	9	8
Epilepsy	9	10	6	8	9	11	3
Anterior poliomyelitis	8	40	33	25	15	7	18
Organic heart disease	120	144	99	144	162	176	120
Endocarditis	11	5	14	15	13	11	8
Pericarditis	2	3		1	2	5	
Angina pectoris	11	6	6	12	9	13	3
Embolism and thrombosis	3	3	6	6	9	4	2
Hemorrhage	6	14	9	7	10	3	11
Bronchitis	11	11	17	17	27	54	19
Broncho pneumonia	9	6	9	17	35	65	9
Pneumonia	30	25	53	78	123	295	97
Congestion of lungs	6	8	10	1	12	5	2
Diseases of stomach	23	2	10	8	17	20	13
Diarrhoea and enteritis	19	67	59	27	7	9	14
Hernia and obstruction of bowels	24	16	24	13	17	26	16
Peritonitis	23	30	20	12	23	23	23
Appendicitis	20	20	16	12	18	15	8
Cirrhosis of liver	18	18	10	18	14	12	9
Other diseases of liver	8	12	4	6	11	11	4
Nephritis and Bright's disease	71	63	109	67	81	97	60
Other diseases of kidneys	21	20	10	8	5	10	5
Other diseases of genito-urinary system	1			21	10	22	6
Puerperal septicemia	5	8	2	2	7	7	2
Other puerperal diseases	10	7	11	3	15	14	3
Gangrene	4	6	10	8	7	10	3
Malformation and injuries at birth	25	13	12	10	17	24	8
Inanition	51	59	71	71	44	71	32
Arteriosclerosis	17	26	25	21	19	32	18
Senile debility	100	117	110	119	112	158	102
Railroad injuries	18	14	14	9	14	2	11
Suicide	18	19	25	20	14	27	13
Homicide	2	4	4	3	6	7	1
Ill-defined causes	52	31	19	17	1		6
Accidents	94	72	116	85	92	97	41
Violence	3	1	1			1	2
Unknown causes	5	7	6	12	8	12	9
Legal execution	1						
Lightning							2
Total	1,504	1,785	1,768	1,615	1,620	2,096	1,232

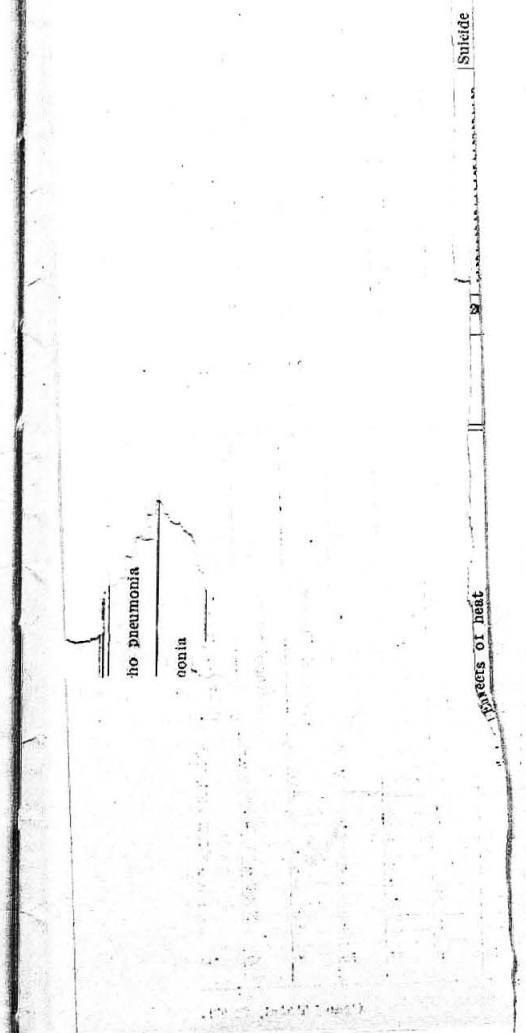


TABLE No. 1—Continued.

REPORT OF DEATHS FROM JULY 1, 1910, TO JANUARY 1, 1911, CLASSIFIED WITH REFERENCE TO AGES.

	July	August	September	October	November	December	*Delinquents
Under 1 year	245	350	325	271	259	375	180
1 to 5 years	92	181	128	90	76	82	77
5 to 10 years	34	49	49	35	37	48	25
10 to 20 years	98	88	83	59	60	80	54
20 to 30 years	97	116	122	125	105	106	80
30 to 40 years	113	97	105	107	113	115	71
40 to 50 years	115	117	145	114	118	157	94
50 to 60 years	128	141	139	147	165	203	109
60 to 70 years	191	168	218	197	202	250	166
70 to 80 years	228	271	235	261	259	371	211
80 to 90 years	127	170	180	182	188	255	135
90 to 100 years	27	29	33	22	32	48	29
100 years and over	2	1	1	------	3	1	1
Unknown	7	7	5	5	3	5	9
Total	1504	1785	1768	1615	1620	2096	1232

REPORT OF DEATHS FROM JULY 1, 1910, TO JANUARY 1, 1911, CLASSIFIED WITH REFERENCE TO SEX.

Male	835	985	952	928	895	1127	667
Female	669	800	816	687	725	969	565
Total	1504	1785	1768	1615	1620	2096	1232

REPORT OF DEATHS FROM JULY 1, 1910, TO JANUARY 1, 1911, CLASSIFIED WITH REFERENCE TO COLOR.

White	1491	1771	1756	1602	1604	2082	1224
Colored	13	14	12	13	16	14	8
Total	1504	1785	1768	1615	1620	2096	1232

REPORT OF DEATHS FROM JULY 1, 1910, TO JANUARY 1, 1911, CLASSIFIED WITH REFERENCE TO NATIVITY.

Native	1174	1423	1415	1299	1243	1626	917
Foreign	311	350	343	310	374	461	298
Unknown	19	12	10	6	3	9	17
Total	1504	1785	1768	1615	1620	2096	1232

TABLE No. 4—Continued.

REPORT OF DEATHS FROM JULY 1, 1910, TO JANUARY 1, 1911, CLASSIFIED WITH REFERENCE TO SOCIAL RELATIONS.

	July	August	September	October	November	December	*Delinquents
Single	602	841	748	641	587	761	467
Married	596	587	664	606	638	866	491
Widowed	281	336	323	342	370	439	249
Divorced	13	19	19	18	21	21	14
Unknown	12	12	14	8	4	9	11
Total	1504	1785	1768	1615	1620	2096	1232
**Stillbirths	50	41	68	48	64	55	48

*These certificates were received too late to be classified according to the month in which the death occurred.

**Stillbirths are not included in the above classification of the deaths.

TABLE NO. 2.

REPORT OF DEATHS FROM JANUARY 1, 1911, TO JULY 1, 1911, CLASSIFIED WITH REFERENCE TO DISEASES.

	January	February	March	April	May	June
Typhoid fever	36	24	11	17	7	10
Malarial fever	1			1		1
Smallpox			1		1	1
Measles	15	21	25	27	16	5
Scarlet fever	8	12	12	15	9	5
Whooping cough	6	9	10	11	6	8
Diphtheria and croup	20	24	13	11	9	5
Influenza	117	69	39	21	5	1
Erysipelas	7	9	17	13	7	5
Cholera infantum	13	13	23	9	20	43
Septicemia and pyaemia	17	28	34	26	26	18
Tuberculosis of lungs	138	126	141	133	125	111
Other forms of tuberculosis	3	5	9	11	16	16
Cancer and other malignant tumors	130	132	116	97	103	130
Acute articular rheumatism	24	17	18	24	38	22
Diabetes	33	20	23	22	19	17
Anemia and leukemia	15	14	18	14	21	15
Alcoholism	2	3	15	5	8	5
Other general diseases	34	54	56	67	76	62
Simple meningitis	17	7	21	16	14	17
Cerebrospinal meningitis	4	18	13	6	3	12
Cerebral hemorrhage and softening of brain	72	81	71	57	53	52
Paralysis	60	65	58	65	47	34
Apoplexy	76	60	76	61	68	49
Convulsions (under 5 years)	12	10	11	19	14	15
Epilepsy	13	5	10	12	11	7
Anterior poliomyelitis	7	4	1	3	3	
Other nervous diseases	14	5	1	8	8	14
Organic heart disease	250	153	212	174	158	162
Angina pectoris	16	12	12	5	10	4
Embolism and thrombosis	1	7	12	5	11	12
Hemorrhage	14	14	14	16	12	13
Bronchitis	75	44	45	31	15	7
Broncho pneumonia	75	69	68	30	22	8
Pneumonia	490	329	250	208	135	38
Asthma	5	13	17	11	13	6
Congestion of lungs	16	5	15	9	9	3
Diseases of stomach	30	22	23	23	18	12
Diarrhoea and enteritis	13	3	6	20	16	11
Hernia and obstruction of bowels	23	22	20	20	26	22
Peritonitis	27	18	28	36	35	24
Appendicitis	12	14	11	8	24	14
Cirrhosis of liver	25	14	15	13	13	12
Other diseases of liver	14	5	9	25	25	18
Nephritis and Bright's disease	125	102	120	139	105	79
Other diseases of kidneys	8	5	2	2	9	4
Venereal diseases	2		2	1		2
Diseases of genito-urinary system	4					
Puerperal septicemia	11	6	12	5	8	1
Other puerperal diseases	12	11	4	12	16	8
Gangrene	6	13	1	10	10	2
Malformation and injuries at birth	21	18	19	16	21	20
Premature birth	47	43	45	36	44	52
Inanition	56	45	46	28	42	28
Arteriosclerosis	41	25	38	30	31	25
Senile debility	162	129	115	105	91	85
Railroad injuries	15	10	13	8	24	30
Suicide	14	14	22	26	15	23
Homicide	2	2	6	5	3	8
Ill-defined causes	1	4	6	8	5	1
Accidents	56	60	54	54	67	84
Violence					1	3
Lightning					3	2
Injuries in mines	1	1	2	1	2	1
Unknown causes	20	17	18	10	8	11
Total	2589	2068	2145	1898	1791	1515

TABLE No. 2—Continued.

REPORT OF DEATHS FROM JANUARY 1, 1911, TO JULY 1, 1911, CLASSIFIED WITH REFERENCE TO AGES.

	January	February	March	April	May	June
Under 1 year	370	280	298	264	243	204
1 to 5 years	133	109	117	102	86	69
5 to 10 years	54	60	50	43	64	40
10 to 20 years	101	74	95	68	108	84
20 to 30 years	146	127	139	136	131	118
30 to 40 years	129	138	135	155	142	89
40 to 50 years	164	142	183	108	115	124
50 to 60 years	210	169	197	178	147	145
60 to 70 years	355	287	274	259	220	209
70 to 80 years	515	390	364	342	308	253
80 to 90 years	349	287	245	196	183	145
90 to 100 years	56	65	37	41	33	24
100 years and over	------	6	7	1	1	1
Unknown	7	4	4	5	10	10
Total	2589	2088	2145	1898	1791	1515

REPORT OF DEATHS FROM JANUARY 1, 1911, TO JULY 1, 1911, CLASSIFIED WITH REFERENCE TO SEX.

Male	1319	1080	1151	1021	963	803
Female	1270	1008	994	877	828	712
Total	2589	2088	2145	1898	1791	1515

REPORT OF DEATHS FROM JANUARY 1, 1911, TO JULY 1, 1911, CLASSIFIED WITH REFERENCE TO COLOR.

White	2573	2072	2117	1875	1761	1499
Colored	16	16	28	23	30	16
Total	2589	2088	2145	1898	1791	1515

REPORT OF DEATHS FROM JANUARY 1, 1911, TO JULY 1, 1911, CLASSIFIED WITH REFERENCE TO NATIVITY.

Native	1933	1528	1600	1403	1325	1118
Foreign	640	549	530	462	442	365
Unknown	16	11	15	33	24	32
Total	2589	2088	2145	1898	1791	1515

TABLE No. 2—Continued.

REPORT OF DEATHS FROM JANUARY 1, 1911, TO JULY 1, 1911, CLASSIFIED WITH REFERENCE TO SOCIAL RELATIONS.

	January	February	March	April	May	June
Single	844	708	759	631	673	544
Married	1017	839	898	793	706	608
Widowed	688	509	453	438	377	313
Divorced	26	21	23	17	17	17
Unknown	14	11	12	19	18	33
Total	2589	2088	2145	1898	1791	1515

**Stillbirths	80	62	72	49	64	56

**Stillbirths are not included in the above classification of the deaths.

TABLE NO. 3.

REPORT OF DEATHS FROM JULY 1, 1911, TO JANUARY 1, 1912, CLASSIFIED WITH REFERENCE TO DISEASES.

	July	August	September	October	November	December	*Delinquent
Typhoid fever	23	37	26	37	47	33	9
Malarial fever	1						1
Smallpox							
Measles	3	1	1	2	5		5
Scarlet fever	5	2	2	4	2	7	7
Whooping cough	12	7	6	6	8	2	2
Diphtheria and croup	9	9	12	14	20	22	8
Influenza	3			3	3	9	6
Erysipelas	4	4	1	5	6	6	4
Cholera infantum	109	153	111	33	10	8	25
Septicemia and pyaemia	36	14	20	10	11	16	6
Pellagra							
Tuberculosis of lungs	99	104	119	95	79	118	34
Other forms of tuberculosis	10	12	9	12	13	3	9
Cancer and other malignant tumors	118	136	119	129	116	108	45
Acute articular rheumatism	18	15	11	9	8	6	10
Diabetes	19	12	18	22	27	23	7
Anemia, leukemia	20	24	11	20	15	18	5
Alcoholism	12	4	6	3	6	8	2
Other general diseases	69	52	24	31	18	29	24
Simple meningitis	19	16	11	11	11	13	5
Cerebrospinal meningitis	9	7	8		4	10	4
Cerebral hemorrhage, apoplexy and softening of the brain	106	109	87	103	126	142	45
Paralysis	56	34	35	28	54	33	19
Convulsions (under 5 years)	2	12	15	6	15	14	6
Epilepsy	6	8	8	2	6	2	4
Anterior poliomyelitis	2	4	5	5	2	2	2
Other nervous diseases	5	8	5	23	22	11	3
Organic heart disease	141	127	130	140	132	166	74
Angina pectoris	7	7	6	12	13	10	9
Embolism and thrombosis	14	8	11	11	12	8	2
Hemorrhage	9	14	5	4	7	8	3
Bronchitis	9	11	12	12	22	20	12
Broncho pneumonia	3	2	11	16	15	22	16
Pneumonia	29	44	33	55	118	137	56
Asthma	4	6	6	10	4	4	5
Congestion of lungs	4		1	11	8	12	4
Diseases of stomach	24	22	20	19	23	22	8
Diarrhoea and enteritis	35	29	21	35	12	7	4
Hernia and obstruction of bowels	24	28	23	17	19	16	10
Peritonitis	30	23	29	22	22	19	4
Appendicitis	25	20	15	18	16	22	7
Cirrhosis of liver	8	6	16	14	14	10	3
Other diseases of liver	15	19	14	13	21	9	11
Nephritis and Bright's disease	97	104	92	107	108	108	45
Other diseases of kidneys	10	3	6	10	5	4	7
Venereal diseases	2	2	3	1		3	2
Diseases of genito-urinary system	1		1			6	
Puerperal septicemia	9	6	6	17	9	12	
Other puerperal diseases	11	11	10	6	9	13	3
Gangrene	7	4	9	4	7	9	3
Malformation and injuries at birth	22	16	23	17	20	29	11
Permature	42	37	46	46	35	41	22
Inanition	51	58	47	55	32	30	18
Arteriosclerosis	36	24	28	47	23	29	17
Senile debility	99	114	101	118	84	94	48
Railroad injuries	16	15	12	14	14	9	6
Suicide	31	22	15	28	26	31	5
Homicide	8	6	6	4	2	3	4
Ill-defined causes			8	13	22	14	5
Accidents	89	78	69	74	90	67	28
Effects of heat	48	3					
Violence					2		3
Lightning	3		2	1			

TABLE No. 3—Continued.

	July	August	September	October	November	December	*Delinquent
Injuries in mines	4	2	3	3	6	2	2
Unknown causes	14	10	5	16	3	8	4
Total	1756	1668	1515	1597	1600	1647	762

REPORT OF DEATHS FROM JULY 1, 1911, TO JANUARY 1, 1912, CLASSIFIED WITH REFERENCE TO AGES.

Under 1 year	300	286	249	209	197	225	132
1 to 5 years	87	100	87	82	54	74	47
5 to 10 years	37	38	26	30	39	29	15
10 to 20 years	70	66	59	58	70	75	38
20 to 30 years	127	126	104	119	115	104	43
30 to 40 years	137	105	109	112	104	117	52
40 to 50 years	134	117	101	128	119	112	43
50 to 60 years	153	148	151	148	153	152	54
60 to 70 years	202	192	210	226	214	253	100
70 to 80 years	270	292	234	255	311	276	141
80 to 90 years	190	153	141	200	187	196	73
90 to 100 years	40	39	24	23	30	23	13
100 years and over	4		3	1	2	3	
Unknown	5	6	7	6	5	8	11
Total	1756	1668	1515	1597	1600	1647	762

REPORT OF DEATHS FROM JULY 1, 1911, TO JANUARY 1, 1912, CLASSIFIED WITH REFERENCE TO SEX.

Male	992	921	818	908	833	891	417
Female	764	747	697	689	767	756	345
Total	1756	1668	1515	1597	1600	1647	762

REPORT OF DEATHS FROM JULY 1, 1911, TO JANUARY 1, 1912, CLASSIFIED WITH REFERENCE TO COLOR.

White	1734	1652	1494	1577	1581	1630	758
Colored	22	16	21	20	19	17	4
Total	1756	1668	1515	1597	1600	1647	762

REPORT OF DEATHS FROM JULY 1, 1911, TO JANUARY 1, 1912, CLASSIFIED WITH REFERENCE TO NATIVITY.

Native	1301	1240	1187	1176	1161	1206	530
Foreign	429	403	312	387	411	423	209
Unknown	26	25	16	34	28	18	23
Total	1756	1668	1515	1597	1600	1647	762

TABLE No. 3—Continued.

REPORT OF DEATHS FROM JULY 1, 1911, TO JANUARY 1, 1912, CLASSIFIED WITH REFERENCE TO SOCIAL RELATIONS.

	July	August	September	October	November	December	*Delinquent
Single	667	692	544	531	524	553	301
Married	706	627	640	656	649	648	289
Widowed	340	339	298	338	395	410	147
Divorced	18	24	26	23	18	18	7
Unknown	19	16	7	19	14	18	18
Total	1756	1668	1515	1597	1600	1647	762
**Stillbirths	54	55	43	82	59	70	24

*These certificates were received too late to be classified according to the month in which the death occurred.

**Stillbirths are not included in the above classification of the deaths.

TABLE NO. 4.

REPORT OF DEATHS FROM JANUARY 1, 1912, TO JULY 1, 1912, CLASSIFIED WITH REFERENCE TO DISEASES.

	January	February	March	April	May	June
Typhoid fever	20	18	23	16	18	13
Malarial fever	1					
Smallpox						1
Measles	2	1	3	8	5	
Scarlet fever	9	5	18	8	6	2
Whooping cough	6	7	15	11	11	15
Diphtheria and croup	15	11	8	3	6	3
Influenza	14	39	35	14	5	3
Erysipelas	8	8	10	7	6	5
Other epidemic diseases		1				
Septicemia	13	21	16	20	15	13
Rabies		1				
Pellagra						
Tetanus		1	2	3	8	7
Tuberculosis of lungs	127	119	140	122	105	100
Tuberculous meningitis	13	6	7	4	8	3
Pott's disease		5	3	1		
Other forms of tuberculosis	9	16	13	12	17	15
Cancer and other malignant tumors	136	128	125	106	150	111
Acute articular rheumatims	10	7	14	13	16	6
Diabetes	23	22	28	21	26	14
Exophthalmic goitre	1	1	3	3	6	3
Leukemia	4	3	1	2	2	4
Anemia, chlorosis	10	23	22	23	23	18
Other general diseases	5	2	10	3	3	4
Alcoholism	8	5	5	6	3	8
Simple meningitis	1	6	9	5	10	9
Cerebrospinal meningitis	9	12	5	9	9	3
Locomotor ataxia	3	3	7	2	7	4
Acute anterior poliomyelitis		1	1	2	3	2
Cerebral hemorrhage, apoplexy	135	124	125	119	126	128
Softening of brain	8	9	3	2	5	6
Paralysis	37	36	36	30	40	27
General paralysis of insane	8	5	6	6	6	9
Other forms of mental alienation	1	5	3	5		
Epilepsy	7	4	7	6	6	11
Convulsions (nonpuerperal)		2		3	2	1
Convulsions of infants	22	18	25	18	13	9
Chorea	1	1	1	1		2
Neuralgia and neuritis	1	1		2	2	1
Other diseases of nervous system	8	6	10	1	7	6
Diseases of the ears	3	2	4	3	6	1
Acute endocarditis	9	23	26	30	12	15
Organic diseuse of the heart	183	160	150	127	117	112
Angina pectoris	11	9	13	12	7	7
Diseases of arteries, atheroma, aneurism, etc.	39	41	39	43	53	37
Embolism and thrombosis	13	13	9	11	12	7
Hemorrhage, other diseases of circulatory system	17	19	3	5	11	14
Bronchitis	22	21	47	32	18	9
Broncho pneumonia	38	27	51	37	13	6
Pneumonia	220	245	241	176	102	45
Pulmonary congestion	15	22	13	15	4	6
Asthma	14	10	18	11	14	5
Other diseases of respiratory system	7	3	6	1	4	2
Ulcer of stomach	10	4	4	12	9	8
Other diseases of stomach	27	32	11	14	26	32
Diarrhoea and enteritis (under 2 years)	10	10	21	21	16	10
Diarrhoea and enteritis (over 2 years)	4	8	5	2	5	7
Appendicitis and typhlitis	22	17	22	9	21	17
Hernia and obstruction of bowels	20	18	18	23	25	22
Cirrhosis of liver	21	15	12	14	12	15
Other diseases of liver	14	17	23	22	17	20
Peritonitis	23	17	22	20	25	10
Nephritis and Bright's disease	129	101	122	133	119	127
Other diseases of kidneys	1	5	4	1	6	6

TABLE No. 4—Continued.

	January	February	March	April	May	June
Diseases of the bladder	3	9	11	4	4	7
Diseases of prostate	9	7	13	8	5	9
Noncancerous tumors and other diseases of female genital organs		4	4	4		3
Puerperal septicemia	4	12	10	9	10	4
Other puerperal diseases	10	13	20	13	12	6
Gangrene	12	17	9	10	14	14
Other diseases of skin and annexa	4	2	4	1		2
Malformation and injuries at birth	27	27	36	11	18	26
Premature birth	47	38	63	50	44	56
Congenital debility, atrophy, marasmus, etc.	49	21	39	44	31	37
Senility	124	100	126	132	105	87
Suicide	15	23	15	19	31	20
Poisoning by food, accidental	5	1	1	3	2	1
Other acute poisonings	4	1	4	1		
Burns	14	11	9	8	4	9
Absorption of deleterious gases, suffocation	8			4	5	3
Accidental drowning	1		4	14	21	24
Traumatism by firearms	4	3	4	3	5	2
Traumatism by cutting or piercing instruments		1				
Traumatism by fall	1	8	9	6	8	13
Traumatism in mines	3	1	3	1		
Traumatism by machines	7	1	2	5	1	1
Railroad accidents	15	8	16	12	12	17
Street car accidents	1		1		1	
Automobile accidents					2	1
Motorcycle accidents						1
Injuries by other vehicles	1			2	1	1
Injuries by animals	1	1	3	2	3	2
Traumatism by other crushing		6	1	4	4	7
Diseases of bones and organs of locomotion		7	1		2	1
Excessive cold	2	1				
Effects of heat					1	2
Starvation	3					
Other external violence	1	1	2	1	3	
Lightning					3	
Electricity (except lightning)			1		1	
Fractures	15	13	15	18	15	18
Homicide	1	3	1	4	2	15
Venereal diseases	7	2	6	5	1	2
Not specified or ill-defined	42	29	35	29	32	25
Total	2002	1894	2092	1819	1732	1521

REPORT OF DEATHS FROM JANUARY 1, 1912, TO JULY 1, 1912, CLASSIFIED WITH REFERENCE TO AGES.

Under 1 year	511	245	310	265	207	194
1 to 5 years	81	92	98	66	76	37
5 to 10 years	27	38	26	44	28	37
10 to 20 years	79	84	65	58	84	55
20 to 30 years	123	88	124	122	121	101
30 to 40 years	109	143	155	118	109	92
40 to 50 years	120	140	121	126	127	105
50 to 60 years	208	183	170	172	186	161
60 to 70 years	294	284	271	272	235	223
70 to 80 years	341	357	396	314	329	310
80 to 90 years	261	234	270	218	186	165
90 years and over	42	37	53	32	34	33
Unknown	6	10	33	12	10	8
Total	2002	1894	2092	1819	1732	1521

TABLE No. 4—Continued.

REPORT OF DEATHS FROM JANUARY 1, 1912, TO JULY 1, 1912, CLASSIFIED WITH REFERENCE TO SEX.

	January	February	March	April	May	June
Male	1060	1009	1080	991	966	872
Female	942	885	1012	828	766	649
Total	2002	1894	2092	1819	1732	1521

REPORT OF DEATHS FROM JANUARY 1, 1912, TO JULY 1, 1912, CLASSIFIED WITH REFERENCE TO COLOR.

White	1968	1872	2084	1808	1718	1516
Colored	34	22	8	11	14	5
Total	2002	1894	2092	1819	1732	1521

REPORT OF DEATHS FROM JANUARY 1, 1912, TO JULY 1, 1912, CLASSIFIED WITH REFERENCE TO NATIVITY.

Native	1471	1429	1561	1372	1312	1129
Foreign	495	443	510	429	389	366
Unknown	36	28	21	18	31	26
Total	2002	1894	2092	1819	1732	1521

REPORT OF DEATHS FROM JANUARY 1, 1912, TO JULY 1, 1912, CLASSIFIED WITH REFERENCE TO SOCIAL RELATIONS.

Single	687	604	680	600	560	463
Married	797	777	790	768	743	655
Widowed	477	470	566	424	397	367
Divorced	29	27	22	14	15	12
Unknown	12	16	25	13	17	24
Total	2002	1894	2092	1819	1732	1521

**Stillbirths	67	80	68	63	57	----	----	----	78

**Stillbirths are not included in the above classification of the deaths.

REPORT OF BIRTHS FOR CALENDAR YEAR 1910 AND MARRIAGES AND DIVORCES FOR FISCAL YEAR ENDING JUNE 30, 1911.

COUNTY	Stillbirths	Births (exclusive of still births)	Marriages	Divorces
Adair	5	290	100	5
Adams	1	212	96	6
Allamakee	1	230	96	3
Appanoose	2	361	276	39
Audubon		302	97	10
Benton	7	387	182	28
Black Hawk	4	587	498	58
Boone	6	517	283	24
Bremer	7	315	165	13
Buchanan	4	321	148	14
Buena Vista		220	155	4
Butler		373	102	4
Calhoun	1	287	148	11
Carroll	2	411	173	9
Cass	4	318	166	11
Cedar	8	312	106	13
Cerro Gordo	2	448	294	32
Cherokee	1	271	115	7
Chickasaw	3	279	118	3
Clarke	3	214	83	9
Clay	1	211	104	8
Clayton	4	449	194	8
Clinton	4	489	476	78
Crawford	3	355	163	16
Dallas	7	383	204	22
Davis	2	271	108	12
Decatur		272	137	18
Delaware	1	354	137	10
Des Moines	4	521	448	54
Dickinson	1	152	66	6
Dubuque	6	620	504	24
Emmet		148	106	5
Fayette	2	535	251	30
Floyd	4	318	144	16
Franklin	4	284	127	3
Fremont		*	109	13
Greene		319	161	13
Grundy		320	97	2
Guthrie	3	271	132	8
Hamilton	4	398	174	17
Hancock	1	256	83	3
Hardin	2	339	167	13
Harrison	3	433	189	14
Henry		246	132	30
Howard		213	99	8
Humboldt	3	228	95	6
Ida		205	99	7
Iowa	1	389	142	9
Jackson	4	285	173	18
Jasper	2	582	229	19
Jefferson	2	235	138	24
Johnson	8	422	247	22
Jones	3	281	168	17
Keokuk	6	396	159	27
Kossuth	5	483	176	5
Lee	5	808	450	14
Linn	6	715	717	95
Louisa	3	146	82	15
Lucas	1	192	118	11
Lyon	1	321	121	3
Madison	4	265	106	6
Mahaska	2	402	287	29
Marion	4	352	203	20
Marshall	2	431	314	26
Mills	1	208	97	8

REPORT OF BIRTHS FOR CALENDAR YEAR 1910 AND MARRIAGES AND DIVORCES FOR FISCAL YEAR ENDING JUNE 30, 1911—Continued.

COUNTY	Stillbirths	Births (exclusive of stillbirths)	Marriages	Divorces
Mitchell	4	295	92	8
Monona	4	344	165	11
Monroe	3	497	240	25
Montgomery	3	260	161	17
Muscatine	2	392	302	49
O'Brien		319	139	4
Osceola	2	184	94	4
Page	2	388	190	19
Palo Alto	3	247	93	8
Plymouth	1	459	183	17
Pocahontas	2	302	107	5
Polk		1,389	1,645	379
Pottawattamie	9	606	1,015	101
Poweshiek	2	279	119	17
Ringgold	3	234	105	12
Sac	2	295	54	15
Scott	6	919	633	94
Shelby	4	346	120	11
Sioux	11	581	119	8
Story	3	418	161	10
Tama	1	341	222	16
Taylor	1	254	106	18
Union		214	173	30
Van Buren	1	277	98	7
Wapello	8	559	451	79
Warren	4	300	140	3
Washington	2	338	134	14
Wayne		282	136	9
Webster	5	555	349	31
Winnebago	3	254	112	4
Winneshiek	8	434	134	9
Woodbury	5	983	857	140
Worth	1	185	58	2
Wright	1	304	117	12
Total	283	35,615	20,872	2,322

*No birth records received from this county.

REPORT OF BIRTHS FOR CALENDAR YEAR 1911 AND MARRIAGES AND DIVORCES FOR FISCAL YEAR ENDING JUNE 30, 1912.

COUNTY	Stillbirths	Births (exclusive of stillbirths)	Marriages	Divorces
Adair	2	312	94	4
Adams	3	220	77	6
Allamakee	5	343	118	1
Appanoose		*	299	36
Audubon	1	266	108	4
Benton	7	471	188	21
Black Hawk	1	629	575	105
Boone	4	553	280	17
Bremer		301	148	4
Buchanan	6	298	167	21
Buena Vista	2	254	116	10
Butler	2	300	114	6
Calhoun	5	301	132	11
Carroll	5	378	173	12
Cass	2	358	175	21
Cedar	5	354	105	11
Cerro Gordo	3	486	297	37
Cherokee		281	126	8
Chickasaw	3	248	111	5
Clarke	1	169	101	20
Clay	2	230	132	2
Clayton	6	479	196	14
Clinton	4	530	431	55
Crawford	3	372	179	14
Dallas	9	437	200	15
Davis	2	232	125	14
Decatur	1	280	108	21
Delaware		337	239	13
Des Moines		503	431	44
Dickinson	4	130	74	8
Dubuque	7	672	558	41
Emmet	1	172	81	5
Fayette	9	542	247	24
Floyd	2	234	151	19
Franklin	3	329	118	8
Fremont	2	270	98	10
Greene	2	328	129	13
Grundy		320	105	3
Guthrie	7	302	178	15
Hamilton	3	384	160	17
Hancock	2	223	78	8
Hardin	4	321	142	17
Harrison	1	436	128	21
Henry	1	287	148	22
Howard		233	96	4
Humboldt	3	268	95	5
Ida		253	95	5
Iowa		361	135	10
Jackson	4	289	182	21
Jasper	3	408	214	16
Jefferson	5	278	124	18
Johnson	4	408	259	25
Jones	6	306	167	30
Keokuk	4	394	172	12
Kossuth	3	495	259	5
Lee	1	417	455	47
Linn	2	949	706	102
Louisa	1	210	80	11
Lucas	3	205	137	12
Lyon	2	312	109	3
Madison		302	122	12
Mahaska	2	328	314	49
Marion	7	402	260	19
Marshall	2	575	269	47
Mills	4	255	101	17

REPORT OF BIRTHS FOR CALENDAR YEAR 1911 AND MARRIAGES AND DIVORCES FOR FISCAL YEAR ENDING JUNE 30, 1912—Continued.

COUNTY	Stillbirths	Births (exclusive of stillbirths)	Marriages	Divorces
Mitchell		208	100	7
Monona	1	376	141	19
Monroe	1	501	216	39
Montgomery	4	287	167	21
Muscatine	3	385	207	39
O'Brien		321	150	15
Osceola	2	241	86	6
Page	4	368	212	22
Palo Alto	1	303	121	11
Plymouth	4	488	171	8
Pocahontas	2	285	87	3
Polk	4	1,705	1,648	451
Pottawattamie	6	614	1,105	218
Poweshiek	1	316	150	9
Ringgold	3	221	116	4
Sac	3	318	132	15
Scott	7	984	701	87
Shelby	4	351	116	9
Sioux	5	628	194	9
Story		332	168	10
Tama		336	168	19
Taylor	1	243	122	8
Union	2	222	169	23
Van Buren	1	240	80	9
Wapello	1	572	426	95
Warren		267	140	7
Washington	6	311	160	14
Wayne	6	281	128	17
Webster	8	593	330	38
Winnebago	2	249	93	1
Winneshiek	9	382	144	10
Woodbury	7	894	915	187
Worth	4	194	75	6
Wright	5	298	148	11
Total	290	36,728	21,477	2,673

*No birth records received from this county.

DEATHS FROM TUBERCULOSIS IN IOWA FOR THE FOLLOWING YEARS.

County	1910	1911	County	1910	1911
Adair	9	6	Jefferson	9	12
Adams	3	5	Jonhson	16	20
Allamakee	8	9	Jones	13	9
Appanoose	20	22	Keokuk	11	13
Audubon	2	3	Kossuth	11	9
Benton	14	14	Lee	40	24
Black Hawk	27	37	Linn	53	63
Boone	25	21	Louisa	6	5
Bremer	21	8	Lucas	7	7
Buchanan	43	44	Lyon	4	8
Buena Vista	14	8	Madison	9	14
Butler	4	7	Mahaska	14	18
Calhoun	9	6	Marion	11	21
Carroll	5	9	Marshall	22	17
Cass	10	12	Mills	19	18
Cedar	10	6	Mitchell	5	16
Cerro Gordo	3	9	Monona	9	1
Cherokee	20	19	Monroe	22	14
Chickasaw	6	5	Montgomery	13	8
Clarke	2	7	Muscatine	28	25
Clay	5	1	O'Brien	8	8
Clayton	13	16	Osceola	5	6
Clinton	27	36	Page	22	32
Crawford	7	7	Palo Alto	9	6
Dallas	6	9	Plymouth	6	8
Davis	12	12	Pocahontas	8	5
Decatur	8	14	Polk	99	102
Delaware	14	13	Pottawattamie	31	34
Des Moines	31	37	Poweshiek	15	9
Dickinson	1	3	Ringgold	6	7
Dubuque	53	54	Sac	7	6
Emmet	8	8	Scott	59	74
Fayette	15	15	Shelby	2	4
Floyd	12	10	Sioux	7	14
Franklin	7	3	Story	21	21
Fremont	3	6	Tama	8	11
Greene	12	6	Taylor	9	7
Grundy	9	6	Union	9	9
Guthrie	8	14	Van Buren	11	12
Hamilton	8	15	Wapello	38	47
Hancock	4	3	Warren	13	14
Hardin	11	12	Washington	10	19
Harrison	10	7	Wayne	7	11
Henry	20	25	Webster	15	20
Howard	10	10	Winnebago	12	10
Humboldt	6	8	Winneshiek	31	12
Ida	1	5	Woodbury	50	56
Iowa	13	14	Worth	5	12
Jackson	11	11	Wright	10	7
Jasper	16	8	Total	1,484	1,560

DEATHS IN BURLINGTON, IOWA, FOR 1909, 1910 AND 1911.
(Exclusive of stillbirths.)

	1909	1910	1911
Males	207	188	214
Females	149	163	162
Total	356	351	376
White	349	341	373
Colored	7	10	3
Total	356	351	376
Native	215	232	219
Foreign	123	106	146
Unknown	18	13	11
Total	356	351	376
Single	116	117	118
Married	136	132	147
Widowed	89	92	93
Divorced	3	7	6
Unknown	12	3	12
Total	356	351	376
Under 1 year	32	46	31
1 to 5 years	12	12	26
5 to 10 years	7	2	7
10 to 20 years	20	14	15
20 to 30 years	23	22	29
30 to 40 years	32	23	21
40 to 50 years	33	33	36
50 to 60 years	40	37	46
60 to 70 years	41	64	60
70 to 80 years	68	61	57
80 to 90 years	31	27	42
90 to 100 years	11	8	5
100 years and over	0	0	0
Unknown	6	2	1
Total	356	351	376
Typhoid fever	7	3	5
Measles	0	0	3
Scarlet fever	2	0	0
Whooping cough	0	4	0
Diphtheria and croup	0	1	3
Influenza	3	0	0
Erysipelas	0	2	2
Cholera infantum	7	4	8
Septicemia and pyaemia	4	0	4
Pellagra	0	0	0
Tuberculosis of lungs	23	19	31
Other forms of tuberculosis	3	4	1
Cancer and other malignant tumors	31	30	31
Rheumatism	3	3	5
Diabetes	2	4	2
Anemia and leukemia	2	2	4
Alcoholism	5	1	3
Other general diseases	11	11	11
Simple meningitis	3	6	5
Cerebrospinal meningitis	2	3	5
Cerebral hemorrhage and softening of the brain	6	6	7
Paralysis	6	8	14
Apoplexy	11	27	19
Convulsions under 5 years	2	5	3
Epilepsy	1	1	1
Anterior pollomyelitis	0	0	0
Other nervous diseases	4	4	1
Organic heart disease	38	24	31
Angina pectoris	1	7	1
Embolism and thrombosis	2	1	1
Hemorrhage	2	1	2
Bronchitis	6	5	9
Broncho pneumonia	2	1	3

DEATHS IN BURLINGTON, IOWA, FOR 1909, 1910 AND 1911—Continued.
(Exclusive of stillbirths.)

	1909	1910	1911
Pneumonia	28	21	29
Asthma	2	3	3
Congestion of lungs	1	1	3
Disease of stomach	4	0	4
Diarrhoea and enteritis	5	5	3
Hernia and obstruction of the bowels	3	10	2
Peritonitis	4	7	1
Appendicitis	4	3	6
Cirrhosis of liver	4	2	6
Other diseases of liver	3	1	5
Nephritis and Bright's disease	17	25	22
Other diseases of kidneys	1	3	1
Venereal diseases	0	0	1
Puerperal septicemia	0	1	0
Other puerperal diseases	3	0	2
Gangrene	2	2	1
Malformations and injuries at birth	4	2	3
Premature birth	4	7	4
Inanition	11	9	8
Arteriosclerosis	6	9	12
Senile debility	25	15	16
Railroad injuries	8	4	5
Suicide	6	6	6
Homicide	1	3	0
Accidents	21	18	16
Violence	1	2	1
Injuries in mines	0	0	0
Effects of heat	0	0	1
Ill-defined causes	0	2	0
Unknown causes	1	0	0
Total	356	351	376

DEATHS IN CEDAR RAPIDS, IOWA, FOR 1909, 1910 AND 1911.
(Exclusive of stillbirths.)

	1909	1910	1911
Males	211	213	244
Females	188	210	178
Total	399	423	422
White	399	420	419
Colored	0	3	3
Total	399	423	422
Native	304	321	299
Foreign	89	96	118
Unknown	6	6	5
Total	399	423	422
Single	132	151	153
Married	173	181	179
Widowed	87	77	79
Divorced	4	11	8
Unknown	3	3	3
Total	399	423	422
Under 1 year	37	60	51
1 to 5 years	23	23	13
5 to 10 years	6	11	6
10 to 20 years	25	17	18
20 to 30 years	37	44	52
30 to 40 years	32	37	46
40 to 50 years	36	48	34
50 to 60 years	62	43	57
60 to 70 years	40	63	69
70 to 80 years	59	42	42
80 to 90 years	33	29	29
90 to 100 years	5	5	4
100 years and over	0	0	0
Unknown	4	1	1
Total	399	423	422
Typhoid fever	12	23	8
Smallpox	0	0	1
Measles	0	2	0
Scarlet fever	0	0	1
Whooping cough	1	2	0
Diphtheria and croup	7	3	4
Influenza	1	0	4
Erysipelas	1	1	1
Cholera infantum	9	15	8
Septicemia and pyaemia	4	8	2
Tuberculosis of lungs	31	29	34
Other forms of tuberculosis	2	1	4
Cancer and other malignant tumors	24	26	24
Rheumatism	2	6	2
Diabetes	4	4	5
Anemia and leukemia	5	2	5
Alcoholism	3	2	3
Other general diseases	13	17	16
Simple meningitis	3	8	3
Cerebrospinal meningitis	2	5	4
Cerebral hemorrhage and softening of the brain	13	5	12
Paralysis	18	4	8
Apoplexy	22	10	9
Convulsions under 5 years	7	7	4
Epilepsy	2	0	0
Anterior poliomyelitis	0	2	0
Other nervous diseases	0	0	2
Organic heart disease	32	37	33
Angina pectoris	3	3	4
Embolism and thrombosis	3	0	6
Hemorrhage	3	2	2
Bronchitis	2	4	5
Broncho pneumonia	2	10	2

DEATHS IN CEDAR RAPIDS, IOWA, FOR 1909, 1910 AND 1911—Continued.
(Exclusive of stillbirths.)

	1909	1910	1911
Pneumonia	26	21	23
Asthma	2	2	1
Congestion of lungs	0	1	1
Diseases of stomach	1	2	6
Diarrhoea and enteritis	3	1	0
Hernia and obstruction of bowels	2	6	5
Peritonitis	4	3	6
Appendicitis	12	9	6
Cirrhosis of the liver	7	3	4
Other diseases of liver	8	10	10
Nephritis and Bright's disease	28	30	26
Other diseases of kidneys	0	2	0
Puerperal septicemia	2	1	5
Other puerperal diseases	1	0	2
Gangrene	0	5	3
Malformations and injuries at birth	4	7	5
Premature births	6	9	14
Inanition	7	11	10
Arteriosclerosis	5	2	9
Senile debility	18	20	16
Railroad injuries	10	8	7
Suicide	4	9	13
Homicide	2	2	4
Accidents	15	21	24
Violence	1	0	1
Lightning	0	0	2
Injuries in mines	0	0	0
Effects of heat	0	0	1
Ill-defined causes	0	0	2
Unknown causes	0	0	0
Total	399	423	422

DEATHS IN CLINTON, IOWA, FOR 1909, 1910 AND 1911.
(Exclusive of stillbirths.)

	1909	1910	1911
Males	115	138	135
Females	108	84	116
Total	223	222	251
White	222	214	245
Colored	1	8	6
Total	223	222	251
Native	140	136	168
Foreign	76	77	75
Unknown	7	9	8
Total	223	222	251
Single	76	98	101
Married	85	72	85
Widowed	53	48	55
Divorced	6	1	4
Unknown	3	3	6
Total	223	222	251
Under 1 year	37	38	36
1 to 5 years	4	7	11
5 to 10 years	0	2	4
10 to 20 years	11	14	15
20 to 30 years	19	22	23
30 to 40 years	20	16	21
40 to 50 years	13	16	18
50 to 60 years	25	29	25
60 to 70 years	23	17	27
70 to 80 years	41	40	42
80 to 90 years	20	12	21
90 to 100 years	3	5	6
100 years and over	1	0	0
Unknown	6	4	2
Total	223	222	251
Typhoid fever	4	7	6
Measles	0	0	1
Scarlet fever	0	0	0
Whooping cough	1	0	2
Diphtheria and croup	0	2	0
Influenza	2	1	0
Erysipelas	0	0	0
Cholera infantum	4	5	4
Septicemia and pyaemia	2	1	3
Pellagra	0	0	0
Tuberculosis of lungs	11	12	21
Other forms of tuberculosis	2	1	0
Cancer and other malignant tumors	24	18	18
Rheumatism	2	1	2
Diabetes	5	3	2
Anemia and leukemia	3	3	2
Alcoholism	0	0	1
Other general diseases	7	5	9
Simple meningitis	0	0	2
Cerebrospinal meningitis	0	3	0
Cerebral hemorrahge and softening of the brain	11	7	7
Paralysis	11	5	8
Apoplexy	4	4	10
Convulsions under 5 years	4	1	1
Epilepsy	0	1	4
Anterior poliomyelitis	0	1	0
Other nervous diseases	3	2	0
Organic heart disease	27	24	24
Angina pectoris	1	0	4
Embolism and thrombosis	1	3	2
Hemorrhage	2	2	1
Bronchitis	1	3	1
Broncho pneumonia	2	1	4

DEATHS IN CLINTON, IOWA, FOR 1909, 1910 AND 1911—Continued.
(Exclusive of stillbirths.)

	1909	1910	1911
Pneumonia	15	8	24
Asthma	1	0	0
Congestion of lungs	2	1	0
Diseases of stomach	3	5	3
Diarrhoea and enteritis	3	0	0
Hernia and obstruction of the bowels	2	1	3
Peritonitis	2	3	4
Appendicitis	1	0	2
Cirrhosis of liver	3	2	2
Other diseases of liver	2	2	2
Nephritis and Bright's disease	10	22	22
Other diseases of kidneys	3	1	0
Puerperal septicemia	0	0	1
Other puerperal diseases	0	0	2
Gangrene	1	0	3
Malformation and injuries at birth	6	4	3
Premature birth	4	12	7
Inanition	4	6	2
Arteriosclerosis	2	3	3
Senile debility	9	17	9
Railroad injuries	3	7	2
Suicide	2	2	3
Homicide	0	2	1
Accidents	9	6	11
Violence	1	0	0
Injuries in mines	0	0	0
Effects of heat	0	0	0
Ill-defined causes	1	0	0
Total	223	222	251

DEATHS IN COUNCIL BLUFFS, IOWA, FOR 1909, 1910 AND 1911.
(Exclusive of stillbirths.)

	1909	1910	1911
Males	255	260	228
Females	191	185	178
Total	446	445	406
White	436	438	402
Colored	10	7	4
Total	446	445	406
Native	299	344	307
Foreign	122	79	78
Unknown	25	22	21
Total	446	445	406
Single	187	190	163
Married	153	164	160
Widowed	94	78	74
Divorced	3	3	3
Unknown	9	10	6
Total	446	445	406
Under 1 year	84	92	71
1 to 5 years	22	28	21
5 to 10 years	11	11	8
10 to 20 years	14	19	21
20 to 30 years	39	33	28
30 to 40 years	39	36	39
40 to 50 years	38	39	35
50 to 60 years	37	52	42
60 to 70 years	55	39	47
70 to 80 years	63	54	58
80 to 90 years	38	36	32
90 to 100 years	3	6	1
100 years and over	0	0	1
Unknown	3	0	2
Total	446	445	406
Typhoid fever	8	14	5
Smallpox	0	0	0
Measles	0	2	4
Scarlet fever	0	4	1
Whooping cough	2	1	2
Diphtheria and croup	7	3	4
Influenza	0	0	1
Erysipelas	1	2	0
Cholera infantum	17	21	5
Septicemia and pyaemia	2	5	6
Tuberculosis of the lungs	21	20	27
Other forms of tuberculosis	2	1	1
Cancer and other malignant tumors	15	22	11
Rheumatism	1	1	3
Diabetes	7	6	4
Anemia and leukemia	2	5	0
Alcoholism	0	0	2
Other general diseases	31	13	13
Simple meningitis	7	5	6
Cerebrospinal meningitis	0	1	0
Cerebral hemorrhage and softening of the brain	16	16	12
Paralysis	6	6	6
Apoplexy	9	13	13
Convulsions under 5 years	1	3	2
Epilepsy	1	1	4
Anterior poliomyelitis	0	0	0
Other nervous diseases	0	3	4
Organic heart disease	49	47	41
Angina pectoris	0	1	2
Embolism and thrombosis	6	7	3
Hemorrhage	0	1	1
Bronchitis	2	3	5
Broncho pneumonia	6	1	5

DEATHS IN COUNCIL BLUFFS, IOWA, FOR 1909, 1910 AND 1911—Continued.
(Exclusive of stillbirths.)

	1909	1910	1911
Pneumonia	25	38	38
Asthma	1	1	2
Congestion of lungs	4	3	2
Diseases of the stomach	3	4	2
Diarrhoea and enteritis	2	3	0
Hernia and obstruction of the bowels	4	3	7
Peritonitis	3	7	7
Appendicitis	5	2	7
Cirrhosis of liver	3	5	6
Other diseases of liver	10	5	5
Nephritis and Bright's disease	34	13	22
Other diseases of kidneys	2	2	2
Puerperal septicemia	1	0	1
Other puerperal diseases	0	0	4
Gangrene	1	1	3
Malformations and injuries at birth	8	8	4
Premature births	12	11	14
Inanition	22	25	18
Arteriosclerosis	4	[illegible]	5
Senile debility	32	27	20
Railroad injuries	11	14	8
Suicide	10	6	8
Homicide	0	0	0
Accidents	24	24	22
Violence	0	0	0
Lightning	0	0	0
Injuries in mines	0	0	0
Effects of heat	0	0	2
Ill-defined causes	1	0	2
Unknown causes	5	8	2
Total	446	446	406

DEATHS IN DAVENPORT, IOWA, FOR 1909, 1910 AND 1911.
(Exclusive of stillbirths.)

	1909	1910	1911
Males	340	406	365
Females	282	301	326
Total	622	707	691
White	614	690	682
Colored	8	17	9
Total	622	707	691
Native	371	437	408
Foreign	236	252	273
Unknown	15	18	10
Total	622	707	691
Single	226	257	233
Married	240	278	263
Widowed	140	152	177
Divorced	7	12	11
Unknown	9	8	7
Total	622	707	691
Under 1 year	94	95	99
1 to 5 years	21	27	18
5 to 10 years	8	13	11
10 to 20 years	20	24	29
20 to 30 years	40	53	59
30 to 40 years	59	46	67
40 to 50 years	69	79	68
50 to 60 years	79	84	81
60 to 70 years	70	94	76
70 to 80 years	81	118	113
80 to 90 years	65	60	58
90 to 100 years	12	10	11
100 years and over	2	1	0
Unknown	2	[illegible]	1
Total	622	707	691
Typhoid fever	7	16	14
Scarlet fever	1	3	1
Whooping cough	2	2	1
Diphtheria and croup	7	6	2
Influenza	2	0	1
Erysipelas	1	1	0
Cholera infantum	17	18	27
Septicemia and pyaemia	3	8	7
Pellagra	0	0	1
Tuberculosis of lungs	64	55	59
Other forms of tuberculosis	0	6	4
Cancer and other malignant tumors	37	55	55
Rheumatism	3	4	4
Diabetes	7	10	7
Anemia and leukemia	3	3	4
Alcoholism	7	4	2
Other general diseases	10	34	22
Simple meningitis	8	10	6
Cerebrospinal meningitis	0	1	3
Cerebral hemorrhage and softening of the brain	11	29	30
Paralysis	5	18	14
Apoplexy	30	28	25
Convulsions under 5 years	4	9	5
Epilepsy	2	0	3
Anterior poliomyelitis	1	1	1
Other nervous diseases	11	6	7
Organic heart disease	71	82	67
Angina pectoris	0	4	1
Embolism and thrombosis	3	2	1
Hemorrhage	0	3	3
Bronchitis	10	21	8
Broncho pneumonia	1	0	2
Pneumonia	56	54	64

DEATHS IN DAVENPORT, IOWA, FOR 1909, 1910 AND 1911—Continued.
(Exclusive of stillbirths.)

	1909	1910	1911
Asthma	4	1	6
Congestion of lungs	1	1	1
Diseases of stomach	11	8	3
Diarrhoea and enteritis	4	7	7
Hernia and obstruction of bowels	2	4	4
Peritonitis	8	12	14
Appendicitis	8	8	8
Cirrhosis of liver	3	6	6
Other diseases of liver	8	7	4
Nephritis and Bright's disease	41	22	29
Other diseases of kidneys	2	4	0
Venereal diseases	0	0	1
Puerperal septicemia	2	4	7
Other puerperal diseases	0	1	4
Gangrene	2	4	5
Malformations and injuries at birth	3	0	8
Premature births	15	21	19
Inanition	38	21	17
Arteriosclerosis	8	7	16
Senile debility	30	29	14
Railroad injuries	3	4	3
Suicide	15	13	23
Homicide	0	1	3
Accidents	24	32	29
Violence	4	1	0
Injuries in mines	0	0	0
Effects of heat	0	0	7
Ill-defined causes	2	1	2
Total	622	707	691

DEATHS IN DES MOINES, IOWA, FOR 1909, 1910 AND 1911.
(Exclusive of stillbirths.)

	1909	1910	1911
Males	638	586	645
Females	489	478	545
Total	1,127	1,064	1,190
White	1,068	1,016	1,132
Colored	59	48	58
Total	1,127	1,064	1,190
Native	931	886	965
Foreign	162	154	183
Unknown	34	24	42
Total	1,127	1,064	1,190
Single	483	465	448
Married	403	388	460
Widowed	192	173	232
Divorced	28	22	21
Unknown	21	16	29
Total	1,127	1,064	1,190
Under 1 year	232	214	204
1 to 5 years	75	58	63
5 to 10 years	12	20	24
10 to 20 years	52	54	50
20 to 30 years	103	109	95
30 to 40 years	107	92	112
40 to 50 years	86	97	119
50 to 60 years	106	106	118
60 to 70 years	138	106	136
70 to 80 years	110	134	159
80 to 90 years	77	65	85
90 to 100 years	14	8	19
100 years and over	2	0	0
Unknown	13	1	6
Total	1,127	1,064	1,190
Typhoid fever	14	29	22
Measles	6	3	1
Scarlet fever	2	2	1
Whooping cough	12	4	4
Diphtheria and croup	20	10	5
Influenza	2	1	4
Erysipelas	3	5	6
Cholera infantum	47	42	41
Septicemia and pyaemia	8	22	15
Tuberculosis of lungs	82	80	78
Other forms of tuberculosis	7	4	9
Cancer and other malignant tumors	59	69	81
Rheumatism	10	9	10
Diabetes	6	4	14
Anemia and leukemia	7	6	16
Alcoholism	10	5	11
Other general diseases	25	34	41
Simple meningitis	11	11	5
Cerebrospinal meningitis	3	3	6
Cerebral hemorrhage and softening of the brain	30	38	38
Paralysis	24	27	15
Apoplexy	17	21	27
Convulsions under 5 years	3	0	6
Epilepsy	1	0	1
Anterior poliomyelitis	1	2	2
Other nervous diseases	4	1	8
Organic heart disease	96	94	102
Angina pectoris	13	7	3
Embolism and thrombosis	6	2	4
Hemorrhage	5	11	11
Bronchitis	13	12	18
Broncho pneumonia	16	21	23
Pneumonia	103	88	89

DEATHS IN DES MOINES, IOWA, FOR 1909, 1910 AND 1911—Continued.
(Exclusive of stillbirths.)

	1909	1910	1911
Asthma	9	5	10
Congestion of lungs	4	5	2
Diseases of stomach	9	6	14
Diarrhoea and enteritis	11	3	10
Hernia and obstruction of bowels	24	16	18
Peritonitis	21	15	12
Appendicitis	11	11	12
Cirrhosis of liver	5	5	6
Other diseases of liver	9	9	14
Nephritis and Bright's disease	56	48	70
Other diseases of kidneys	2	5	3
Venereal diseases	1	0	5
Puerperal septicaemia	8	2	3
Other puerperal diseases	7	3	10
Gangrene	2	3	4
Malformations and injuries at birth	17	13	18
Premature births	58	35	45
Inanition	56	61	36
Arteriosclerosis	8	10	13
Senile debility	45	42	65
Railroad injuries	8	11	11
Suicide	16	17	10
Homicide	5	5	7
Accidents	65	55	66
Lightning	0	0	1
Injuries in mines	0	2	4
Effects of heat	0	0	1
Ill-defined causes	0	0	6
Unknown causes	4	1	1
Total	1,127	1,064	1,190

DEATHS IN DUBUQUE, IOWA, FOR 1909, 1910 AND 1911.
(Exclusive of stillbirths.)

	1909	1910	1911
Males	272	319	286
Females	227	266	203
Total	499	585	489
White	499	584	489
Colored	0	1	0
Total	499	585	489
Native	319	351	304
Foreign	172	219	174
Unknown	8	15	11
Total	499	585	489
Single	215	240	186
Married	177	200	176
Widowed	91	128	108
Divorced	6	8	5
Unknown	10	9	14
Total	499	585	489
Under 1 year	81	76	55
1 to 5 years	29	37	18
5 to 10 years	10	17	15
10 to 20 years	24	26	22
20 to 30 years	40	54	31
30 to 40 years	41	36	42
40 to 50 years	42	46	46
50 to 60 years	40	60	50
60 to 70 years	66	69	66
70 to 80 years	76	92	87
80 to 90 years	47	62	44
90 to 100 years	5	7	4
100 years and over	0	0	0
Unknown	4	8	9
Total	499	585	489
Typhoid fever	7	11	10
Scarlet fever	4	3	5
Whooping cough	1	6	0
Diphtheria and croup	7	17	11
Influenza	5	2	2
Erysipelas	1	0	2
Cholera infantum	21	18	1
Septicemia and pyaemia	12	2	8
Pellagra	0	0	0
Tuberculosis of lungs	42	41	41
Other forms of tuberculosis	1	4	1
Cancer and other malignant tumors	27	34	32
Rheumatism	1	4	5
Diabetes	3	3	2
Anemia and leukemia	1	7	4
Alcoholism	0	1	1
Other general diseases	12	14	12
Simple meningitis	5	14	7
Cerebrospinal meningitis	11	6	2
Cerebral hemorrhage and softening of the brain	17	26	20
Paralysis	8	19	13
Apoplexy	8	19	8
Convulsions under 5 years	4	7	10
Epilepsy	3	0	4
Anterior poliomyelitis	0	0	0
Other nervous diseases	9	3	4
Organic heart disease	42	57	38
Angina pectoris	2	3	3
Embolism and thrombosis	1	7	3
Hemorrhage	2	3	2
Bronchitis	8	14	9
Broncho pneumonia	7	4	4
Pneumonia	39	24	30

DEATHS IN DUBUQUE, IOWA, FOR 1909, 1910 AND 1911—Continued.
(Exclusive of stillbirths.)

	1909	1910	1911
Asthma	2	1	2
Congestion of lungs	4	0	2
Diseases of stomach	3	5	9
Diarrhoea and enteritis	7	4	4
Hernia and obstruction of bowels	9	7	4
Peritonitis	11	11	11
Appendicitis	2	5	3
Cirrhosis of liver	7	12	8
Other diseases of liver	1	5	3
Nephritis and Bright's disease	34	33	38
Other diseases of kidneys	2	4	0
Venereal diseases	0	0	0
Puerperal septicemia	1	0	1
Other puerperal diseases	1	2	4
Gangrene	4	3	0
Malformations and injuries at birth	7	3	4
Premature births	9	19	15
Inanition	18	8	11
Arteriosclerosis	4	6	2
Senile debility	34	44	33
Railroad injuries	7	7	8
Suicide	5	7	5
Homicide	1	1	1
Accidents	10	17	21
Violence	1	4	0
Injuries in mines	0	2	0
Effects of heat	0	0	0
Ill-defined causes	1	0	0
Unknown causes	3	2	2
Total	499	585	489

DEATHS IN FORT DODGE, IOWA, FOR 1909, 1910 AND 1911.
(Exclusive of stillbirths.)

	1909	1910	1911
Males	74	103	108
Females	70	75	62
Total	144	178	170
White	143	177	170
Colored	1	1	0
Total	144	178	170
Native	96	127	123
Foreign	44	48	45
Unknown	4	3	2
Total	144	178	170
Single	58	65	84
Married	49	74	47
Widowed	32	35	35
Divorced	3	3	2
Unknown	2	1	2
Total	144	178	170
Under 1 year	25	36	31
1 to 5 years	4	6	12
5 to 10 years	3	2	7
10 to 20 years	9	5	8
20 to 30 years	11	17	19
30 to 40 years	16	15	12
40 to 50 years	10	15	9
50 to 60 years	12	11	16
60 to 70 years	18	28	18
70 to 80 years	20	26	23
80 to 90 years	14	14	12
90 to 100 years	1	2	2
100 years and over	0	0	0
Unknown	1	1	1
Total	144	178	170
Typhoid fever	1	2	2
Measles	0	1	0
Scarlet fever	0	2	1
Whooping cough	2	0	0
Diphtheria and croup	0	0	11
Influenza	0	0	0
Erysipelas	1	1	0
Cholera infantum	3	6	11
Septicemia and pyaemia	1	2	3
Pellagra	0	0	0
Tuberculosis of lungs	12	8	12
Other forms of tuberculosis	0	0	0
Cancer and other malignant tumors	8	10	10
Rheumatism	1	1	2
Diabetes	3	0	1
Anemia and leukemia	0	1	0
Alcoholism	1	1	1
Other general diseases	4	8	5
Simple meningitis	2	2	2
Cerebrospinal meningitis	0	0	0
Cerebral hemorrhage and softening of the brain	1	2	5
Paralysis	4	4	2
Apoplexy	6	8	1
Convulsions under 5 years	1	1	0
Epilepsy	0	0	0
Anterior poliomyelitis	0	0	0
Other nervous diseases	2	0	1
Organic heart disease	10	15	15
Angina pectoris	0	2	3
Embolism and thrombosis	0	0	0

DEATHS IN FORT DODGE, IOWA, FOR 1909, 1910 AND 1911—Continued.
(Exclusive of stillbirths.)

	1909	1910	1911
Hemorrhage	1	1	2
Bronchitis	4	1	1
Broncho pneumonia	1	0	3
Pneumonia	21	21	16
Asthma	0	1	1
Congestion of lungs	0	0	0
Diseases of stomach	4	4	2
Diarrhoea and enteritis	0	2	1
Hernia and obstruction of the bowels	2	1	2
Peritonitis	1	3	0
Appendicitis	2	6	6
Cirrhosis of liver	1	1	2
Other diseases of liver	0	1	0
Nephritis and Bright's disease	9	6	5
Other diseases of kidneys	1	1	1
Puerperal septicemia	0	1	0
Other puerperal diseases	1	0	2
Gangrene	1	3	0
Malformations and injuries at birth	0	0	0
Premature birth	0	4	1
Inanition	8	8	6
Arteriosclerosis	2	3	3
Senile debility	8	15	13
Railroad injuries	2	4	3
Suicide	2	1	2
Homicide	0	0	0
Accidents	10	13	6
Lightning	0	0	1
Injuries in mines	0	0	1
Ill-defined causes	0	0	1
Unknown causes	0	0	1
Total	144	178	170

DEATHS IN KEOKUK, IOWA, FOR 1909, 1910 AND 1911.
(Exclusive of stillbirths.)

	1909	1910	1911
Males	118	93	92
Females	94	76	90
Total	212	169	182
White	202	147	156
Colored	10	22	26
Total	212	169	182
Native	138	125	121
Foreign	58	31	46
Unknown	16	13	15
Total	212	169	182
Single	53	62	45
Married	75	67	75
Widowed	72	31	54
Divorced	3	3	2
Unknown	9	6	6
Total	212	169	182
Under 1 year	14	18	9
1 to 5 years	7	11	7
5 to 10 years	2	6	3
10 to 20 years	7	10	6
20 to 30 years	15	14	13
30 to 40 years	15	12	15
40 to 50 years	19	26	17
50 to 60 years	22	15	19
60 to 70 years	36	14	40
70 to 80 years	47	25	33
80 to 90 years	19	14	14
90 to 100 years	4	2	2
100 years and over	0	0	1
Unknown	5	2	3
Total	212	169	182
Typhoid fever	3	7	6
Measles	0	1	1
Scarlet fever	2	0	0
Whooping cough	2	6	0
Diphtheria and croup	0	0	3
Influenza	2	5	3
Erysipelas	1	0	0
Cholera infantum	3	6	1
Septicemia and pyaemia	1	0	2
Tuberculosis of the lungs	20	20	17
Other forms of tuberculosis	0	0	0
Cancer and other malignant tumors	14	2	13
Rheumatism	1	0	0
Diabetes	1	2	2
Anemia and leukemia	1	0	1
Alcoholism	0	1	3
Other general diseases	4	6	7
Simple meningitis	0	3	1
Cerebrospinal meningitis	1	0	0
Cerebral hemorrhage and softening of the brain	10	5	4
Paralysis	12	4	10
Apoplexy	6	2	8
Convulsions under 5 years	3	2	2
Epilepsy	0	1	1
Anterior poliomyelitis	1	2	0
Organic heart disease	21	17	22
Angina pectoris	2	0	0
Embolism and thrombosis	0	0	0
Hemorrhage	2	3	1
Bronchitis	3	2	2
Broncho pneumonia	2	1	0
Pneumonia	17	11	21
Asthma	1	0	2

DEATHS IN KEOKUK, IOWA, FOR 1909, 1910 AND 1911—Continued.
(Exclusive of stillbirths.)

	1909	1910	1911
Congestion of lungs	1	0	0
Diseases of stomach	7	1	4
Diarrhoea and enteritis	2	1	0
Hernia and obstruction of bowels	0	1	1
Peritonitis	0	4	2
Appendicitis	1	1	1
Cirrhosis of liver	1	1	2
Other diseases of liver	6	2	0
Nephritis and Bright's disease	13	11	9
Other diseases of kidneys	0	0	0
Venereal diseases	0	1	0
Puerperal septicemia	0	0	0
Other puerperal diseases	0	0	1
Gangrene	1	2	0
Malformations and injuries at birth	2	2	1
Premature birth	4	3	2
Inanition	3	3	2
Arteriosclerosis	1	0	2
Senile debility	16	14	10
Railroad injuries	0	2	2
Suicide	3	2	1
Homicide	1	1	2
Violence	2	0	0
Accidents	12	8	5
Effects of heat	0	0	1
Ill-defined causes	0	0	1
Total	212	169	182

DEATHS IN MARSHALLTOWN, IOWA, FOR 1909, 1910 AND 1911.
(Exclusive of stillbirths.)

	1909	1910	1911
Males	167	221	167
Females	110	89	52
Total	277	310	219
White	277	307	217
Colored	0	3	2
Total	277	310	219
Native	228	255	171
Foreign	37	38	38
Unknown	12	17	10
Total	277	310	219
Single	65	82	57
Married	120	125	74
Widowed	74	81	73
Divorced	10	9	10
Unknown	8	13	5
Total	277	310	219
Under 1 year	21	24	20
1 to 5 years	9	3	5
5 to 10 years	3	4	1
10 to 20 years	11	9	2
20 to 30 years	9	24	12
30 to 40 years	18	20	11
40 to 50 years	19	20	11
50 to 60 years	19	23	12
60 to 70 years	57	59	51
70 to 80 years	74	76	61
80 to 90 years	29	34	32
90 to 100 years	2	3	1
100 years and over	0	0	0
Unknown	6	11	0
Total	277	310	219
Typhoid fever	5	3	2
Measles	0	1	0
Scarlet fever	1	0	0
Whooping cough	0	2	0
Diphtheria and croup	3	3	1
Influenza	1	4	1
Erysipelas	1	1	2
Cholera infantum	6	5	7
Septicemia and pyaemia	4	2	2
Tuberculosis of the lungs	24	13	12
Other forms of tuberculosis	0	0	1
Cancer and other malignant tumors	18	18	17
Rheumatism	0	0	2
Diabetes	3	2	2
Anemia and leukemia	9	4	0
Alcoholism	0	1	2
Other general diseases	14	7	2
Simple meningitis	1	1	0
Cerebrospinal meningitis	2	1	0
Cerebral hemorrhage and softening of the brain	9	3	15
Paralysis	15	13	8
Apoplexy	6	6	8
Convulsions under 5 years	1	4	3
Epilepsy	0	2	2
Anterior poliomyelitis	2	0	0
Organic heart disease	36	29	26
Angina pectoris	1	0	1
Embolism and thrombosis	0	1	1
Hemorrhage	2	4	2
Bronchitis	0	2	0
Broncho pneumonia	3	4	3
Pneumonia	29	27	12
Asthma	2	4	5

DEATHS IN MARSHALLTOWN, IOWA, FOR 1909, 1910 AND 1911—Continued.
(Exclusive of stillbirths.)

	1909	1910	1911
Congestion of lungs	0	6	1
Diseases of stomach	3	3	0
Diarrhoea and enteritis	2	4	1
Hernia and obstruction of bowels	1	2	0
Peritonitis	4	5	3
Appendicitis	1	0	3
Cirrhosis of liver	2	3	3
Other diseases of liver	3	2	1
Nephritis and Bright's disease	23	22	21
Other diseases of kidneys	0	1	0
Puerperal septicaemia	0	0	0
Other puerperal diseases	1	2	2
Gangrene	1	2	0
Malformations and injuries at birth	2	1	1
Premature birth	8	0	2
Inanition	4	0	5
Arteriosclerosis	1	0	0
Senile debility	22	28	27
Railroad injuries	3	48	2
Suicide	3	4	1
Homicide	0	1	0
Accidents	2	9	6
Effects of heat	0	0	1
Total	277	310	219

DEATHS IN MUSCATINE, IOWA, FOR 1909, 1910 AND 1911.
(Exclusive of stillbirths.)

	1909	1910	1911
Males	128	141	109
Females	97	98	99
Total	225	239	208
White	220	235	207
Colored	5	4	1
Total	225	239	208
Native	168	179	152
Foreign	52	57	55
Unknown	5	3	1
Total	225	239	208
Single	80	85	67
Married	88	91	83
Widowed	46	56	52
Divorced	10	5	3
Unknown	1	2	3
Total	225	239	208
Under 1 year	30	27	32
1 to 5 years	20	15	9
5 to 10 years	4	4	3
10 to 20 years	9	12	10
20 to 30 years	18	16	6
30 to 40 years	19	19	13
40 to 50 years	14	19	12
50 to 60 years	25	16	13
60 to 70 years	32	35	22
70 to 80 years	33	35	32
80 to 90 years	19	33	41
90 to 100 years	1	6	14
100 years and over	0	0	1
Unknown	1	2	1
Total	225	239	208
Typhoid fever	7	6	5
Measles	1	0	0
Scarlet fever	0	1	0
Whooping cough	0	0	2
Diphtheria and croup	4	4	1
Influenza	1	2	5
Erysipelas	0	0	1
Cholera infantum	5	9	4
Septicemia and pyaemia	3	5	1
Pellagra	0	1	0
Tuberculosis of the lungs	14	15	10
Other forms of tuberculosis	2	4	4
Cancer and other malignant tumors	15	16	6
Rheumatism	2	3	1
Diabetes	0	4	2
Anemia and leukemia	0	3	1
Alcoholism	0	0	0
Other general diseases	5	4	7
Simple meningitis	4	0	0
Cerebrospinal meningitis	4	0	0
Cerebral hemorrhage and softening of the brain	6	6	4
Paralysis	6	8	5
Apoplexy	8	9	11
Convulsions under 5 years	1	5	1
Epilepsy	1	0	0
Anterior poliomyelitis	0	0	0
Other nervous diseases	3	0	3
Organic heart disease	26	14	24
Angina pectoris	0	0	2
Embolism and thrombosis	2	0	1
Hemorrhage	4	2	1
Bronchitis	3	0	1
Broncho pneumonia	4	1	2

DEATHS IN MUSCATINE, IOWA, FOR 1909, 1910 AND 1911—Continued.
(Exclusive of stillbirths.)

	1909	1910	1911
Pneumonia	18	17	14
Asthma	0	0	4
Congestion of lungs	2	4	2
Diseases of stomach	1	2	0
Diarrhoea and enteritis	1	1	2
Hernia and obstruction of bowels	1	3	2
Peritonitis	2	4	4
Appendicitis	0	4	2
Cirrhosis of liver	1	4	0
Other diseases of liver	2	3	2
Nephritis and Bright's disease	13	18	14
Other diseases of kidneys	2	1	0
Puerperal septicemia	0	0	0
Other puerperal diseases	0	1	1
Gangrene	0	0	1
Malformations and injuries at birth	5	3	3
Premature birth	9	5	8
Inanition	2	3	5
Arteriosclerosis	0	0	5
Senile debility	19	23	20
Railroad injuries	4	3	1
Suicide	3	1	2
Homicide	0	0	1
Accidents	11	15	9
Lightning	0	0	0
Injuries in mines	0	0	0
Ill-defined causes	0	1	0
Unknown causes	1	0	0
Total	225	239	208

DEATHS IN OTTUMWA, IOWA, FOR 1909, 1910 AND 1911—Continued.
(Exclusive of stillbirths.)

	1909	1910	1911
Males	163	176	180
Females	151	144	157
Total	314	320	337
White	302	313	331
Colored	12	7	6
Total	314	320	337
Native	268	271	300
Foreign	38	48	32
Unknown	8	1	5
Total	314	320	337
Single	133	113	146
Married	116	128	123
Widowed	47	72	64
Divorced	10	5	2
Unknown	8	2	2
Total	314	320	337
Under 1 year	55	53	59
1 to 5 years	23	22	22
5 to 10 years	6	9	11
10 to 20 years	14	7	16
20 to 30 years	29	32	25
30 to 40 years	33	27	32
40 to 50 years	24	20	21
50 to 60 years	27	30	35
60 to 70 years	41	36	37
70 to 80 years	35	48	44
80 to 90 years	18	27	33
90 to 100 years	5	6	1
100 years and over	0	0	0
Unknown	4	3	1
Total	314	320	337
Typhoid fever	11	11	7
Measles	1	0	1
Scarlet fever	0	4	2
Whooping cough	2	2	2
Diphtheria and croup	4	1	3
Influenza	1	4	2
Erysipelas	1	0	0
Cholera infantum	19	7	11
Septicemia and pyaemia	1	1	0
Pellagra	0	0	0
Tuberculosis of the lungs	33	31	30
Other forms of tuberculosis	2	0	6
Cancer and other malignant tumors	18	25	25
Rheumatism	2	0	2
Diabetes	3	1	4
Anemia and leukemia	5	2	0
Alcoholism	0	2	2
Other general diseases	6	10	10
Simple meningitis	2	3	1
Cerebrospinal meningitis	1	1	3
Cerebral hemorrhage and softening of the brain	10	7	6
Paralysis	4	6	3
Apoplexy	4	7	9
Convulsions under 5 years	2	2	1
Epilepsy	0	0	1
Anterior poliomyelitis	0	0	0
Other nervous diseases	0	0	2
Organic heart disease	37	27	16
Angina pectoris	3	1	1
Embolism and thrombosis	2	1	4
Hemorrhage	0	0	1
Bronchitis	2	1	3
Broncho pneumonia	3	4	3

DEATHS IN OTTUMWA, IOWA, FOR 1909, 1910 AND 1911.
(Exclusive of stillbirths.)

	1909	1910	1911
Pneumonia	23	30	30
Asthma	3	1	0
Congestion of lungs	0	0	1
Diseases of stomach	4	3	1
Diarrhoea and enteritis	1	1	4
Hernia and obstruction of the bowels	1	3	4
Peritonitis	3	6	2
Appendicitis	3	3	4
Cirrhosis of liver	0	1	1
Other diseases of the liver	6	3	4
Nephritis and Bright's disease	16	25	26
Other diseases of kidneys	1	2	0
Venereal diseases	1	0	1
Puerperal septicemia	0	0	0
Other puerperal diseases	0	1	1
Gangrene	0	1	2
Malformations and injuries at birth	2	5	3
Premature birth	8	13	21
Inanition	15	12	5
Arteriosclerosis	10	9	11
Senile debility	7	19	17
Railroad injuries	8	6	4
Suicide	2	3	4
Homicide	3	1	1
Accidents	17	12	17
Violence	0	0	0
Injuries in mines	1	0	2
Effects of heat	0	0	3
Unknown causes	0	0	1
Total	314	320	337

DEATHS IN SIOUX CITY, IOWA, FOR 1909, 1910 AND 1911.
(Exclusive of stillbirths.)

	1909	1910	1911
Males	333	323	376
Females	257	306	313
Total	590	629	689
White	583	623	677
Colored	7	6	12
Total	590	629	689
Native	396	461	508
Foreign	173	144	165
Unknown	21	24	16
Total	590	629	689
Single	251	286	323
Married	244	224	265
Widowed	76	96	88
Divorced	4	9	5
Unknown	15	14	8
Total	590	629	689
Under 1 year	93	117	133
1 to 5 years	40	52	55
5 to 10 years	13	20	22
10 to 20 years	40	20	31
20 to 30 years	51	59	65
30 to 40 years	71	68	55
40 to 50 years	63	75	77
50 to 60 years	63	65	68
60 to 70 years	58	59	67
70 to 80 years	44	55	69
80 to 90 years	41	30	35
90 to 100 years	3	7	7
100 years and over	0	0	0
Unknown	10	2	5
Total	590	629	689
Typhoid fever	16	15	10
Measles	1	4	1
Scarlet fever	0	3	5
Whooping cough	1	6	4
Diphtheria and croup	7	5	11
Influenza	2	3	6
Erysipelas	1	1	3
Cholera infantum	24	34	28
Septicemia, and pyaemia	8	10	9
Tuberculosis of the lungs	31	34	30
Other forms of tuberculosis	6	8	9
Cancer and other malignant tumors	43	52	44
Rheumatism	9	9	2
Diabetes	8	6	6
Anemia and leukemia	4	8	4
Alcoholism	6	9	4
Other general diseases	32	27	14
Simple meningitis	7	4	9
Cerebrospinal meningitis	1	3	1
Cerebral hemorrhage and softening of the brain	7	8	13
Paralysis	6	8	5
Apoplexy	16	10	23
Convulsions under 5 years	10	3	5
Epilepsy	1	1	1
Anterior poliomyelitis	0	4	3
Other nervous diseases	3	0	4
Organic heart disease	37	37	44
Angina pectoris	4	0	2
Embolism and thrombosis	4	6	7
Hemorrhage	6	5	5
Bronchitis	6	9	6
Broncho pneumonia	10	15	12
Pneumonia	44	41	63

DEATHS IN SIOUX CITY, IOWA, FOR 1909, 1910 AND 1911—Continued.
(Exclusive of stillbirths.)

	1909	1910	1911
Asthma	3	2	1
Congestion of lungs	0	0	3
Diseases of stomach	2	5	7
Diarrhoea and enteritis	7	4	1
Hernia and obstruction of bowels	8	11	14
Peritonitis	16	9	19
Appendicitis	19	18	24
Cirrhosis of liver	1	2	5
Other diseases of liver	5	7	13
Nephritis and Bright's disease	32	33	40
Other diseases of kidneys	4	3	2
Venereal diseases	0	5	1
Puerperal septicemia	1	2	2
Other puerperal diseases	5	7	6
Gangrene	2	0	1
Malformations and injuries at birth	16	13	11
Premature births	11	19	22
Inanition	12	21	20
Arteriosclerosis	5	11	11
Senile debility	28	21	26
Railroad injuries	10	9	8
Suicide	7	9	11
Homicide	2	3	2
Accidents	32	24	37
Lightning	0	0	0
Injuries in mines	0	0	0
Ill-defined causes	1	1	3
Unknown causes	0	2	0
Total	590	629	689

DEATHS IN WATERLOO, IOWA, FOR 1909, 1910 AND 1911.
(Exclusive of stillbirths.)

	1909	1910	1911
Males	107	170	179
Females	90	133	149
Total	197	303	328
White	197	303	328
Colored	0	0	0
Total	197	303	328
Native	155	252	274
Foreign	41	48	52
Unknown	1	3	2
Total	197	303	328
Single	75	135	128
Married	79	97	135
Widowed	38	67	56
Divorced	2	3	5
Unknown	3	1	4
Total	197	303	328
Under 1 year	36	71	51
1 to 5 years	12	20	15
5 to 10 years	3	3	9
10 to 20 years	8	15	15
20 to 30 years	21	27	28
30 to 40 years	10	19	26
40 to 50 years	12	19	32
50 to 60 years	23	23	35
60 to 70 years	18	26	47
70 to 80 years	30	43	39
80 to 90 years	19	28	26
90 to 100 years	2	8	4
100 years and over	1	0	0
Unknown	2	1	1
Total	197	303	328
Typhoid fever	0	4	10
Measles	4	4	0
Scarlet fever	4	1	0
Whooping cough	0	3	2
Diphtheria and croup	3	3	4
Influenza	1	1	1
Erysipelas	2	0	0
Cholera infantum	7	6	7
Septicemia and pyaemia	3	3	4
Pellagra	0	0	0
Tuberculosis of the lungs	10	19	20
Other forms of tuberculosis	0	1	4
Cancer and other malignant tumors	7	20	32
Rheumatism	1	4	0
Diabetes	3	4	2
Anemia and leukemia	1	3	1
Alcoholism	4	3	2
Other general diseases	7	12	9
Simple meningitis	1	10	9
Cerebrospinal menenigitis	1	4	5
Cerebral hemorrhage and softening of the brain	7	20	11
Paralysis	3	3	5
Apoplexy	1	6	2
Convulsions under 5 years	1	3	4
Epilepsy	0	0	1
Anterior poliomyelitis	1	4	0
Other nervous diseases	3	7	4
Organic heart disease	11	15	20
Angina pectoris	1	0	2
Embolism and thrombosis	0	1	0
Hemorrhage	5	5	2
Bronchitis	1	2	5
Broncho pneumonia	2	2	2

DEATHS IN WATERLOO, IOWA, FOR 1909, 1910 AND 1911—Continued.
(Exclusive of stillbirths.)

	1909	1910	1911
Pneumonia	23	21	33
Asthma	0	2	1
Congestion of lungs	0	0	0
Diseases of the stomach	0	1	5
Diarrhoea and enteritis	1	1	1
Hernia and obstruction of the bowels	2	4	2
Peritonitis	0	3	6
Appendicitis	2	4	2
Cirrhosis of the liver	0	0	3
Other diseases of the liver	2	0	1
Nephritis and Bright's diseases	18	14	21
Other diseases of kidneys	3	0	2
Puerperal septicemia	2	3	2
Other puerperal diseases	0	1	3
Gangrene	2	0	1
Malformations and injuries at birth	4	3	5
Premature births	7	10	10
Inanition	8	8	8
Arteriosclerosis	1	1	2
Senile debility	20	28	16
Railroad injuries	1	7	5
Suicide	1	3	6
Homicide	0	0	0
Accidents	9	9	18
Violence	0	0	0
Injuries in mines	0	1	0
Effects of heat	0	0	4
Ill-defined causes	0	0	1
Total	197	303	328

EMBALMERS' DEPARTMENT.

On the 30th day of June, 1912, there were in the state of Iowa, 1101 licensed embalmers in good standing with the Iowa State Board of Health.

During the biennial period, July 1, 1910, to June 30, 1912, there were 122 embalmers' licenses issued upon examination and 11 through reciprocity, making a total of 133.

Iowa has reciprocity with Colorado, Idaho and Illinois.

The embalmers feel that they are a constituent part of the state board of health, and the office of the board is the general center for the diffusion of knowledge relative to the prevention and spread of disease.

DISINTERMENTS.

During the biennial period, ending June 30, 1912, a total of 2,197 disinterment permits were issued from the state board of health office as follows:

1910-11		1911-12	
July	20	July	89
August	55	August	96
September	138	September	88
October	155	October	123
November	146	November	87
December	55	December	49
January	10	January	17
February	38	February	21
March	86	March	28
April	104	April	167
May	137	May	158
June	98	June	111
Total	1,042	Total	1,034

Special disinterment permits issued..... 121

Total number of permits issued.....2,197

NURSES' DEPARTMENT.

At the end of the biennial period, June 30, 1912, there were 1,220 nurses registered in Iowa. Of this number 251 were granted certificates during the last biennial period.

Since January 1, 1910, all nurses who have applied for registration were required to pass an examination as the time for registration without examination as fixed by law expired January 1, 1910. Nurses holding diplomas from any of the following list of training schools are eligible to examination before this board:

TRAINING SCHOOLS IN GOOD STANDING WITH THE STATE BOARD OF HEALTH.

June 30, 1912.

Atlantic	Atlantic Hospital Training School.
Boone	Eleanore Moore Hospital.
Burlington	Burlington City Hospital.
Burlington	Mercy Hospital.
Carroll	St. Anthony's Hospital.
Cedar Rapids	Mercy Hospital.
Cedar Rapids	St. Luke Hospital.
Centerville	St. Joseph's Mercy Hospital.
Cherokee	Cherokee State Hospital.
Clarinda	Clarinda State Hospital.
Clinton	Agatha Hospital.
Clinton	St. Joseph's Mercy Hospital.
Council Bluffs	Jennie Edmundson Memorial Hospital.
Council Bluffs	Mercy Hospital.
Cresco	St. Joseph's Mercy Hospital.
Creston	Cottage Hospital.
Creston	Unity Hospital.
Davenport	Davenport Hospital.
Davenport	Mercy Hospital.
Davenport	St. Luke's Hospital.
Des Moines	Des Moines General Hospital.
Des Moines	Iowa Methodist Hospital.
Des Moines	Mercy Hospital.
Dubuque	Finley Hospital.
Dubuque	St. Joseph's Mercy Hospital.
Ft. Dodge	St. Joseph's Mercy Hospital.
Glenwood	Glenwood State Hospital.
Ida Grove	Conn Brothers' Hospital.

Independence	Independence State Hospital.
Iowa City	State University Hospital, (Regular).
Iowa City	State University Hospital, (Homeopathic).
Keokuk	Graham Hospital.
Keokuk	St. Joseph's Hospital.
Maquoketa	Iowa Sanitarium Training School.
Marshalltown	St. Thomas' Mercy Hospital.
Mason City	City Park Hospital.
Muscatine	Benjamin Hershey Memorial Hospital.
Muscatine	Bellevue Hospital.
Mt. Pleasant	Mt. Pleasant State Hospital.
Nevada	Iowa Sanitarium Training School.
Oskaloosa	Abbott Hospital.
Oskaloosa	Oskaloosa Public Hospital.
Ottumwa	Ottumwa Hospital.
Sioux City	German Lutheran Hospital.
Sioux City	Samaritan Hospital.
Sioux City	St. Joseph's Mercy Hospital.
Sioux City	St. Vincent's Hospital.
Waterloo	Synodical Presbyterian Hospital.
Waverly	St. Joseph's Mercy Hospital.

BOARD OF MEDICAL EXAMINERS.

The total number of physicians registered and practicing in this state June 30, 1912.....3,653

Ratio 1 to every 609 persons.

Number of certificates issued during biennial period..... 333

Number of certificates issued upon examination..... 202

Number of certificates issued under reciprocal agreements with other states 131

Number of itinerants' licenses issued during biennial period..... 21

Number of osteopathic certificates issued..... 50

The state board of medical examiners, believing that the standard of medical education should be advanced, has adopted a preliminary requirement; therefore all persons contemplating the study of medicine, surgery and obstetrics, or who expect to appear before the Iowa state board of medical examiners for examination must be graduates of a fully accredited* high school, academy, or seminary in which at least two years of foreign language is required, and in addition thereto, two full years of college work in an accredited college, which shall include at least ten semester hours† of chemistry, ten of physics (or six, if one year in the subject was done in high school), six of biology, and ten of foreign language. The foreign language taken in college must include enough Latin to make the total Latin taken in high school and college together equal to two years' work in that subject.

All colleges requiring a lesser standard of qualifications will not be considered in good standing with the Iowa state board of medical examiners.

*By an "accredited" high school, academy and seminary is meant one that has been inspected and fully accredited by the state university of the state in which it is located; or, in other words, a high school, academy or seminary, a diploma from which would admit the holder to the college of liberal arts of the state university of Iowa without examination. The matriculation examination for entrance on the study of medicine must be conducted by one especially qualified and not 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 Iowa state inspector of schools.

†By "semester hour" is meant a subject taken for one hour a week during one semester. This equals from sixteen to eighteen hours of didactic class-room work or thirty-two to thirty-six or more hours of laboratory work.

FOURTH BIENNNAL REPORT OF THE DIRECTOR OF THE IOWA STATE BOARD OF HEALTH BACTERIOLOGICAL LABORATORY.

July 1, 1910-July 1, 1912.

I herewith submit the fourth biennial report giving an account of the work done and expenditures made during the past two years and recommendations as to work for the coming biennium.

NUMBER AND KINDS OF EXAMINATIONS.

During the past biennium 27,078 examinations were made and preventive treatments given in the bacteriological laboratories of the Iowa state board of health. Of these 21,691 were examnations made in the central laboratory of the board of health at Iowa City, 2,669 were preventive treatments and 2,718 were examinations made in the auxiliary laboratory of the board of health. In the total number of examinations 9,994 were for diphtheria; 3,611 for typhoid fever, 6,127 for tuberculosis and 4,677 miscellaneous.

DIPHTHERIA—Of the 9,994 examinations for diphtheria, 4,283 were for diagnosis of which 1,524 were positive, 2,584 negative and 175 questionable; 5,611 were for release from quarantine of which 2,346 were positive, 3,239 negative and 26 questionable.

TYPHOID FEVER—Of the 3,611 examinations for typhoid fever, 1,133 were positive, 2,137 negative and 341 questionable.

TUBERCULOSIS—Of the 6,127 sputum examinations, 1,344 were positive and 4,783 negative.

MISCELLANEOUS—See table following.

Tabulated, the examinations are as follows:

KIND OF SPECIMEN	Positive	Negative	Diagnosis reserved	Total
Diphtheria	3,870	6,823	201	9,994
Typhoid fever	1,133	2,137	341	3,611
Tuberculosis	1,344	4,783	.....	6,127
Miscellaneous—				
Water	.....	.....	.....	420
Milk	.....	.....	.....	46
Rabies	.....	.....	.....	82
Blood	.....	.....	.....	130
Cerebro-spinal meningitis	.....	.....	.....	57
Urine	.....	.....	.....	86
Feces	.....	.....	.....	75
Tissue	.....	.....	.....	400
Pleural exudate	.....	.....	.....	32
Glanders	.....	.....	.....	70
Animal inoculations	.....	.....	.....	248
Hogs	.....	.....	.....	95
Eye specimens	.....	.....	.....	80
Ear specimens	.....	.....	.....	50
Secretions, excretions and exudates	.....	.....	.....	2,816
				4,677
Preventive treatments	.....	.....	.....	2,669
Grand total	.....	.....	.....	27,078

Table giving the number of examinations made annually and biennially since the establishment of the laboratory:

July 1st, 1904—July 1st, 1905	3,580	8,779—First Biennial Period
July 1st, 1905—July 1st, 1906	5,199	
July 1st, 1906—July 1st, 1907	8,453	17,289—Second Biennial Period
July 1st, 1907—July 1st, 1908	8,856	
July 1st, 1908—July 1st, 1909	10,437	22,961—Third Biennial Period
July 1st, 1909—July 1st, 1910	12,524	
July 1st, 1910—July 1st, 1911	13,437	27,078—Fourth Biennial Period
July 1st, 1911—July 1st, 1912	13,641	

Table giving reports from auxiliary laboratories:

LOCALITY	In Charge of	Diphtheria	Typhoid fever	Tuberculosis	Miscellaneous	Not specified	Total
Sioux City	E. W. Meis	537	40	228	4	------	809
Davenport	H. M. Decker	420	------	------	------	124	544
Des Moines	L. S. Ross	252	57	121	27	------	457
Burlington	E. J. Wehman	147	56	166	------	------	369
Mason City	F. Albert & C. F. Starr	196	------	17	------	93	305
Waterloo	W. M. Shirley	226	1	7	------	------	234
	Grand total	------	------	------	------	------	2,718

NUMBER OF CULTURE STATIONS.

There are at the present time, 824 culture stations of the bacteriological laboratory. These are located in 764 cities and towns. During the past biennium 34,188 diagnosis outfits have been supplied to the various culture stations. Of these 19,138 were diphtheria outfits; 6,316 typhoid fever, and 8,734 tuberculosis outfits.

The establishment of culture stations has brought the benefits of the laboratory of the state board of health very close to the people of the state. The supplying of the culture stations with the diagnosis outfits makes such available to all physicians at any time and without charge. In other states the outfits are sent to physicians only on request and at their expense. This no doubt, accounts for the unusually large number of physicians in Iowa who make use of the laboratory.

RABIES.

During the past two years, 82 examinations were made in the laboratory for evidence of rabies or hydrophobia. The specimens examined consisted of the following animals, 73 dogs, 5 cats, 3 horses, 1 hog. A positive report is given when either Negri bodies are found on microscopical examination or when the disease develops in an inoculated animal. In a number of cases, the brain was so destroyed or the specimen so putrid that a satisfactory laboratory examination could not be made. It should be borne in mind also that the laboratory examination does not always reveal the disease even if it exists, for that reason it is exceedingly important that the animal which does the biting should not be killed but be confined and watched. If the animal does not develop typical symptoms or die within ten days it is safe to say that it was not affected by rabies. If the animal cannot be secured without danger to others, it should be shot through the heart rather than the head. The development of so many cases of rabies in Iowa is due, I am sure, to the fact that the people are not sufficiently informed as to the possibility of eradicating the disease. There is no fact in preventive medicine better established than that rabies may be entirely exterminated. If all stray or unlicensed dogs were killed and if, when the disease makes its appearance in a community, all dogs were muzzled for a period of six months, the disease can be practically stamped out in the course of a few years.

PASTEUR TREATMENT.

During the past two years 74 persons applied for the Pasteur treatment for the prevention of rabies. The treatment was given to 67, it being found unnecessary to give it to the remainder because of the absence of rabies in the animal which did the biting. In only one case did the disease develop subsequently, due, no doubt, to an unusually severe infection as indicated by the extremely rapid development of rabies in lower animals bitten by the same dog. If instead of making the great mistake of killing an animal as soon as it is suspected that it is affected by rabies, the animal be shut up and watched, it will no doubt be found that some of the Pasteur treatments which are now being given are unnecessarily, but under the circumstances, advisedly administered. The patients who received the Pasteur treatment have come from the following localities:

Ames	1	Manson	1
Arispe	4	Minburn	1
Arthur	1	Mt. Vernon	2
Boone	13	Oelwein	2
Burlington	2	Shannon City	7
Cedar Rapids	5	Solon	1
Clinton	3	Strawberry Point	1
Cresco	5	Thayer	1
Davenport	11	Waverly	1
Fort Des Moines	1	Webster	1
Fort Dodge	1	Wolcott	1
Hampton	1		
		Total	67

TYPHOID FEVER EPIDEMICS.

During the biennium, there have been a rather large number of epidemics of typhoid fever, three of which have been very serious. These occurred at Des Moines, Cedar Falls and Oskaloosa.

THE DES MOINES EPIDEMIC—During the latter part of 1910 and the early part of 1911, Des Moines was visited by an epidemic of typhoid fever during which there occurred 209 cases of the disease. An examination of a sample of the city water made soon after the beginning of the epidemic revealed sewage pollution as indicated by the presence of an

unusually large number of colon bacilli. A careful investigation made subsequently by Dr. L. L. Lumsden (see Pulbic Health Reports, Vol. XXVI, No. 4, Jan. 27, 1911) proved that the water supply was the source of the epidemic.

THE CEDAR FALLS EPIDEMIC—During the fall of 1911 there occurred an epidemic of typhoid fever in Cedar Falls during which there were 170 cases of the disease, with a death rate of about 10 per cent. Many of the cases were students at the state teachers college. The investigation was made by Dr. A. L. Grover of the university department of pathology and bacteriology by permission of the president of the university, who found the city water supply was the source of infection. (See An Outbreak of Typhoid Fever in Cedar Falls, Ia., in the Journal of Infectious Diseases, Vol. X, No. 3, May, 1912, pp. 388-403; also embodied in this biennial report.)

THE OSKALOOSA EPIDEMIC—During this epidemic which occurred in the spring of 1912, there were 65 cases of typhoid fever. An investigation made by Dr. W. H. Frost of the U. S. public health and marine hospital service and Dr. M. F. Boyd of our laboratory traced the source to the city water supply. (For report, see Public Health Reports; also embodied in this biennial report.)

ANTI-TYPHOID VACCINATION.

During the past biennium 248 persons received the anti-typhoid vaccination. Every person, with but few exceptions, received three treatments. The persons vaccinated consisted of students at the university of Iowa, of physicians, and nurses who came to the laboratory for treatment, and in a few instances of persons residing in localities where typhoid fever was prevalent. There is no doubt as to the protection offered by the vaccination. In 1911, the director of the laboratory and Dr. Mendenhall of the department of pathology and bacteriology conducted an investigation as to the extent to which the protective substances are produced in the body as the result of the administration of the vaccine. (See Reactions Induced by Anti-typhoid Vaccination, American Journal of the Medical Sciences, February, 1912, also supplement to this report.) It has for some years been known that anti-typhoid vaccination was of great value. It has not as a rule been advised during an outbreak of typhoid fever in a community; we believe that there is no good reason for withholding the vaccination at such times. Accordingly we advised the vaccination during the outbreak at Cedar Falls. Such was carried out with a result most noticeable in connection with the nurses. It was estimated that each of the 170 cases of typhoid fever had a nurse; of these 88 were vaccinated, none of whom developed typhoid fever; twelve of the remaining 82 contracted the disease. (See An Outbreak of Typhoid Fever in Cedar Falls, Ia., Journal of Infectious Diseases, Vol. X, No. 3, May, 1912, p. 401; also supplement to this Report.) We would strongly urge the more general adoption of anti-typhoid vaccination.

TYPHOID BACILLI CARRIERS.

During the past biennium an outbreak of typhoid fever occurring near Muscatine was traced to a typhoid bacilli carrier, that is, a person who

is a carrier of typhoid bacilli but who at the time is not affected by typhoid fever. (See Typhoid Bacilli Carriers, Journal of the Iowa State Medical Society, September 15, 1911, also Supplement to this Report.) This outbreak was unusual in that a large number of persons became carriers without contracting the disease. The importance of typhoid carriers as disseminators of typhoid fever is not appreciated by the public in general. Typhoid fever is entirely too common a disease in Iowa. If what we now know regarding the prevention of the disease were put into operation, I confidently believe that the number of cases of typhoid fever would be reduced to less than one-tenth of what it is at present. It is of the highest importance that a sanitary survey more particularly with reference to the water supply should be made as soon as possible. Such work can in part be done by an epidemiologist for which there is urgent need.

DIPHTHERIA AND THE PUBLIC SCHOOLS.

It is now quite generally recognized that probably most cases of diphtheria are contracted through association in the public schools. Occasionally the development of a large number of cases in a certain school calls particular attention to such. More recently it has been shown that the source of infection is frequently a "bacilli carrier," i. e., a person who carries diphtheria bacilli in his nose and throat but who at the time is not, or possibly at no time has been, affected by diphtheria. Until the recognition of this fact and the adoption of correspondingly appropriate regulations, diphtheria often continued among the school children of a community for months. The closing of the schools and the repeated disinfection of school buildings was of little avail. On the other hand, the examination, clinical and bacteriological, of the throats of persons exposed and the isolation at home of those found to be carriers has served to place a sudden check on every outbreak in which it has been faithfully tried. By such means, severe outbreaks of diphtheria among school children in Charles City, Waterloo, Davenport, Muscatine and other places which occurred during the past biennium, were rapidly brought under control. (See article "Diphtheria Carriers and Medical Inspection of Schools," Iowa Medical Journal, Dec., 1911; also Supplement to this Report.)

EXAMINATION OF PUBLIC DRINKING CUPS.

At the request of Secretary Sumner, we made a bacteriological examination of a number of common drinking cups obtained from various public places. Disease-producing bacteria were found on a number of them. The complete findings were published in the Iowa Health Bulletin of the State Board of Health, Vol. XXV, October, November, December 1911, No. 2.

CO-OPERATIVE WORK WITH THE UNITED STATES PUBLIC HEALTH AND MARINE HOSPITAL SERVICE.

The United States public health and marine hospital service is making an investigation of the extent to which interstate streams are being polluted with sewage. For the investigation of the Missouri river they

have asked for the co-operation of the boards of health of the several adjacent states. In compliance with such, daily examinations of water from the Missouri river at Sioux City are now being made at the laboratory. The results of this investigation which will be published by the public health and marine hospital service, will serve to stimulate an investigation as to the degree of pollution of the streams within the states and point out the supreme importance of the prevention of such pollution in order that the water supply of our cities may be rendered more safe.

NEW DIAGNOSIS OUTFITS.

During the past two years the diagnosis outfits, both for tuberculosis and diphtheria, have been altered. The change of the tuberculosis outfit consisted simply of adding an inner all-tin case to comply with recently adopted postal regulations. The diphtheria outfit was markedly altered—having been changed from an express package to a mailing case. This change has been of decided value, first, in reducing the expense of transportation from 25 cents to 8 cents and second, in more rapid delivery since there is no delay in the transferring of specimens as was formerly done by express companies. That this change is being appreciated is evidenced in part by the increase in the number of specimens submitted.

PERSONNEL OF THE LABORATORY.

Dr. Henry Albert has continued as the director of the laboratory since its establishment eight years ago. Dr. Jessie B. Hudson, first assistant bacteriologist, resigned in April, 1912, to accept the position of pathologist to the Woman's Hospital, Philadelphia. A. R. Alden, her successor, began work July 1st. During the interval this work was done by Dr. A. C. Echternacht. Dr. M. F. Boyd, who has, during the past year been second assistant bacteriologist, has resigned to become health officer of Oskaloosa, Ia. Anna Stach was secretary-clerk, and Leo Musgrove attendant during the biennium. During the past winter, pressure of work required additional help for a few weeks. The several employes of the laboratory have worked faithfully—appreciating at all times the great responsibility associated with the nature of the work.

FINANCIAL REPORT. CLASSIFIED SUMMARY OF EXPENDITURES FOR BIENNIUM JULY 1, 1910—JULY 1, 1912.

PERMANENT EQUIPMENT:			
Furniture and filing cases	$ 141.99		
Apparatus	1,148.23		
Diagnosis outfits	1,062.35		
		$ 2,352.57	
CURRENT EXPENSE:			
Salaries	$ 6,923.07		
Express	619.24		
Postage	641.73		
Animals and feed	214.82		
Travel expense	117.84		
Telegraph and telephone	106.30		
Printing	324.30		
General laboratory expense	695.39		
		9,641.69	
Total			$11,994.26

Bills indicating exactly for what the various items are and receipts for same are to be found in the offices of the auditor of state and secretary of the Iowa state board of health and are also found in this biennial report.

SAVING IN TIME AND MONEY TO THE PEOPLE OF IOWA BY RELEASE OF QUARANTINE FOR DIPHTHERIA BY THE LABORATORY (CULTURE METHOD, BASED ON 5,611 SPECIMENS FOR RELEASE.)

Period of quarantine by "time-limit" method (in days)	28	
Average period of quarantine by "culture" method	16	
Number of days saved per each quarantine	12	
Number of families in which diphtheria occurred	518	
Average number of persons in family	4.6	
	2,382	
Number of persons quarantined for diphtheria	2,382	
Number of days saved per each quarantine	12	
Total number of days (for individuals) saved from quarantine		28,593

Number of "school" days saved to children (2-5 of family)	11,437
Number of days saved to heads of families (1-5 of family)	5,718
Average daily earning capacity of heads of family....	$ 2.50
Total earnings saved (by heads of families alone)...	$14,296.00

TABLE REPRESENTING COST OF WORK DONE BY THE LABORATORY IF MADE BY A COMMERCIAL INSTITUTION.

(All examinations in the board of health laboratory are made free of charge.)

(Based on examinations made and treatments given during the past biennium July 1, 1910-July 1, 1912.)

KIND OF SPECIMEN	Number	Price per examination	Cost
Diphtheria	9,994	$ 2.00	$ 19,988.00
Typhoid fever	3,611	2.00	7,222.00
Tuberculosis	6,127	2.00	12,254.00
Water	420	10.00	4,200.00
Milk	46	3.00	138.00
Tissue	400	5.00	2,000.00
Rabies	82	10.00	820.00
Animal inoculations	248	10.00	2,480.00
Pasteur treatments	67	100.00	6,700.00
Anti-typhoid vaccination	248	5.00	1,240.00
Other preventive treatments	260	2.00	520.00
General miscellaneous examinations	3,491	5.00	17,455.00
Investigating typhoid epidemics—35 days; $25 per day			875.00
Total			$ 75,892.00

Add to such $14,296.00 saved to the people of the state by release of quarantine for diphtheria by the laboratory method, we have a grand total of $90,188.00 saved to the people of the state by their bacteriological laboratory. The biennial appropriation for the laboratory is $12,000.00. This does not take into consideration that the physicians have had the advantage of having the outfits on hand and obtaining them free of charge instead of sending away for the outfits for which they must pay and also wait several days before they arrive.

RECOMMENDATIONS.

1. That the resignation of Dr. M. F. Boyd as assistant bacteriologist be accepted.

2. That Dr. Mildred E. Sheetz be appointed assistant bacteriologist at a salary of $400.00 per annum (for one-half of her time) for the year beginning July 1, 1912.

3. That Dr. A. C. Echternacht be named as bacteriologist in charge of the auxiliary laboratory in Mason City, and Dr. M. F. Boyd in charge of a similar laboratory in Oskaloosa.

4. That the director have charts showing some of the results of the board of health laboratory work made for the Iowa exhibit of the international congress of hygiene and demography to be held in Washington, D. C., in September, 1912.

5. That the board of health consider the advisability of

a Asking the executive council to issue 300 paper-covered reprints of this biennial report of the director of the laboratory.

b Adding the making of laboratory examination of venereal diseases to the work of the laboratory and of asking the legislature for an additional appropriation of $2,000.00 per annum for carrying on such work.

c Having an epidemiologist, and of asking the legislature for an additional appropriation of $2,500.00 per annum for epidemiological work.

The work of the laboratory during the past biennium has consisted almost entirely of routine diagnostic work, there having been but very little time for work of a research nature. The work of the board of health laboratory may be very profitably increased along a number of lines as suggested in the recommendations. If the scope or amount of work should be increased it will require an additional support fund and the service of additional assistants.

Very respectfully submitted,

HENRY ALBERT.

Educational Articles

REACTION INDUCED BY ANTI-TYPHOID VACCINATION.

By Henry Albert, M. D., Professor of Pathology and Bacteriology, University of Iowa, and A. M. Mendenhall, M. D., Instructor in Pathology and Bacteriology, University of Iowa, Iowa City.

(From the Laboratory of Pathology and Bacteriology, University of Iowa.)

With the object of determining the reactions induced by typhoid bacillus vaccines, we made a series of examinations of ten medical students, who voluntarily received the vaccination during the early part of the past year. We were especially interested in the change in the number and proportion of leukocytes, but made such other determinations as were necessary to demonstrate that specific antibodies were actually produced. Finding that better results were obtained with a vaccine prepared at the Army Medical School, Washington, D. C., than one which was prepared from our own culture, we used vaccines supplied by Major Russell. This vaccine (No. 44) was prepared by cultivating a nonvirulent strain of the typhoid bacillus on slanted agar for eighteen hours, then making a suspension of the growth in sterile salt solution and diluting it so that each cubic centimeter contained 1,000,000,000 bacilli. This was then sterilized at a temperature of 56° C. for one hour and its sterility tested by aerobic and anaerobic cultivation and by animal inoculation. After the addition of tricresol (to make a 0.25 per cent. solution) as a preservative the vaccine was placed in sterile glass ampoules, which were sealed by heat.

Artificial immunization against typhoid fever was first tried on lower animals by means of living cultures of typhoid bacilli. Among the earlier experimenters were Simmons and Frankel (1886), Beumer, Chantemesse, Widal and Sanarelli.[1] In 1892 Brieger, Kitasato, and Wassermann[2] determined that the use of killed typhoid bacilli was quite as efficient in inducing the production of antibodies as were living bacteria. Pfeiffer's[3] work in 1893 and the following year, in demonstrating the possibility of inducing marked bacteriolysis in the body (Pfeiffer's phenomenon) was a great stimulus to further research, as was also the work on agglutinins by Grubler and Durham in 1896. In 1896 Pfeiffer and Kolle,[4] working together, and A. E. Wright[5] independently, inoculated two men with typhoid vaccines. The laboratory evidence of the production of immunity was sufficiently great to warrant the application of the vaccination on a more extensive basis. In 1897 Wright[6] reported the inoculation of eighteen persons, and the following year introduced anti-typhoid vaccination on a rather large scale among the English soldiers engaged in the Boer

[1]Handbuch der Technik und Methodik der Immunitatsforshung, i, 723.
[2]Zeitschr, f. Hyg., 1892, xii, 137.
[3]Deut. med. Woch., 1896, Nos. 7 and 8.
[4]Duet. med. Woch., 1896, p. 735.
[5]Lancet, September 19, 1896, p. 807.
[6]Brit. Med. Jour., January 30, 1897, p. 16.

war in southern Africa. Certain unfavorable reports regarding the work in southern Africa caused a partial suspension of the work for a few years. In 1904, on the advice of R. Koch, it was introduced in the German army, and a little later reintroduced among the English soldiers through the efforts of Col. Leishman. In 1908 it was introduced in our own army, the vaccine being prepared under the direction of Major Russell, of the Army Medical School in Washington. The submission of our soldiers to vaccination was at first voluntary but was made compulsory in 1911.

Clinical Evidence of Protection. The statistics of Wright[7] on his vaccinations during the Boer war are based on 19,069 soldiers vaccinated as compared with 150,231 not vaccinated. Roughly considered, the vaccination reduced the incidence of the disease about 50 per cent, and the mortality almost 75 per cent. Later, with better technique in the preparation of the vaccine and having the vaccination consist of two or three injections, the results have been still better. According to a recent report of Leishman,[8] based on 5,473 persons vacinated as compared with 6,610 not vaccinated, the number of cases of typhoid fever and deaths from that disease was only about one-tenth as high among the former as among the latter. Instances in which protection was definitely proved, although on a smaller scale, are quite numerous.

Our vaccinations consisted of three subcutaneous injections in the arm at intervals of ten days, the first dose consisting of 500,000,000 typhoid bacilli and the other two of 1,000,000,000 each. The reaction may be both local and systemic in character. The local reaction begins usually in from four to five hours after injection and gradually subsides in three to five days. At its height it usually consists of an area of redness about 10 cm. in diameter, which is swollen and tender. Occasionally the axillary lymph nodes are also slightly enlarged and tender. A systemic reaction, consisting of one or more of the following symptoms, pyrexia up to 103° F., headache, malaise, insomnia, nausea, and in rare instances backache, vomiting, chills, herpes labialis, loss of weight, and albuminuria, also sometimes develops. These general symptoms begin usually in five to six hours after injection and disappear before the lapse of forty-eight hours. The reactions following the different injections in the same individual may vary somewhat, but taken on an average they become progressively less (see Table I).

[7]Quoted by Russell, The Military Surgeon, 1909.
[8]Royal Army Medical Corps, 1909, xii, p. 166.

TABLE NO. 1.

	Local redness and swelling 8 cm. or more in diameter	Pain or tenderness in axilla	No increase of temperature	Temperature from 98.6 to 100	Temperature from 100 to 103	Temperature 103 or above	Headache	Backache	Insomnia	Nausea	Chills	Malaise	"Soreness all over"
First injection	10	5	4	6	0	0	2	3	4	2	3	6	1
Second injection	10	2	3	7	0	0	1	1	0	0	0	2	3
Third injection (on basis of 9)	9	0	2	7	0	0	0	0	0	0	0	0	0

The frequency with which the signs and symptoms of the reaction developed in the individuals vaccinated, who were male students from twenty-one to thirty years of age, is given in the above table. Ten students received two injections, but only 9 were vaccinated a third time.

The mild character of the reaction is indicated by the fact that of more than 30,000 injections given to the soldiers of the United States Army, there was either no general reaction or only a mild one (temperature elevated but not up to 100° F., or merely headache and malaise) in about 95 per cent., and that in no instance were there any untoward results. In addition to the ten individuals of our series mentioned above, we also obtained a volunteer for vaccination who had had an attack of typhoid fever nine years previously. Following the first injection he had a severe local reaction consisting of swelling and redness of the entire upper arm and extending for two inches below the elbow. This inflamed area, which was very tender, continued for twenty-four hours. After his second injection the above-mentioned symptoms were even more marked and the individual had a temperature of 103.5° and was delirious for ten hours. In consideration of the severity of these reactions it was not thought advisable to give the usual third injection. Russell also reports more severe reactions in those who have previously had typhoid fever.

The reactions upon which the immunity depends or by which it may be measured may be divided into leukocytic, opsonic, phagocytic, agglutinic, and bacteriolytic. That the bacteriolysins are increased can easily be determined by the method of Pfeiffer. The bacteriolytic tests are, however, very unsatisfactory, inasmuch as no method has yet been devised by which the amount of bacteriolysins may be accurately determined. Although some observers[9] have demonstrated that there is a marked increase in the opsonins, determination of the opsonic index is rather unsatisfactory. Somewhat more satisfactory is the estimation of the power of phagocytosis by the dilution method of Neufelt. Using this method, Russell[10] has found that, beginning about the fifth to eighth day after the first injection, there was a rapid rise in the power of phagocytosis, reaching its height in about three weeks, when the phagocytic titer was one to two, occasionally five or six, thousand times as

[9]Jour. of Med. Research, June, 1910, xxi (New Series, xvii), No. 3, p. 435.
[10]Boston Med. and Surg. Jour., January 5, 1911, clxiv, No. 1, p. 1.

high as that of normal blood, after which it gradually declined until at the end of one year it was again normal. The agglutinins begin to increase at about the same time as the opsonins, as determined by the power of phagocytosis, and rise rapidly until, at the end of three or four weeks, it is possible to get agglutination (Widal reaction) with a dilution of blood serum 500 to 5,000 times, or in some cases even 20,000 times. After this time it gradually declines, although it may still be possible to secure agglutination with a dilution of 1 to 100 at the end of a year.

Although a number of investigations relative to the degree of immunity as measured by the factors just mentioned have been made, we have found no record of a study of the leukocytic reaction following antityphoid vaccination in the human being. With the object of making such a study, careful leukocyte counts, both total and differential, were made of the ten subjects of our experiment. All of the counts were made at a time to avoid, so far as possible, the influence of digestion. Controls made by injecting as much salt solution and tricresol as is found in one dose of the vaccine did not give any leukocytic reaction.

Table II gives the average leukocyte count (total and differential) of the ten persons as determined before and at different times after the three injections.

TABLE NO. II.

FIRST INJECTION.

	Total number leukocytes	Polymorphonuclear neutrophiles		Small lymphocytes		Large mononuclears		Eosinophiles		Transitionals	
	Total and Percentage of Various Types of Leukocytes										
Just before	8400	5088	60.7	2544	30.0	424	5.0	137	2.8	132	2.7
One day after	10360	7148	69.3	2020	19.5	736	7.1	176	1.7	124	1.2
Two days after	8680	5900	67.6	1300	15.0	868	10.0	195	2.6	130	1.5
Three days after	8130	4376	61.2	2057	25.3	772	9.5	138	1.7	162	2.0
Four days after	7140	3806	58.3	2070	29.0	685	9.6	164	2.3	57	0.8
Five days after	7111	4338	61.0	1586	22.3	704	9.9	185	2.6	92	1.3
Six days after	7210	4297	59.6	1859	25.8	576	8.0	331	4.6	201	2.8
Seven days after	7960	5150	64.7	1926	24.2	562	7.1	127	1.6	166	2.1

SECOND INJECTION.

Just before	6510	3647	54.8	2070	31.8	560	8.6	160	2.6	104	1.6
One hour after	7433	4159	57.3	2378	32.0	520	7.0	74	1.0	170	2.3
Six hours after	13540	9522	70.4	2978	22.0	947	7.0	121	0.8	119	0.8
One day after	9280	6958	71.0	1959	21.0			55	0.6		
Two days after	7911	5505	39.6	1379	17.4	688	8.7	63	0.8	158	2.0
Four days after	7000	4179	59.7	1799	25.7	749	10.7	98	1.4	98	1.4
Seven days after	6311	4077	59.0	2142	31.0	463	7.0	276	0.4	138	2.0

THIRD INJECTION.

Just before	7742	4830	62.4	1455	18.8	836	10.8	155	2.0	155	2.0
One hour after	9600	6375	66.4	1920	22.4	499	5.2	192	1.2	132	2.0
Two days after	7400	4884	66.0	1659	22.4	444	6.0	59	0.8		
Four days after	6400	3667	57.3	1536	24.0	723	11.2	256	4.0	211	3.3

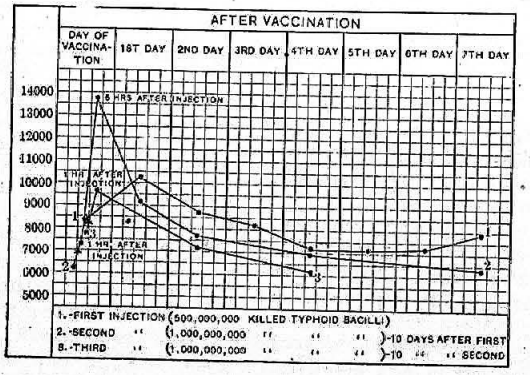


CHART I.—Total leukocyte count following anti-typhoid vaccination.

Chart I shows in a graphic way that the increase and decline in the total number of leukocytes occurs relatively about the same time following each injection. The degree of leukocytosis was highest following the first injection, and was successively less for the two subsequent injections. The curve following the second injection is the most representative one, inasmuch as several counts were made at short intervals following this injection. It indicates that the rise in the number of leukocytes in the peripheral blood is rapid and probably at its height in about six hours when the average count was 13,540 as compared with 6,510 just before the injection. This corresponds to the time when the subjective symptoms are just beginning. The total count rapidly falls again, to reach the normal level on the second or third day after injection. In one instance the leukocyte count raised from 7,200 just before injection to 8,600 one hour later and 22,800 six hours after injection.

Chart II represents in a graphic way the total leukocyte count and the total number of each of the different types of leukocytes following the several injections. It will be noticed that the increase in the total number of leukocytes is due almost entirely to an increase in the number of the polymorphonuclear neutrophile leukocytes and the large mononuclears; the small lymphocytes, the transitional cells and eosinophiles remaining about the same. It will also be noticed that the fall in the number of neutrophiles is more rapid than that of the total count, due to the fact that the large mononuclear counts remain rather high for from four to seven days after the injection.

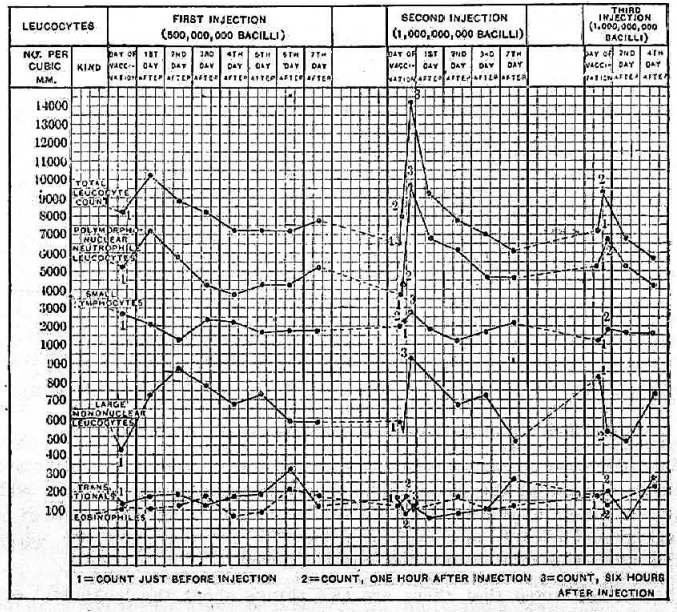


CHART II.—Leukocyte count, total and differential, following antityphoid vaccination.

Chart III represents graphically the percentage of the different types of leukocytes following the several injections. Considering the curves given in Chart II, it is very apparent that the fall in the percentage of small lymphocytes, due to a corresponding increase in the percentage of the neutrophiles during the first six hours after injection, caused a

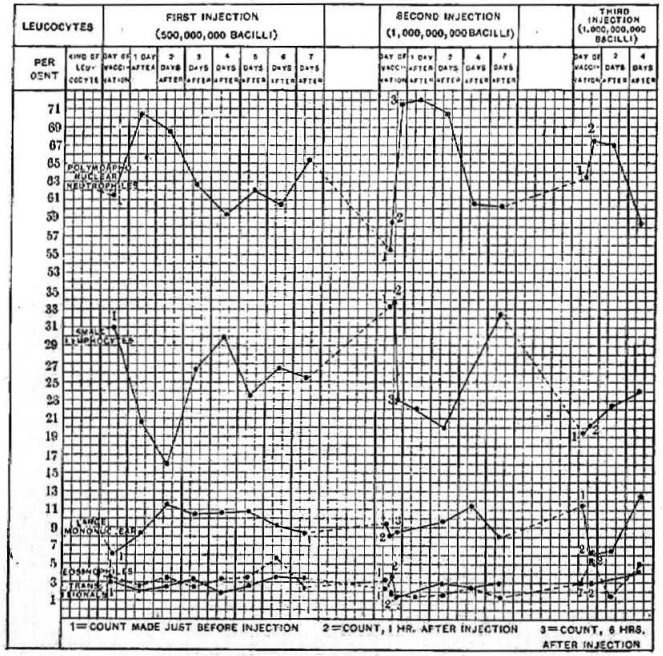


CHART III.—Differential leukocyte count following antityphoid vaccination.

slight decrease in the percentage of the large mononuclear leukocytes. The percentage of the latter rose, however, to above normal, even while the percentage of the neutrophiles was still high. The percentage of the large mononuclears, moreover, continued to remain above the normal even after the total count had become normal.

It will be noted that there are two things about the leukocytic reactions that stand out prominently—(1) the high leukocytosis following injection of the vaccine, and (2) the considerable increase, both relative and absolute, in the number of large mononuclear leukocytes.

The increase in the total leukocyte count is of interest, inasmuch as there is usually no leukocytosis in uncomplicated cases of typhoid fever. It is due principally to an increase in the number of polymorphonuclear leukocytes. Such may readily be explained by the rather marked local reaction induced by the vaccine.

The increase in the number of large mononuclear leukocytes is, however, we believe, of more significance. The large mononuclear cells mentioned all had the same general appearance, but varied in size. A few of them were about the size of the polymorphonuclear leukocyte, but most of them were two to three times as large. The nucleus was usually slightly eccentric, but not peripheral, there being a thin ring of cytoplasm entirely around it. The diameter of the nucleus was usually about one-half the diameter of the whole cell. It was stained deeply blue, being of about the same intensity as the nucleus of the small lymphocytes. The cytoplasm was of a paler blue than the nucleus, but not purplish. There were no definite granules in the cytoplasm, but it was occasionally noted that there seemed to be a very slight fibrillar character to it. At times it was noted that the nucleus was rather indefinite in outline and merged imperceptibly into the surrounding cytoplasm. The stain used was eosinated or erythrosinated methylene blue.

Various observers have noted that there is an increase in the number of the large mononuclear leukocytes in typhoid fever and during convalescence from that disease. Thayer,[11] on analyzing the blood findings of 832 cases of uncomplicated typhoid fever, found that the large mononuclear leukoytes represented on an average 12.4 per cent. of the leukocytes during the first week of the disease, 14.4 per cent. during the fourth week, 16.8 per cent. during the eighth week, at about which percentage it remained until after the fifth week of convalescence.

De Sandro,[12] conducting certain experiments in fatigue with dogs, rabbits, and guinea-pigs, and using "typhoid toxin" as a test of resistance, found that, after injection, there was an initial leukopenia, followed by a leukocytosis, at first of the polymorphonuclear type and later of the mononuclear (especially large) type. Of importance is the observation that in the fatigued animals the initial leukopenia was more marked and prolonged and the subsequent leukocytosis (both polymorphonuclear and mononuclear) was less intense and persistent than in the normal controls. He also found that the influence of fatigue caused the agglutinins to develop less rapidly and to a less extent than under normal conditions.

SUMMARY AND CONCLUSIONS. 1. Statistics based on a large number of cases show conclusively that anti-typhoid vaccination confers a marked degree of protection against typhoid fever.

2. The injection of typhoid vaccines induces a local reaction in all cases and a general reaction in some cases.

3. A previous attack of typhoid fever apparently causes the reaction to be more severe than is observed in individuals who have not had typhoid fever.

4. Anti-typhoid vaccination causes a marked increase in the specific agglutinins, opsonins, and bacteriolysins.

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[11]Johns Hopkins Hosp. Rep., 1900, viii, 487.

[12]Riforma Med., 1910, xxxv, 841 to 871; abstract in Journal of Amer. Med. Assoc., September 17, 1910, p. 1064.

5. The injection of typhoid vaccines causes a marked polymorphonuclear neutrophile and large mononuclear leukocytosis.

6. The marked increase (both absolute and relative) of the large mononuclear leukocytes in the peripheral blood is the only leukocytic change which is common to both clinical typhoid fever and anti-typhoid vaccination.

7. Such occurrences suggests that these leukocytes have something to do with the formation of antibodies concerned with the production of anti-typhoid immunity.

8. It seems well worth while to attempt experiments on the artificial production of large mononuclear leukocytosis and to see what relation such may have to the production of antibodies in the presence of typhoid infection or anti-typhoid vaccination.

TYPHOID BACILLI CARRIERS.

HENRY ALBERT, M. D., Iowa City, Iowa.

There is at the present time, I believe, no problem of public health work that deserves more serious consideration than the methods of preventing the spread of typhoid fever.

We have all, I am sure, often wondered at the source of infection of isolated cases, and at times of endemics and epidemics of this disease. We have for some time known that typhoid bacilli are excreted by a typhoid fever patient, probably in all cases with the feces and in about 25 per cent of all cases with the urine. In some instances they are also excreted with the sweat, saliva, nasal secretions, etc. We had thought that they disappeared with, or soon after, the convalescence of the patient and so have been inclined to blame the privy vault and soil for all cases that could not be explained as coming from the water or through it, the milk supply or contact with existing cases.

We are beginning to learn and appreciate the importance of "typhoid bacilli carriers"—individuals who continue to excrete typhoid bacilli with the feces and urine for days, yes months, even years (in one instance as long as fifty-two years) after recovery from the disease. Not only people who have had the disease, but many who have never had it, may become carriers. We have known for some time that in typhoid fever as in all other infectious diseases, the question of resistance has much to do with infection, i. e., not all exposed to, or who ingest or inhale pathogenic germs are infected; but that they should harbor the bacilli and continue to harbor and excrete them for long periods of time without being affected by them has come to our knowledge only during the past few years.

The majority of typhoid fever patients continue to excrete typhoid bacilli for some time after clinical recovery. It has now become quite generally agreed that those who cease to excrete typhoid bacilli within a period of three months after recovery, as indicated by normal temperature, from an attack of typhoid fever are to be regarded as temporary carriers, and those who continue to excrete them after a period of three months or longer, as chronic carriers.

Although Frosch called attention to the existence of typhoid bacilli carriers and the possibility of their transmitting typhoid fever in 1902 and Lentz in 1905 wrote an exhaustive article in which he mentioned a

*Read in Section on Preventive Medicine, 60th Session, Iowa State Medical Society, May, 1911.
*Reprinted from Journal I. S. M. S., Sept., 1911.

number of cases of typhoid fever traceable to such carriers, the first recognized striking example of the influence of a chronic typhoid bacilli carrier was reported by Kayser (7) of Strassburg in 1906. The person in question was a woman, the proprietress of a bakery, who had typhoid fever ten years previous, but who still harbored the typhoid bacilli. Attention was called to her because of the fact that for several years almost all of her employes and apprentices and many of the people who took meals at her establishment contracted typhoid fever.

The following table represents the principal findings of a number of the more significant epidemics of typhoid fever traceable to typhoid bacilli carriers:

Endemics and Epidemics of Typhoid Fever Traceable to "Typhoid Bacilli Carriers"

REPORTED By	REPORTED When	Number of carriers	Sex	OCCUPATION	Length of time between attack of typhoid fever and time carrier condition was discovered	Never had typhoid fever as far as known	Cases of typhoid traceable to carriers: Number	Cases of typhoid traceable to carriers: During what time	Typhoid bacilli found in: Feces	Typhoid bacilli found in: Urine
Albert & Gunn 1	1907	1	M	Milker	1 yr.		13			X
Albert & Hudson	1911	2		Heads of family	2 yrs.		2			X
Albert & Painter	1910	1	M	Milker	4 mos.		60			X
Friedel 2	1906	1	F	Kitchen work		X	70			
Gregg 3	1908	1	F	Boarding H'k	52 yrs.		7	3 yrs.	X	
Huggenberg 4	1908	1	F	Housekeeper	31 yrs.		13	3 yrs.	X	
Johnstone 5	1910	1	M	Milker			230	17 yrs.		
Jundell 6	1909	1	F	Housekeeper		X	22	54 yrs.	X	
Kayser 7	1906	1	F	Prop. bakery	10 yrs.		Many		X	
Kayser	1906	1	F	Milk trade			17		X	
Kossel 8	1907	1	M	Milker		X	00		X	
Levy & Kayser 10	1907	1	F	Inmate asylum	3 yrs.		00			
Lumsden & Wooward 11	1909	1	F	Milker	18 yrs.		50		X	
Ravanel & Smith 13	1909	1	M	Wash dishes		stage of incub.	40			
Roscoe 14	1909			Inmate asylum		X	12			
Scheller 16	1908	1	F	Milker	17 yrs.		32	14 yrs.	X	X
Soper 17	1907	1	F	"Typhoid Mary"		X	26	7 yrs.	X	
Southworth 18	1907	1	F	Child 16 mos	under 1 yr.		4			

Permit me to call particular attention to a few of the more interesting of these outbreaks:

In the fall of 1907, there was an outbreak of thirteen cases of typhoid fever in three families of a certain community in Cedar Falls, Iowa. The water used by these people was from the general city supply. All of these used milk from one source and theirs were the only families that obtained milk from this source. It was quite obvious therefore that the outbreak was due to this milk supply. Investigation showed that the man who did the milking had had typhoid fever one year previous and examination revealed the presence of typhoid bacilli in his urine. Hexamethylenamin was administered, the bacilli could not be found for some time, but one

year later when several cases of typhoid fever again occurred among students boarding at his house, examination again showed typhoid bacilli to be present in his urine. He was ordered by the local authorities to discontinue the maintenance of a boarding house.

In the autumn of 1910, we examined specimens of urine from ten members of a family and found typhoid bacilli in seven of them. Of the seven—I am informed by the attending physician, Dr. Loose of Maquoketa, Iowa—two gave a history of severe prolonged illness (which was probably typhoid fever) within two years; two had just recovered from severe attacks of the disease, and three had never presented symptoms suggestive of such. The water supply was apparently free from pollution.

During the months of January and February, 1911, there occurred about eighty cases of typhoid fever in Oskaloosa, Iowa. Most of these cases were fairly definitely traceable to a person in the country who had had typhoid fever four months before and who did some of the milking. The milk was sold to a central milk depot in the city. Typhoid bacilli were found in his urine.

The most remarkable case as regards the duration of the "carrier" condition is the one reported in 1908 by Gregg (3). Seven cases of typhoid fever had occurred among the customers of a boarding house in Massachusetts between July, 1906, and April, 1908. An investigation revealed the fact that the keeper of the house had had typhoid fever in 1856—52 years previous. During the time that these seven cases occurred no other cases of typhoid fever were known to exist in the city. The water and milk supply were the same as that was used in the greater part of the city. An examination of the housekeeper's feces revealed typhoid bacilli in considerable number. The woman gave no history of any second attack of the disease. It is presumed, therefore, that she has been a carrier for 52 years.

The largest number of cases of typhoid fever traceable to a single carrier has been reported by Johnstone (5) of England. The carrier was employed as a milker on several farms in succession. Milk from these farms was supplied to people in the city of Folkestone and vicinity. Typhoid fever appeared in turn among the customers of milk from different farms corresponding to the places on which the man worked. During the period 1893-1909, it is figured that 230 cases of typhoid fever were attributed to this carrier, which represents 64 per cent of the cases of typhoid fever of that city. The number of cases annually varied from a few to 68 (1899).

Ravenel & Smith (13) report an unusual outbreak of 40 cases of typhoid fever occurring among the students of the University of Wisconsin, traceable to a carrier who during the stage of incubation of that disease was engaged in washing dishes in a boarding house.

Scheller (16) refers to an estate in Prussia in which typhoid fever was endemic for 14 years, during which time 32 of the 180 people living on the estate contracted the disease. On investigation it was found that a woman who had for 14 years been employed in the dairy

had typhoid fever 17 years ago or three years before she began her service on the estate. It was also found that typhoid bacilli were present in her stools in almost pure culture. At the time of the investigation, an examination of the urine and feces of all the healthy people, 40 in number—who were then using milk from the estate dairy was also made and revealed the fact that 18 of them were bacilli carriers and that only five of these 18 had ever had typhoid fever. Of these 18 carriers, 10 were found to contain the typhoid bacilli in their feces, and 10 in the urine—four having them in both the feces and urine. The feces and urine of 30 persons on the estate who did not get their milk from the estate dairy were also examined, but no typhoid bacilli were found. All of the bacilli carriers were given a course of treatment with hexamethylenamin. After a month's treatment, no typhoid bacilli could be found in the discharges from any of the carriers except the original carrier, in whom they persisted, despite all efforts at their removal.

One of the most interesting cases reported in America is one by Soper (17) concerning a woman, who, as a cook had during a period of seven years, transmitted typhoid fever to 26 persons in seven out of eight different families in which she had worked from 1900 to 1907. In almost every instance the disease occurred in the family within a few weeks after her arrival. The case was brought to light by an investigation of a household epidemic of typhoid fever which occurred in Oyster Bay, N. Y., during the latter part of August, 1907. Six out of eleven members of the household were affected. Indirect evidence showed that she probably had a mild attack some years before. Believing that she was a menace to the public health she was taken in charge by the New York City Department of Health. "Typhoid Mary," as she has been called, continued to excrete large numbers of typhoid bacilli with her feces for several years.

A study of this table enables us to formulate certain general conclusions:

1. Although a study of a large number of statistics shows that there are more male than female typhoid carriers it is to be noted that about 75 per cent of all the carriers responsible for the appearance of typhoid fever in others are women.

2. Almost without exception the carriers who have been responsible for transmitting the disease to others have been people who have either been engaged in some occupation as baker, cook or handler of milk, which has enabled them to transmit typhoid bacilli to substances used as food by others—or who, such as children or inmates of insane asylums, are careless about their personal habits. Simonds, examining the records of 33 carriers concerned with the transmission of typhoid fever, finds that 13 of them were dairy workers, 9 cooks, 7 housewives and 3 laundresses.

3. Carriers responsible for the disease in others have in some instances had the disease but a short time previous—in others as long as 10, 30 and even 52 years.

4. Carriers who have never had typhoid fever, so far as known, have been responsible for a number of severe epidemics of the disease.

5. Endemics of typhoid fever traceable to a given carrier, have extended over long periods of time—in one instance, 54 years.

6. Typhoid bacilli carriers may excrete the germs with the feces or urine or both. Most frequently they have been found in the feces alone. This raises the question as to the source of the typhoid bacilli.

It is quite certain that they may multiply in the urinary bladder. It is possible also to conceive of the retention and multiplication of the bacteria in the various folds and pockets of the gastro-intestinal canal, more especially in such blind pouches as the appendix. The gall bladder, however, seems to be the place where the typhoid bacilli develop most frequently and in largest number. So constantly have the bacteria been found in the gall bladder of all cases of typhoid fever examined bacteriologically that it is quite probable that this organ becomes infested and we know, also frequently infected, in probably all cases of typhoid fever.

Marchildon (12) has recently pointed out that the source of typhoid bacilli of chronic bacilli carriers may come from infected seminal vesicles and prostrate gland. He found these to be involved in two fatal cases of typhoid fever. In this connection it is of interest to note that Huet has shown that influenza of horses may be transmitted to females after males have apparently recovered. He found by examining the seminal vesicles of some of the domestic animals that some which were apparently healthy had pathogenic bacteria in the vesicles. He also found that if animals were experimentally infected, bacteria could usually be recovered from the vesicles and occasionally only from such.

The finding of typhoid bacilli is the only positive evidence that we have of the existence of the carrier condition. A high opsonic index or a positive agglutination test is only of suggestive value. The value of bacteriological examinations is considerably diminished by the observation that the bacilli are often excreted intermittently—there being intervals when no typhoid bacilli can be found. Another difficulty arises from the fact that typhoid bacilli soon die when left in fecal material, so that it is impracticable to send specimens very far for examination. Nevertheless, where facilities are available, the laboratory may be advantageously employed, to determine the cessation of the carrier condition.

A large number of examinations have been made to indicate the danger of typhoid bacilli carriers to the public health. I have collected some of these and considered them under the following heads:

1. The proportion of cases of well recognized typhoid fever which became carriers. Lentz, examining 400 cases, found that 4.5 per cent excreted typhoid bacilli for more than ten weeks after recovery and 3 per cent for more than thirteen months after recovery. Klinger, examining 482 cases, found typhoid bacilli in the excretions of 1.7 per cent six weeks after recovery. Semple & Greig, making daily examinations of

86 cases, found that 11 per cent excreted typhoid bacilli for more than six weeks after recovery. Frosch, examining 6,708 cases, found that 2.1 per cent of these were temporary carriers, i. e., did not excrete them beyond a period of three months after recovery, and 2.5 per cent were chronic carriers, i. e., continued to excrete them for more than three months. Prigge, examining 10,481 cases, found that 3 per cent continued to excrete them for more than one year; Kayser, examining 200 caess, found that 3 per cent, and Bruckner, examining 316 cases, found that 3.8 per cent continued to excrete them for more than one year after recovery. Taking the average of these figures, it may be stated that about 5 per cent of all cases of typhoid fever continued to excrete typhoid bacilli for at least three months after recovery, and that 3 per cent are found to continue to excrete them for more than one year after recovery.

2. The proportion of carriers who have never had—so far as known—an attack of typhoid fever. Klinger, examining 1,700 persons closely associated with typhoid fever, found that .009 per cent became temporary carriers without developing the disease. Prigge, examining 10,841 persons, found 35 carriers among them; of these 27 had previously had typhoid fever and 8 gave no history of having had typhoid fever. Klinger found that 56 per cent of 211 cases of temporary carriers and 20 per cent of 220 cases of chronic carriers gave no history of typhoid fever. It is therefore to be noted that when persons who have not had typhoid fever become carriers they are more prone to be of the temporary than of the chronic type. It appears from statistics that fully one-half of all temporary carriers have never had typhoid fever, so far as known.

3. Proportion of the general population who are carriers. There occur annually about 200,000 cases of typhoid fever in the United States; if 3 per cent of these become chronic carriers and remain so for three years, it would mean that there are 18,000 carriers all the time; if we add to it one-fourth that number, representing chronic carriers who give a history of typhoid fever, we have 22,500. It is probable that there are constantly fully as many temporary carriers as there are chronic ones which would give us a total of 45,000. The population of the United States last year was slightly more than 90,000,000. According to such figures one out of every 2,000 people is a typhoid bacilli carrier. Menilli found one carrier among 250. Rosenau, Lumsden and Castle found 3 carriers out of 993 healthy people living in a certain block of the average type in Washington, D. C. Such figures would seem to indicate that one out of every 500 people of the general population is a typhoid bacilli carrier. To be conservative let us place it at 1:1000.

4. Proportion of cases of typhoid fever traceable to carriers. Kayser traced 9.5 per cent of 505 cases to bacilli carriers; Forster, 20 per cent of 386 cases; Schumacher, 26.6 of 45 cases, and Mayer, 32.3 per cent of 495 cases; . Frosch, investigating 2,080 cases, was unable to learn of the source in 53 per cent, but traced 5 per cent of the balance, the source of which was definitely known, to bacilli carriers. It is probable that a considerable higher proportion of the cases, the sources of which is not known, may have resulted from bacillus carriers. It would seem from

these figures that at least 10 per cent of all of our cases of typhoid fever may be traceable to carriers. Germans who have recently studied the subject very carefully believe that they are the source of the majority of our cases of typhoid fever. If such were the case it would seem that cities which have witnessed severe epidemics of typhoid fever due to causes that did not appear before nor after such outbreak should have a considerable larger number of cases of typhoid fever after than previous to the outbreak. Statistics, however, from several places would not seem to bear out such conclusion. The typhoid bacilli of the carriers seem less virulent than those from persons affected by the disease. This, no doubt, accounts for the fact that a relatively smaller number of cases of typhoid fever are traceable to contact with carriers than with those affected with the disease. The number of bacteria excreted by the carrier is often higher than from those affected with typhoid fever.

What may be done to prevent typhoid fever patients from becoming typhoid bacilli carriers, and typhoid bacilli carriers from giving the disease to others?

As remedial measures more or less applicable may be mentioned:

1. The administration of hexamethylenamin. The administration of this substance in sufficiently large doses gives antiseptic properties to both the urine and the bile. Richardson has recommended the giving of hexamethylenamin as a prophylactic to all typhoid fever patients in doses of 30 grs. a day for ten days, beginning with the third or fourth week of the disease. Crowe has recently shown that when given in doses of 75 grains per day, it has a distinct influence in ridding the gall bladder of contained bacilli. It has been found, however, that this drug cannot be depended upon to free carriers from typhoid bacilli. Soper's case received 100-150 grs. a day without the desired effect.

2. The feces and urine of typhoid fever patients should preferably be disinfected for at least six weeks after the patient has entirely recovered from the disease, just as during the period of illness.

3. The prohibition of persons known to be "bacilli carriers" from engaging in any occupation as cooking, baking, dairy work, etc., which may, from the articles handled, endanger the lives of others. This prohibition may well apply to all who have had typhoid fever, for a period of one year after recovery or until by repeated examinations no typhoid bacilli can be found. If such precautions cannot be observed, it is exceedingly important that such persons should be carefully instructed as to personal cleanliness.

4. The isolation of chronic bacilli carriers in institutions such as insane asylums.

5. Operation in the nature of a cholecystotomy and drainage of the gall bladder or complete removal of that organ has resulted in a number of instances in removing the source of typhoid bacilli. Such an operation may very properly be performed on patients such as insane, where because of careless habits, they may transmit the disease to others. It may also be very properly performed on individuals who have symptoms point-

ing to gall bladder disease. The fact, however, that the gall bladder is not the only source of the typhoid bacilli of carriers and that there have been instances in which operation failed to remove the carrier condition together with the severity of the operation makes it impracticable to recommend it as a routine procedure.

6. The administration of typhoid vaccines has in several instances been successful in freeing carriers from typhoid bacilli; in others, however, it appears to have had no effect.

SUMMARY AND CONCLUSIONS.

1. Chronic typhoid bacilli carriers must be regarded as a menace to the public health, it having been shown that probably:

(a) Five per cent of all cases of typhoid fever become chronic typhoid bacilli carriers.

(b) Three per cent of all cases of typhoid fever continue to excrete typhoid bacilli for more than one year after recovery.

(c) Twenty-five per cent of all chronic typhoid bacilli carriers have never had typhoid fever.

(d) One in every 1,000 of the population is a typhoid bacilli carrier.

(e) Ten per cent of all cases of typhoid fever are traceable to carriers.

2. Whenever there are household epidemics or a series of outbreaks of the disease in a locality or an institution or among soldiers in the field we should consider that a bacilli carrier is the most probable source.

3. If an individual has an attack of cholecystitis or biliary colic soon after an attack of typhoid fever, we should suspect that such has been caused by typhoid bacilli and that such a person is a typhoid bacilli carrier.

4. Chronic typhoid bacilli carriers transmit the germs to others, practically, only by the handling of articles of food, consumed without being cooked, or handled after being cooked.

5. Persons who have recovered from an attack of typhoid fever should preferably not engage in an occupation such as dairying, doing kitchen work, etc., for at least one year after the attack.

6. Persons who have ever had typhoid fever or within a year been exposed to infection with typhoid fever should thoroughly wash their hands with soap and water before handling any article of food which is to be consumed without being cooked or reheated to the boiling point.

7. That the spirit of the rule of the Iowa State Board of Health namely, "That no person in the state of Iowa who is known to harbor typhoid bacilli in the body, or in other words, to be a typhoid carrier, shall be permitted to handle milk or other dairy products offered for sale," may very properly be applied to all in whom there is a strong probability that they may be a typhoid bacilli carrier.

8. The administration of hexamethylenamin and typhoid vaccines and ocasionally the performance of a cholecystotomy may be advantageously employed to remove the carrier condition.

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NOTE—For additional reference see text book by Chopin on the source and modes of infection, article by Thompson on The Enteric Fever Carrier, Prof. Roy. Soc. Mad. Vol. IV, No. 1; and article by Simonds on Typhoid Bacilli Carriers and Their Relation to the Public Health, Amer. Jour. of Am. Sci., Vol. CXL, No. 2, page 247.

DIPHTHERIA CARRIERS AND MEDICAL INSPECTION OF SCHOOLS FOR IOWA.

The recognition of the presence of diphtheria bacillus carriers among school children furnishes another strong argument in favor of efficient medical inspection of schools. With the increase of our knowledge in regard to the bacteriology of diphtheria and the habits of that microorganism, we have learned that the Klebs-Loeffler bacillus may linger for varying lengths of time in the nose and throat of persons who have recovered from an attack of diphtheria. In recognition of this fact our state board of health several years ago changed the basis for the release from quarantine of diphtheria patients from a definite time limit to the absence of diphtheria bacilli from the nose and throat as determined by bacteriological examinations. According to the old time limit every person who had diphtheria was kept in quarantine for twenty-eight days if antitoxin had been used—otherwise for thirty-five days. According to the culture method the average period of quarantine of diphtheria patients in Iowa has been about sixteen days. Unfortunately, however, there are some in whom the bacteria remain so persistently that they can still be found after five to seven weeks, in one of our cases for seven weeks and in one case on record for twenty-three weeks. Another condition which has been the subject of considerable study in recent years has been the presence of diphtheria bacilli in the throats of persons who are not nor, so far as known, have ever been affected by diphtheria. These diphtheria bacilli carriers are of most frequent occurrence when diphtheria is prevalent in a community. Fortunately the bacilli living under such conditions are frequently of low virulence and in some instances have lost their disease-producing power entirely. On the other hand, their virulence is often of full strength, and even though they may not produce any disease in the carrier, when transferred to other persons, they may produce the disease in its most virulent form. It is very certain that diphtheria has been kept alive for months in institutions and communities by diphtheria carriers. Indeed, it is quite probable that carriers are the source of more cases of diphtheria than persons actually affected by the disease.

In view of such the examination of the throats of school children is of the highest importance whenever there is an outbreak of diphtheria among them. Such examination should consist both of an inspection of the throats and of swabbing the throat for the purpose of making a bacteriological examination, for, although it has been shown that the specific germs are found most often in throats that are "sore," as indicated by excessive redness, etc., they are also frequently found in throats that

are perfectly normal. The proportion of children not affected by what is recognized as clinical diphtheria, but who are diphtheria carriers, varies naturally according to the extent of the exposure. In 1894, Park found virulent diphtheria bacilli in about 1 per cent of healthy throats in New York City. In 1907, Fisher, examining the throats of 4,081 healthy individuals living in the Connecticut Hospital for the Insane, where there were a number of cases of diphtheria, found that 2.08 per cent of them were diphtheria bacillus carriers. It has been shown that by the examination of a large number of cases that when diphtheria is not present in a community from 1 to 2 per cent of the people are carriers of diphtheria bacilli, but that when diphtheria is present in a community the percentage is very much higher, ranging from 5 to 10 per cent. Basing the percentage on the examination of healthy persons who have been quite directly exposed to infection, the percentage often reaches as high as 50 per cent. On account of the greater exposure of children in schools, the proportion of carriers among such children would naturally be higher than among the population in general. Last winter the Chicago Board of Health found that 50 per cent of the children of one school were diphtheria carriers. During the past month we have assisted in a similar investigation of school children in a city in Iowa among whom there were twenty-five well known cases of diphtheria. Bacteriological examination showed that about 20 per cent of the other children of the school where the cases occurred were diphtheria carriers. The virulence test, which consists of inoculating a guinea pig with a culture of the bacteria, was positive for most of the cultures for which it was tried. Fortunately that city has an efficient and faithful medical inspector of schools. Through his efforts the disease is rapidly being stamped out.

HOW TO RID DIPHTHERIA CARRIERS FROM DIPHTHERIA BACILLI.

In many individuals the carrier condition is only a temporary one; in others, however, they persist for a longer period of time. The following methods have been used to get rid of the specific bacilli:

1. *Local Application of Antiseptics.* The nasal cavities should be sprayed with a weak antiseptic, such as hydrogen peroxide, or throat should be sprayed, gargled or swabbed with disinfectants, among the more efficacious of which are hydrogen peroxide, silver nitrate and Loeffler's solution. The liquid application of such antiseptic does not, however, always succeed in getting rid of the specific germs. Believing that the crypts of the tonsils afforded a good hiding place for the bacteria, Dr. L. W. Dean attempted several years ago the disinfection of such by the use of a swab dipped in a 10 per cent solution of silver nitrate and well introduced into the crypts of the tonsils. By doing so he succeeded in getting rid of the bacteria in all of the cases on which such was attempted, and in many instances after they failed to disappear by simply swabbing the surface. Squeezing the tonsils and forcing out the

exudate often in the form of plugs in the tonsillar crypts has been tried with some success by Kretschmer, who succeeded in freeing thirteen patients from the carrier condition.

2. *Spraying of a Living Culture of Staphylococci.* In December, 1909, Schiotz, a Danish physician, described a method of freeing throats from diphtheria bacilli which seems destined to be a procedure of very common use. Thus far it has proved more successful than any other method, and so far no unfavorable results have been reported. Schiotz inoculated the throat with a pure culture of staphylococci. He obtained his suggestion from the fact that a person with a staphylococcic sore throat placed in a diphtheria ward under a mistaken diagnosis did not contract diphtheria. He also found that several patients after recovery from diphtheria in whom the diphtheria bacilli persisted for some time, the germ disappeared on the development of an ordinary staphylococcic sore throat. He reports the treatment of six cases with the staphylococcic culture obtained from a throat of a healthy person. The diphtheria bacilli disappeared after one inoculation in the throat of the man who had been detained in the hospital for three months as a diphtheria bacilli carrier, and a woman who had likewise been detained for two months. The other patients who had had diphtheria more recently recovered from the diphtheria condition with equal rapidity after one treatment with staphylococci. During the early part of this year Page tested the method with equal success. More recently Catlin, Scott and Day tried the staphyloccocic spray on carriers in connection with an epidemic of diphtheria occurring at the Rockford (Ill.) hospital. Out of a population of 70 persons 17 per cent developed diphtheria and 31 per cent became carriers in spite of liquid antiseptic treatment, and some of them continued to remain as carriers; the bacilli soon disappeared after the use of the staphylococcic spray. The spray used was a 24 hour old broth culture of the staphylococcus pyogenes aureus which had been isolated one year previous from a facial carbuncle and had been grown continuously since on agar. The material was sprayed into the nose and throat two or three times daily. In no instance did any harmful condition develop as the result of the introduction of the staphylococci. In all cases the bacilli disappeared; in most of them within a day or a few days after the beginning of the treatment.

CONCLUSIONS.

1. From 1 to 2 per cent (varying according to communities) of normal persons are carriers of diphtheria bacilli.

2. During outbreaks of diphtheria the percentage of diphtheria carriers (persons not affected by clinical diphtheria) is increased to 5 or even 50 per cent of the population, depending on the degree of contact with cases of diphtheria or carriers of the germs—the larger percentages occurring where "contact" is rather intimate, as in school or, more especially, at home.

3. The bacilli of carriers are transmitted to other persons principally by rather intimate contact, as by use of common drinking or eating utensils, towels or close proximity to a person coughing or sneezing.

4. The diphtheria bacilli of carriers are ordinarily of little or no virulence, consequently there is no need of paying any particular attention to carriers when the disease in its clinical form is not present in the community.

5. When diphtheria breaks out in a community it means that there must be some virulent diphtheria bacilli. Under such conditions not only does the number of carriers increase, but proportionately the number of persons with virulent diphtheria bacilli also increases.

6. The nose of diphtheria carriers should be sprayed with some weak antiseptic such as hydrogen peroxide and the throat should be sprayed, gargled or swabbed with antiseptics—among the most efficacious of which are hydrogen peroxide, silver nitrate and Loeffler's solution. A spray of staphylococci has proved very efficacious in the cases tried.

7. *Whenever there is an outbreak of diphtheria among the children of a certain school, the throat of every pupil, teacher or other worker in such school should be examined both by inspection to note the condition of the throat and by bacteriological examination.*

8. *Those with a "sore" throat should be sent home immediately and should not be permitted to return to school until proved by bacteriological examination not or no longer to be diphtheria carriers. Or in case the bacilli persist in remaining after a thorough attempt at removing them, the patient should remain isolated until it is proved that the bacilli are not virulent.*

9. *Those who have no "sore" throat may remain in school until result of bacteriological examination indicates that they are diphtheria carriers. If such is the case they should remain at home and be treated as mentioned under* (2).

10. *If the epidemic is extensive among the children of a certain school, immunizing doses of diphtheria antitoxin may be given to all.*

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AN OUTBREAK OF TYPHOID FEVER IN CEDAR FALLS, IOWA.*

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Cedar Falls is a city of about 5,000 inhabitants, situated on Cedar river about seven miles above Waterloo in Black Hawk county. The Iowa State Teachers College is located in the city and has an attendance of about 1,100. As many of the students are regular residents of Cedar Falls the combined population is in the neighborhood of 6,000. The city is principally a residential one, being the home of well-to-do people, many of whom are retired farmers and their families. There is a flour mill and several smaller manufacturing establishments in the town, but none of these employ very many hands. Outside of the students, who are somewhat overcrowded in rooming and boarding houses, most of the people live in their own homes—that is, are not lodgers.

About November 1, 1911, several cases of typhoid fever developed in the city. At the request of Dr. Albert, Director of the Bacteriological Laboratory of the State University, I was assigned to represent the State Board of Health in order to make an epidemiological investigation of conditions at Cedar Falls. This investigation was started November 9, 1911. Attempts were at once made to prevent further infection, by publishing in the local papers a notice which was signed by the mayor of the city (in Iowa the mayor is president of the board of health, the city council being the board), warning the public against uncooked foods.

Samples of water were taken at various points from the public supply and sent to the laboratory for bacteriological examination. The study of each individual case was now commenced by visiting the homes of those reported sick with typhoid fever. As the disease is not a reportable one in Iowa, although Cedar Falls had an unenforced ordinance compelling the report of same, I was obliged to obtain my reports of cases from the local physicians. In every instance I found the physicians willing and even anxious to facilitate the work. For obtaining the necessary data a very full inquiry blank was filled out in each case.

Each night on returning to the hotel the data obtained in this way during the day were tabulated, and from the resulting information my attention would be directed to whatever phase of the subject might be brought to the front. After 80 cases had been thus thoroughly investigated it seemed as if we had enough knowledge on which to make final

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conclusions. These facts and conclusions will be briefly enumerated so that the results and the manner in which they were obtained may be seen.

Four cases of typhoid fever occurred during July, 1911, two of which were apparently due to swimming in the river and the other two were traced to carriers. These appeared to have nothing to do with this epidemic. Of the 80 cases of typhoid fever investigated all were white, 34 were male, and 46 female.

As compared with previous epidemics we had the following:

PERCENTAGE OF TYPHOID FEVER AT SPECIFIED AGES DURING VARIOUS OUTBREAKS.

Age in Years	Waterville, Maine,* 1903 Caused by Water	Stamford, Conn.* Caused by Milk	Des Moines, Ia.* 1910 Caused by water		Texarkana, Ark.-Tex.† Caused by Milk	Cedar Falls, Ia.‡ 1911
			Investigator		Investigator	Investigator
			Sayler	Lumsden	Redlon	Grover
0-10	17	35	14	20	40	15
10-20	38	24	43	44	42	38
20-30	26	23	26	28	12	32
30-40	10	12	11	4	6	11
40-50	4	5	5	4	0	3
50-70	5	1	1	0	0	1
Totals	100	100	100	100	100	100

Public Health Rep., U. S. Public Health and Marine Hospital Service, 1911, 26.
†*Ibid.*, 1912, 27.
‡*Rep. to William H. Merner, Mayor of Cedar Falls*, Nov. 20, 1911.

The percentages in this outbreak, given in the above table, resembled more closely the ones obtained from outbreaks that were due to water rather than those due to milk. Further comparisons might be made but seem unnecessary.

The accompanying charts showed the dates of the onset of first symptoms of those infected and the dates when the patients first took to their beds. The four cases in July and August have been omitted.

From these we saw that the beginning of the epidemic was about November 4, that November 8 was the high point, and that from then on it gradually diminished. The difference in the dates of first symptoms and those of first going to bed gave marked evidence of prodromal symptoms. We allowed fourteen days as the incubation period for typhoid fever and counted back from November 5. This gave October 21 as the approximate time of infection.

At the time of my investigation there were reported to me by the physicians 95 cases of typhoid fever, 80 of which were examined. Since that time there have been reported to the mayor, including the above, about 170 cases. These, with reports from other parts of the state of persons ill with the disease who undoubtedly contracted it in Cedar Falls, make a total of at least 200 infections. The death rate has been about 10

per cent, which compares favorably with the usual water-borne typhoid fever epidemic death rate. The diagnosis was confirmed in a great many of the cases by the Widal test. As in all epidemics, there were some cases reported as typhoid that could not be proved, and on the other hand there were, as usual, many more cases that were light and passed unnoticed. The students of the Teachers College went home in numbers and carried the disease to many parts of the state.

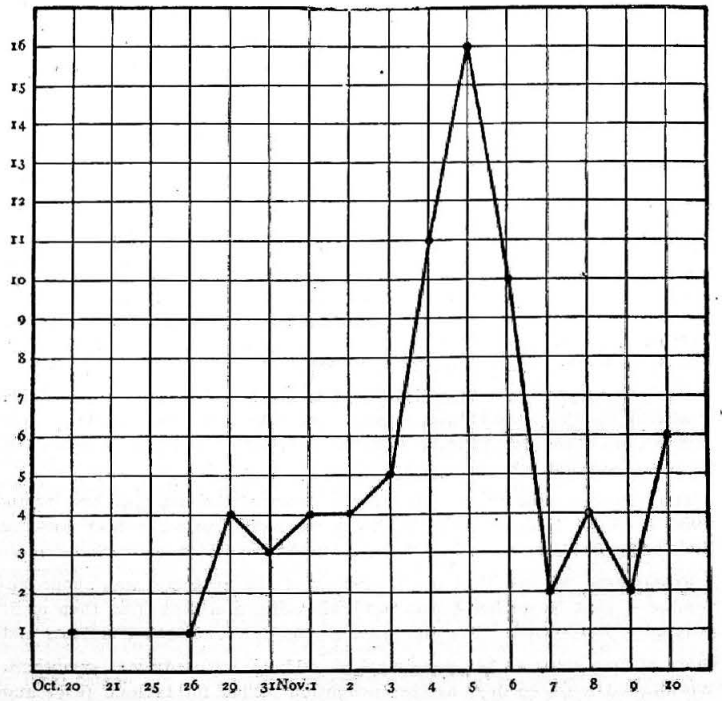


CHART 1.—Showing date when patients first felt ill.

Nearly all of the persons infected, except the students, had lived in their residence for more than a year—the students about 10 weeks. Thus previous residence was excluded as having any bearing on the outbreak. The occupations had nothing to do with the infection, as is shown by the following table.

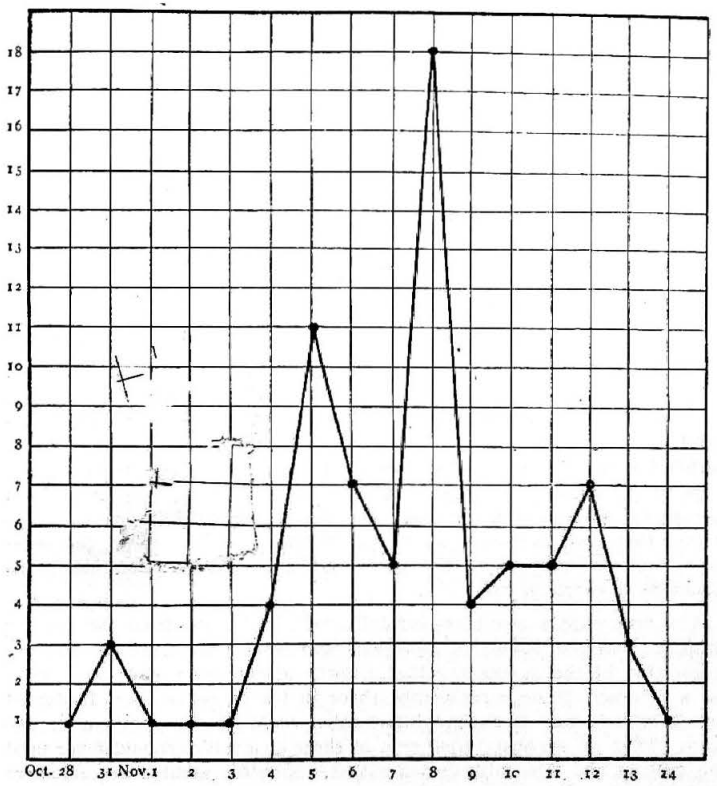


CHART 2.—Showing date when patients first went to bed.

OCCUPATIONS OF THOSE INFECTED WITH TYPHOID FEVER.

Infant	2	Driver	1
Retired	1	Servant	1
Student (college)	18	Electrician	1
School child	30	Farmer	1
Housewife	8	Post-office clerk	1
Bookkeeper	2	Conductor	1
Undertaker	1	Librarian	1
Teacher (public school)	2	Grocer	1
Teacher (college)	1	Not obtained	3
Laborer	4		
			80

There was a greater proportion of the cases among scholars and students, but these of course were all at the typical "typhoid age." The table of ages has already shown that there was no great proportion of

very young children infected. Then again, nearly all the children of school age in this community are to be found in school rather than at work, as in many other places.

The places of business of those infected were distributed well over the city and the school children evenly distributed throughout the schools in proportion to each school's attendance. The sanitary conditions of the premises were excellent. Sixty of the houses were connected with the public sewer. The privies in some of the other places were open to objection on account of faulty construction and improper care, but these very evidently had no connection with the source of infection. There were a few cases where old wells driven down to limestone foundation were used as cesspools—which seemed a most dangerous and pernicious practice and one that should be absolutely forbidden.

The season, the distribution, and the general character of the outbreak entirely eliminated flies and other insects as the cause of the outbreak. Every house had been screened during the previous summer. There had been no unusual amount of wind and apparently no dust at time of infection. Also there was no history to be obtained that would point to either carriers or contact as a cause of the epidemic. From the explosive type of the outbreak we know that the infecting agent must have been spread by some beverage or food. Outside of the students nearly all obtained their food at home. As to the student boarding houses, the cases were scattered pretty well throughout all, and no connection was to be found as to carriers, etc.

The milk supply was most carefully examined, both from the inquiry into the source of supply of those sick and from a most careful sanitary inspection of the dairies involved. Forty of the cases had taken milk as a beverage, 20 on cereals only, three in tea or coffee only, 13 denied using milk in any form, and information could not be obtained in one case. Thus we see that 16 per cent of those sick with typhoid fever used no milk at all. The milk dealer with the greatest number of customers had the most cases among his patrons—in other words, no one milk dealer had a number of cases disproportionate to the size of his business. The following table shows the number of cases taking milk from each distributor:

Milkman	"A"	21	Milkman	"K"	1
"	"B"	10	"	"L"	1
"	"C"	4	"	"M"	1
"	"D"	4	"	"N"	1
"	"E"	2	"	"O"	1
"	"F"	2	"	"P"	1
"	"G"	2	"	"Q"	1
"	"H"	2	Have their own cow		6
"	"I"	2	No milk used		13
"	"J"	1	Information not obtained		4
					80

In epidemics that have been traced to milk as the inciting factor we have generally seen that there were apt to be several cases in one family, that prodromes were absent, due to virulence of the infecting organisms—milk being such a good culture medium for the typhoid bacillus that it would be present in immense numbers—and that those of the so-called "milk-drinking age" (young children) were more apt to be infected. Those of any age drinking milk as a beverage of course will show the greater proportion of infections in such an epidemic. This condition was not manifested in Cedar Falls.

There were many cross clues to work out on the milk question and it took some time and an immense amount of work successfully to rule out milk, although in the main the evidence tended from the start to point away from milk as the incitor of the outbreak. It was found, as stated above, that the milk drinkers were not especially affected, nor the young (of the milk-drinking age), nor were prodomes absent, nor were there more than one case per family except in a few instances. Many dairies were visited and samples of their well water taken and examined at the laboratory. These sanitary examinations showed absolutely no evidence of carriers or contaminated wells where the milk was produced. One of the first cases in July, which I have already referred to as probably having been infected from swimming in the river, was in the milk business until the day before he died. While sick he apparently had very little care and was accustomed to sleep on his ice chest in the cellar in order to try and keep cool. He was evidently up and about more or less all the time. Why an epidemic did not start then is hard to say. The day previous to his death he sold out to another man. This second milkman in October also sold out his business to milkman "A" and went to work for milkman "B," delivering but not otherwise handling the milk. He soon developed typhoid fever and died. The last two weeks that he worked he undoubtedly had the disease. His death took place around the first of November. Milkmen "A" and "B" had together 31 of the cases, or 38.75 per cent of the total. Hence it will be seen that this all taken together rather complicated the situation. However, everything taken as a whole, when all the dairies had been investigated and all other data obtained, pointed against milk being the infective agent.

Forty-one of those sick with typhoid fever had eaten ice cream, of whom 16 obtained it at one place, eight from another place, and the other 17 at both places or at home. Both ice cream manufacturers had their own private source of cream and denied any trading from one to the other—in fact they appeared rivals rather than friends. The first place had twice during October bought cream of milkman "A." This further complicated matters. Further investigation showed, however, that none of this cream was made into ice cream, but was all retailed over the counter. All the dairies supplying these places were inspected but no possible source of infection was found. Milk and ice cream were finally ruled out as a source of infection from the fact that the disease as manifested did not resemble a "milk type" of infection and for the other reason given above.

All the grocery stores in the city, with one exception, got their butter from a local creamery which collected cream from 250 farms and dairies in the surrounding country. The owners of this creamery appeared to be keeping a very careful watch over their producers and had reports of sickness as to only two places (one scarlet fever and one small-pox), the milk from which had been immediately discontinued. It was of course impossible to look into all these sources of cream. Also, two of the cases of typhoid fever bought their butter from the store not supplied from this creamery and it was learned that many of the college boarding houses obtained their supply of butter from farmers who brought it in from the surrounding country. On these grounds further consideration of butter was given up.

Apples and grapes had been eaten by about all of those sick with typhoid fever, but the sources of supply were so various and scattered that it would have been unreasonable even to have considered them. Celery had been eaten by less than 50 per cent of those infected. Many of the people raised their own celery and the remainder obtained that which had been about all raised by one gardener who used deep well water with which to irrigate his land and wash the celery. He used no "night-soil" as fertilizer. The water from the well on examination proved to be good. Therefore, on account of the rather small percentage of cases who had used this celery and from other data obtained in regard to other phases of the subject, celery was ruled out as the inciting factor. Other vegetables were eaten raw but by a very small percentage—less than 25—and the vegetables and their source were, as in the case of apples, varied and scattered. Raw shellfish had been eaten by only one or two. Only a few persons had taken a trip out of town at the time of infection. There was no history of previous typhoid or intestinal trouble to be obtained, either in the households where sickness was found or in the households of their servants. In this manner carriers as the source of infection were ruled out.

The city water the source of supply for all the residents of Cedar Falls who contracted typhoid fever in this outbreak, except in two cases—one of which worked where he drank city water and the other attended public school where city water was furnished. Three cases outside the city limits had their own private water supply—but they all obtained city water either at their places of business or on daily trips to town.

The city of Cedar Falls had always prided itself on the purity of its water supply. Chemical analysis had failed to defect any pollution with sewage material. The chlorine and nitrate content were always high and showed some variation, but such had been explained as coming from natural sources. According to Dole,[1] this variation pointed rather strongly to surface water pollution. The source of water supply is a collection of springs at the foot of a hill southeast of the city, along the banks of a "dry run" which empties into the Cedar River about 200 yards below, after passing under the tracks of the Chicago, Rock Island & Pacific Railroad. The sanitary sewer of the city empties into the river a short distance above this point. The location of these springs is lower than the city itself and also lower than most of the surrounding country. The water-shed comprises about 30 square miles. These springs cannot be seen, as they are inclosed with brick and roofed over with some sort of material. Other springs (one of which is known as the Pfeiffer) are to be seen gushing forth large streams below, along the banks of the "run." From the inclosure noted above, an overflow pipe of iron, fitted at the end with a swinging trap valve, empties into "dry run." A wooden conduit (iron under "dry run") conducts the water by gravity from the spring about 1,000 feet northeast to a brick and cement collecting cistern from which it is pumped directly into the city mains. The pumping station is situated beside the cistern. The excess pumpage overflows from the mains into a water tower some distance from the water plant on a high ridge of land in the central portion of the city.

[1]*Rep. to Director U. S. Geological Survey*, 1911; *Cedar Falls Daily Record*, January 15, 1912.

The formation from which these springs issue is what is known as the Cedar Valley Limestone and is a broken formation full of faults and water runs. Most of the drilled wells in the surrounding country go down to this same stratum. It outcrops in the bed of this "dry run" and can be seen in several quarries upstream along its course. This "dry run" some distance from the springs disappears in its gravelly bed and possibly reappears again below. It is admitted by all that during high water or after severe rains the water from these springs is apt to be roily; also that the water in both the drilled wells and the quarries mentioned above becomes roily. These facts, together with the fact that the geological formation tends to intercommunication between these various sources of ground water, show that at times there certainly has been contamination with surface water. Whether this contamination comes from the overflowing river or from the water-shed itself cannot be ascertained. We do know that crevices into which brooklets run and disappear are present along "dry run." These crevices have in the past been sealed up whenever found. We know also that the overflow pipe from the spring is under water when the river is high enough to back up along "dry run;" that the collecting cistern has no impervious bottom; and that the wooden conduit is not water tight. These last two portions of the system are constructed under water, owing to the springy condition of the ground. It would seem therefore that there was and is yet a chance for contamination at all these points.

On October 19 and 20,[1] the flour mills in Cedar Falls had to shut down on account of high water, the rise being of about four and a half feet and taking several days to return to normal. It requires about a two-foot rise to cover the spring overflow. This high water followed the flooding of the headwaters of the river and did not take place until four or five days after the heavy local rains in October. Now the previous season was one of almost no rainfall and this October rain had therefore an unusual amount of surface contamination to wash into the river. The

[1]According to the records of Superintendent John Lemmer of the Waterloo and Cedar Falls Union Mill Co.

river thus became a much more concentrated source of contamination than for a long time previous. The time of the high water and that of the infection were the same. On October 20 or 21 the college filled its swimming pool and made a somewhat extra draw in that direction. It was noticeable that a large number of cases appeared in the general direction of the college and along the principal main. The standpipe takes the excess pumpage by a pipe running to it from the principal main. It is possible that infected water may have been pumped into the tank at night when little was being used and distributed the following morning. Water has been seen to be the only thing that was common to all. It could easily have been contaminated from the river, from crevices along "dry run," from seepage into wooden conduit, into the cistern, or into spring itself. Bacteriological examination of the water at different times varies considerably and shows some possibility of contamination. It certainly shows more variation than a deep ground water should. The following table gives these analyses previous to reporting. Analyses made since show no evidence whatever of contamination.

Sample No.	SOURCE	Colonies			Gas in	
		At Room Temp.	At Incubator Temp.	Of Colon Group	1 c. c.	2 c. c.
1513	City water not packed properly (not examined)					
1515	City water	30	4	3	None	None
1522	Pumping station (not iced)	140	35	5	95 per cent	20 per cent
1523	Pumping station (iced)	7	3	0	Trace	Trace
1526	Spring overflow (iced)	480	40	0	30 per cent	60 per cent
1535	Pumping station (iced)	4	3	0	60 per cent	Trace
1536	Pumping station (iced)	3	12	0	Trace	Trace
1537	Spring overflow (iced)	12	1	0	"	30 per cent
1539	City water (iced) Burr House	4	1	0	"	Large trace
1541	City water (iced) Burr House	20	3	0	"	" "
1527	Pool near pumping station (condensation water from pumps)	2,000	1,500	0	55 per cent	48 per cent

The following were the conclusions given as to the source of the epidemic:[1]

"I feel convinced that the city water was the source of the epidemic for the following reasons:

"1. Every patient used the city water.

"2. Every other cause of infection can be absolutely eliminated.

"3. Laboratory examinations show at times pollution of water with sewage material.

"4. City water becomes cloudy after high water, indicating that it is subject to change in the surface soil.

"5. Time of infection corresponds with high-water period.

"6. The construction of the water plant is such as to permit of pollution.

[1]*Rep. to William H. Merner, Mayor of Cedar Falls*, November 20, 1911.

"7. The emptying of the standpipe may have influenced the determination of water polluted at that particular time in the direction of the standpipe and account for the great number of cases along main leading directly into or out of it.

"8. The season of occurrence, the extent and the explosive character of the outbreak are all in favor of water being the cause of the epidemic."

During the investigation it was advised that the water be treated with hypochlorite of lime. This was at once done. In the final report made it was also recommended:

"1. That there be instituted a system of public water supply which shall be free from the possibility of pollution with sewage material.

"2. That the ordinance relating to the reporting of cases of typhoid fever be very strictly complied with.

"3. That the city sewerage system be extended as rapidly as possible to all parts of the city.

"4. That privy vaults be abolished in all places where it is possible to connect with the sewer or where such connections have already been established.

"5. That all drilled wells used as cess-pools be abolished."

One recommendation made, viz., that the people become vaccinated against typhoid fever, was readily taken up. The following data as to the results of this vaccination were obtained from local physicians.

1. Number of persons vaccinated against typhoid fever between January 1, 1911, and February 1, 1912, 911.

2. Number of persons vaccinated who contracted typhoid fever, 12.

Number after one inoculation, 4. How long after { 7 days, 6 weeks, 8 days, 8 days }

Severity of disease, all mild.

Number after two inoculations, 3. How long after { 4 days, 3 days, 7 days }

Severity of disease { 1 mild, 2 dead }

Number after three inoculations, 5. How long after { 3 days, 2 years, 2 weeks, 2 weeks, 2 weeks }

Severity of disease, all mind.

Number after four inoculations, 0. How long after ———

Severity of disease ———.

Number of persons vaccinated who were nursing cases of typhoid, 88.

Number of these who contracted typhoid, 0.

Number not vaccinated and nursing cases of typhoid, who contracted the disease, 12.

We find that 911 persons were vaccinated at this time and one two years previous, which, with 12 infections, gives a percentage of infection of 1.2. The population of Cedar Falls plus the students of about 6,000. Estimating the percentage on a basis of 170 cases, we have a percentage of infection of the whole population of 2.8. It is almost impossible to figure percentages in this epidemic, since we have no exact knowledge of the time when the last 90 cases took sick. Everyone probably was exposed to the infection at the same time. Over half of the

cases were taken sick before vaccination was begun, so that the percentage of cases developing afterward was somewhat reduced. None of the first hundred cases had been vaccinated. The percentage of infection in those vaccinated was, as stated above, 1.2, which, compared with 2.8 per cent in the case of the total population, seems to indicate that vaccination will at least reduce the number of secondary infections. It also seems to have a tendency to reduce the severity of the infection, for nearly all those given in the table above were infected before vaccination was begun. The death-rate of the whole epidemic was about 10 per cent, of those infected after vaccination, 16.6 per cent. Both of the deaths were in cases with a particularly virulent type of the disease, which were infected before vaccination. The mild course of all the other cases would seem to indicate that as a general thing vaccination tends to reduce the severity of infection whether patient became infected before or after the vaccination. This is borne out by the fact that after three inoculations there were no deaths and a mild infection only. The fact that 88 nurses were vaccinated with no infections is certainly significant when compared with the fact that there were 12 infections in the non-vaccinated nurses. The number of nurses is not known, but allowing one for a case, we would have an infection percentage rate in the 88 nurses not vaccinated of 14.6.

Although the epidemic was disproportionately large for the size of the city, the conditions were handled in the best possible way. Nearly every patient had a trained nurse—the state maintained two hospitals for the students and the city one for those without homes. Every precaution was taken, which together with the vaccinations did much, to prevent secondary infections.

As a result of these epidemiological findings Professor A. Marston from an engineering standpoint made the following recommendations:[1]

"1. I recommend that the city of Cedar Falls at once install permanent reliable apparatus for sterilizing the present spring water supply with hypochlorite of lime, and that the city continue such sterilization with all possible precautions, *at all times when the spring water supply is used.*

"2. I further recommend that the city of Cedar Falls proceed at once to sink an artesian well similar to those at Waterloo, and to properly equip it with pumping apparatus, pump house, and clear water basin, all at an estimated total cost of $15,000. I recommend that when artesian supply is developed the present spring water supply be used only as a reserve in case of breakdown and only with proper sterilization.

"3. I further recommend that in due time a second artesian well be sunk, and the spring water supply abandoned entirely."

For safety while the wells are being installed he also advised the construction of a sort of chimney on roof of spring enclosure with a manhole at top above high-water level so that the condition of the spring water might be determined at high water. This has been done.

On December 30, 1911, R. B. Dole, chemist of the United States Geological Survey, was sent to Cedar Falls to make a sanitary survey of the water supply—necessarily limiting his inquiry to what would be pertinent to the Survey's investigation of Pollution of Rivers of Iowa, that is, to sources of ground water pollution. At his request I was present and assisted him in this phase of the investigation from a bacteriological standpoint only. His description of the water plant and supply is in much more detail but yet essentially the same as I have given. He made a most exhaustive geological survey and found the condition of the Cedar Valley limestone as has been explained. An attempt was made on the so-called "Carpenter quarry" in a crevice, and in the bed of "dry run" itself at varying distances above the spring, to prove that contamination with surface water could take place, by using fluorescin. Owing to the amount of snow on the ground and the severe cold freezing the ground, or because the right place was not selected, no results were obtained. There did not seem to be enough water present at the time properly to wash the coloring matter into the ground. Possibly this will take place with the spring thaws.

[1] *Rep. to C. H. Streeter, Superintendent of Water Works; Cedar Falls Daily Record*, January 8, 1912.

Mr. Dole gives the following comparative table of chemical analysis:

(Parts per Million.)

Date	Analyst	Fixed Solids	Total Solids	Chlorine
August 8, 1905	Bates	288	432	7.0
September 26, 1905	"	250	382	6.75
February 26, 1907	"	190	242	3.0
November 3, 1908	Kinney	234	342	5.5
December 5, 1909	"	144	261	4.75
December 12, 1910	"	106	306	5.76
November 7, 1911	" *	164	324	7.12
November 7, 1911	" *	155	311	7.0
November 7, 1911	" *	192	418†	7.25
November 7, 1911	" *	169	310	6.50

*Samples from four different taps.
†Evidently an error in computation. Should be 313.

In his report he goes carefully into the questions of filtration of the river water and of artesian wells. He appears to think it is a matter to be decided only after long and careful tests. He thinks the question of forming a water district with Waterloo should be looked into. He sums up as follows:

"As it is apparent that the water in the limestone immediately underlying the city is liable to dangerous contamination, measures should be taken to abandon this source of supply not only by the public but by individuals, and to further this action the use of water for domestic purposes from wells entering this limestone on the shallow beds of gravel overlying it should be prohibited by the city authorities. The best way to insure such abandonment is to remove the pump and fill up the well. The use of privies and cess-pools wherever connection can be made withthe city sewerage should be prohibited, and effort made to extend the sanitary sewerage through the city."

At about the same time Clark H. Streeter, city engineer and superintendent of water works, recommended that certain improvements in the line of safety be carried out while the question of obtaining a new supply was being considered. In the main these were: to replace the wooden conduit with a tight cast-iron gravity conduit to pumping sta-

tion, to put a checking valve on spring overflow, to continue use of hypochlorite of lime, and to observe condition of spring at next overflow of river. He also recommended other improvements in the operating system.[2]

It is interesting to note that this community has had always present for years the danger of an epidemic of typhoid fever, yet the water only became contaminated for a short time and since has been as good as before. What is done to prevent future repetitions yet remains to be seen, but I feel that the community is one that will take the proper steps to safeguard its health.

SUMMARY.

The city of Cedar Falls, Ia., during November, 1911, suffered from an outbreak of typhoid fever. The time of infection was probably about October 20 or 21, 1911. The city water was used by all those afflicted, and, as all other possible causes can be ruled out, was undoubtedly the cause of the outbreak. There were about 200 cases with about 10 per cent of deaths.

Further investigations were made by Professor A. Marston and by Mr. R. B. Dole. Both agreed that the city water supply was the cause of the epidemic. All investigators, including Mr. C. H. Streeter, agreed on certain precautions to be taken immediately, and, in the main, on certain future improvements, particularly as to the fact that the city should seek a new water supply, although past and present analyses of the water show no particular pollution present.

The epidemic was handled in a proper manner and secondary cases well provided against by vaccination against typhoid fever, the results of this preventive treatment agreeing with previously published reports.

[2]M. F. Arey, professor of Natural Science in the Iowa State Teachers College, was able to render great assistance in pointing out the gological formations and establishing the drifts, dips, etc., of the water-shed.

REPORT OF AN OUTBREAK OF TYPHOID FEVER IN DES MOINES, IOWA, IN 1910.[1]

(By L. L. LUMSDEN, Passed Assistant Surgeon, United States Public Health and Marine-Hospital Service.)

The investigation of the recent typhoid fever outbreak at Des Moines, Iowa, was made in compliance with a request to the Surgeon General of the Public Health and Marine-Hospital Service from the secretary of the Iowa State Board of Health..

The investigation was begun on December 22, 1910, and completed on January 7, 1911. It comprised a sanitary survey of the Raccoon River from Valley Junction to the filter galleries from which the water supply of Des Moines is obtained, bacteriological examinations of the water supply, an epidemiological study of about 50 individual cases of the disease, a review of the epidemiological data previously collected by the city health office, a study of the death records at the State health office, an inspection of a number of places such as dairies, grocery stores, and ice-cream manufactories, where foods are sold or prepared for sale, a careful inquiry into the origin and distribution of fruits, vegetables, and shellfish sold in the city during the period in which the outbreak was caused, a clinical study of a number of cases of the disease, a survey of the general sanitary conditions of the city, and a consideration of all other conditions which appeared to be likely to throw any light on the situation.

TIME OF OCCURRENCE AND EXTENT OF OUTBREAK.

As there is no law requiring a report of cases of typhoid fever in Des Moines, the records of deaths (supposed to be complete since 1905) give the only figures available from which the prevalence of the disease in recent years can be estimated. The following table and chart (No. 1), based on compilations from the records at the office of the State Board of Health, show the number of deaths reported from typhoid fever in Des Moines by months since January, 1905.

Months	1905	1906	1907	1908	1909	1910	Total
January	1	2			2	1	6
February	1	2		1	2		6
March	1	2	1	1			5
April			1			1	2
May			2	2	2		6
June	1		3	1			5
July	2	2	4	1		1	10
August	2	1	3	4	2	2	14
September	2	1	3	1	2	4	13
October	2	2	3	2	1	1	11
November	2		2	2	2	2	10
December		1	3	1	2	16	23
Total	14	13	25	16	15	28	111

[1]Reprint from the Public Health Reports, Vol. XXVI, No. 4, Jan. 27, 1911.

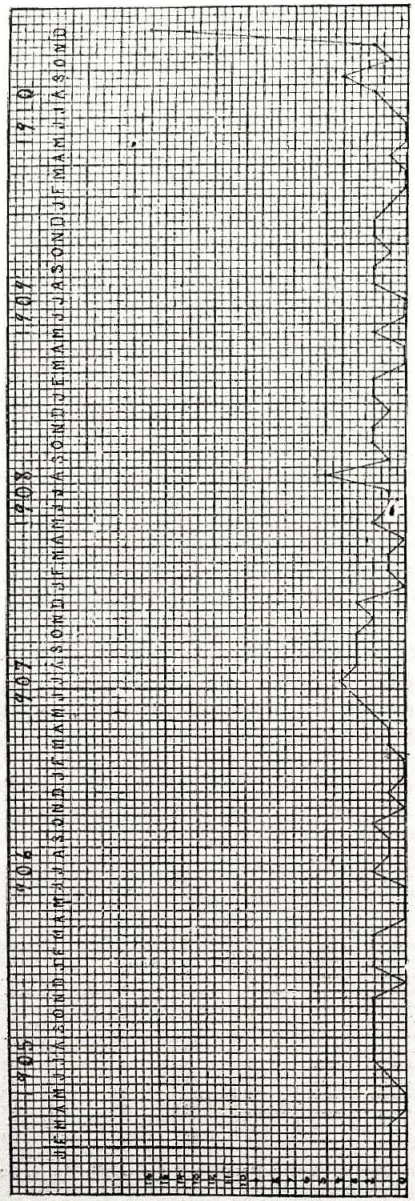


CHART No. 1.—Deaths from Typhoid Fever, by Months, from 1905 to 1911.

It is evident that the number of deaths in December, 1910, was unusually high. Most of the deaths occurring in December were of persons who were taken sick in the latter part of November and in the early part of December.

Between November 25 and December 31, 1910, 209 cases were reported to the city health office. So far as can be ascertained the vast majority of these cases developed definite symptoms (took to bed) between November 15 and December 10. That this period of 25 days represents the time of occurrence of the outbreak proper is indicated by the results of (1) an investigation conducted by the city health officer, in which the dates of onset of 106 cases were carefully collected, and (2) an investigation conducted by the writer, in which the dates of onset of 50 cases reported during the outbreak were determined. The rate of admission of cases to the two largest hospitals of the city also points to this period as the time of occurrence of the outbreak. The time of admission of cases to hospital probably averaged about 5 days subsequent to dates of definite onset of illness. The rates of admission of cases to the Methodist and Mercy hospitals were as follows:

DATE OF ADMISSION	Number of cases		
	Methodist Hospital	Mercy Hospital	Total
October 1 to 14			
October 14	1		1
October 15 to 28			
October 28		1	1
October 29 to November 15			
November 15	1		1
November 16 to 22			
November 22	1	1	2
November 23	1	2	3
November 24		2	2
November 25	6	4	10
November 26	1	2	3
November 27	5	3	8
November 28	3	1	4
November 29	3	3	6
November 30	4		4
December 1	3		3
December 2	2	1	3
December 3	3		3
December 4	3		3
December 5	1		1
December 6	2		2
December 7		1	1
December 8			
December 9	1		1
December 10	1		1
December 11	1	1	2
December 12			
December 13	1	1	2
December 14	1	1	2
December 15	2		2
December 16		1	1
December 17		1	1
December 18			
December 19	1		1
December 20			
December 21			
December 22			
December 23			
December 24			
December 25			
Total	46	28	74

The time of high admission rate was from November 22 to December 7. The number of cases admitted to the two hospitals in this period was 57, while from October 1 to November 22 only 3 cases were admitted, and from December 7 to December 25 only 14 cases. The dates of onset of illness in the 50 cases which the writer investigated personally are shown in chart No. 2. The dates of onset, as given in this chart, were determined certainly with reasonably sufficient exactness and probably represent fairly accurately the rate of occurrence of all the cases developing during the outbreak.

From all the facts ascertained it seems certain that the outbreak began sharply about November 17, reached its maximum about November 24, and continued high, but at a gradually declining rate, until about December 7. Therefore, accepting 12 days as the usual incubation period of the disease in instances of sudden and extensive outbreaks, it appears that the chief cause of the outbreak became operative about November 5, reached its maximum about November 12, and continued until about November 25, when it either ceased entirely to operate or continued to operate, but at a markedly diminished rate.

The exact number of cases which occurred in the outbreak is not known. Inability to secure a report of cases which could be regarded as reasonably complete was a great handicap in the investigation. The lack of law requiring the reporting of cases of typhoid fever in Iowa and the existence of statutes which prohibit municipalities in the State from enacting ordinances requiring the reporting of local cases constitute a condition urgently needing immediate correction.

Without legal enactment a prompt report of cases can not be reasonably expected and outbreaks may occur without the health authorities learning of them in time to have even a possible chance to apply preventive measures. The recent outbreak in Des Moines, it seems, was first brought to the attention of the authorities by publications in the local newspapers 10 or 15 days after the outbreak had begun. It is fortunate that the outbreak was learned of even at that early period, and the local press is to be congratulated for its vigilance.

Other communities in Iowa are liable at any time to be visited by outbreaks, and in some of these communities there may be no local press or one not so vigilant as that of the capital city.

Between November 29 and December 31, 209 cases were reported to the city health office. That this number does not comprise all the cases that occurred is certain, and how many more did occur can only be estimated.

In the course of the investigation of 40 reported cases between December 27 and December 31, 5 cases were found which had not been reported. Of these 5 cases, 2 were in homes from which a previous case had been reported, and 3 were in homes from which a previous case had not been reported. Thus, if 5 cases which had not been reported were found by inquiring at about 40 homes it is reasonable to believe that quite a large number of cases which had not been reported could have been found if all the homes in the city had been canvassed.

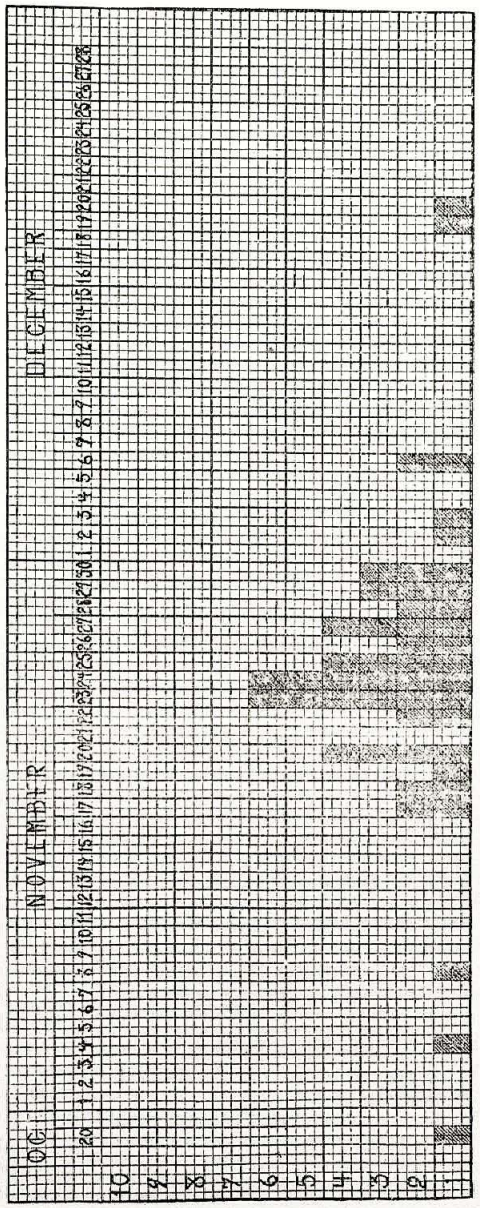


CHART No. 2.—Dates of Onset of 50 Cases Specially Investigated.

At a meeting of the Polk County Medical Society on the evening of December 23 several physicians stated that they had not reported all of their cases. Thereupon the writer requested that all the physicians send to the city health office a complete report of all cases which they had treated since November 1, giving name, address, and onset of illness of each patient, the list to include all cases whether previously reported or not. A motion for compliance with this request was put to the society and carried without a dissenting vote, but such report as was requested was received from only one physician.

There were very probably some cases which were not attended by a physician and which were not reported.

In view of all the facts and on a basis of strong probability the number of cases which occurred between November 15 and December 31 is estimated at about 300. Of these 300 cases probably about 250 occurred in the period from November 17 to December 7, that is, when the outbreak was at its height, and resulted from the operation of the chief cause of the outbreak. On this estimate one person in about every 290 in the city's population was affected. That the infection was widely and synchronously distributed over the city is beyond question.

DIAGNOSIS.

Among the many positively or negatively helpful suggestions received from various sources in the course of the investigation one was that on account of the popular excitement many cases had been reported as typhoid fever under mistaken diagnosis. Judging from the histories obtained in about 80 cases and from clinical inspection of about 30 cases, the writer is convinced that over 90 per cent of the cases reported as typhoid fever were correctly diagnosed as such.

EPIDEMIOLOGICAL INVESTIGATION OF CASES.

When an extensive and explosive outbreak of typhoid fever occurs in the cold winter season in a city having a generally distributed public water supply, suspicion usually falls first upon the water supply as the source of the infection. As the water has been used for drinking purposes by most of the people in the community it has to be considered certainly as a possible common factor in the causation of the outbreak. But just because the water is used by most of the people it is difficult to either eliminate or definitely involve it as the source of the infection and although in such instances extraordinary precautions should be taken at once to safeguard against the possible spread of infection by the water supply, final decisions should not be rendered until after a thorough investigation has been made of the water supply and of the other possible sources of infection. To determine the possible sources of infection a careful epidemiological study of cases is necessary in order to ascertain to what conditions the persons affected were exposed prior to illness. As the facts are collected and studied one suspected source after another may be eliminated until the true principal source or sources of the infection can be determined, as a rule, with reasonable certainty.

Before the beginning of this investigation of the situation in Des Moines epidemiological data in regard to 106 cases reported after the beginning of the outbreak had been collected under the direction of the city physician, Dr. H. L. Sayler. From certain quarters some doubt as to the accuracy of these data was expressed on the ground that the canvass had been made hastily and by college students inexperienced in epidemiological work. For this reason, and also in order to collect data regarding certain conditions not covered by the canvass of the 106 cases, the writer personally investigated 51 cases. In the investigation of these 51 cases the homes of the patients were visited and a careful inquiry was made to ascertain all the facts called for by the following blank form:

TYPHOID FEVER CASE CARD.

Case No. —.
Name ———. Age ———. Sex ———. Nationality ———.
Date of first symptoms ———. Date took to bed ———.
Date of death ———. Date of recovery ———.
Widal reaction positive or negative ———.
Rose spots ———. Intestinal hemorrhages ———.
Previous attack of typhoid ———. When ———.
Residence when taken sick ———, from ——— to ———.
Previous residence ———, from ——— to ———.
Subsequent residence ———, from ——— to ———.
Character of residence ———. Sewage disposal ———.
Water-closet in house ———. Water-closet in yard ———. Privy vault ———.
Conditions of sanitary devices ———. Relation of privy to well ———.
General sanitary conditions of residence:
Good ———. Fairly good ———. Rather bad ———. Bad ———.
Previous cases of typhoid in house ———.
Previous cases of typhoid in neighborhood ———.
Occupation ———. Where ———, from ——— to ———.
Water used at place of employment:
Solely ———. Principally ———. Occasionally ———.
Was patient away from Des Moines within 30 days prior to illness ———.
Where ———, from ——— to ———.
Exposed to known infection while away ———.
Water for drinking 30 days prior to illness:
Solely ———. Principally. Occasionally ———.
Soda water ———. Where ———.
Source of ice ———. How used ———.
Meals, where taken ———. Milk, how used ———.
Beverage ———. In cereals ———. In coffee or tea only ———.
Source of milk ———. Usually ———. Occasionally ———.
Milk used, boiled or pasteurized ———. Ice cream ———. Source ———.
Celery———, lettuce———, radishes———, raw shell fish———, apples———.
Contact:
Association with patients in febrile stage.
Association with suspected cases.
Association with convalescents.
Association with persons who were in contact with patients.

Prophylaxis:
Are stools disinfected ———. How ———.
How disposed of ———. Is urine disinfected ———. How ———.
How disposed of ———.
Other precautions:
Efficient ———. Fairly efficient ———. Inefficient ———.
Name and address of attending physician ———.
Summary ———.
Date of investigation.

———,
Investigator.

Of the 51 cases investigated by Dr. Sayler and the writer, 43 had been covered in the previous canvass conducted under Dr. Sayler's direction, and the findings in the two separate investigations of these 43 cases were found to be in substantial agreement. That the findings of one investigation checked in salient features with the findings of the other is, of course, an indication of the accuracy of the findings of both investigations.

The 51 cases investigated were reported after the beginning of the outbreak. They were from among persons living in widely separated parts of the city and in all ways were selected so that they could be considered fairly representative of all the cases which occurred during the outbreak. The data collected in the investigation of these 51 cases, therefore, may be considered to indicate sufficiently accurately what would have been found generally true for all the cases occurring during the outbreak.

The following interpretations of the findings in these 51 cases were as follows:

IMPORTED CASES.

One of the cases was in a person who came to the city after onset of illness and who undoubtedly contracted the infection elsewhere. Another was in a person who had been away from the city about half of the time during the 30 days prior to illness and whose chances of contracting the infection in or away from the city were about equal. Three others were in persons who had been away from the city for a day or two or less during the 30 days prior to illness and whose chances of contracting the infection while away were estimated at about 10 per cent. All of the remaining cases (46) were in persons who had not been away from the city within the 30 days prior to onset of illness. From these findings it appears that in less than 2 per cent of the cases occurring during the outbreak was the infection contracted away from Des Moines.

AGE AND SEX.

For the 50 cases investigated and considered of local origin, the age and sex of the persons affected were as follows:

AGE IN YEARS	Number of Cases		
	Male	Female	Total
0 to 4		4	4
5 to 9	1	5	6
10 to 14	3	9	12
15 to 19	5	5	10
20 to 24	1	9	10
25 to 29	2	2	4
30 to 34			
35 to 39	1	1	2
40 to 44		1	1
45 to 49		1	1
Total	13	37	50

In extensive outbreaks caused by milk-borne infection the proportion of cases in children under 10 usually is considerably larger than was that found among the cases in the Des Moines outbreak, as shown by the following table:

AGE IN YEARS	Percentage of typhoid cases at specified age			
	Waterville, Me., 1903, caused by water	Stamford, Conn., 1895, caused by milk	Des Moines, 1910	
			Sayler's 98 cases	Lumsden's 50 cases
0 to 10	17	35	14	20
10 to 20	38	24	45	44
20 to 30	26	23	24	28
30 to 40	10	12	11	4
40 to 50	4	5	5	4
50 to 70	5	1	1	0
Total	100	100	100	100

It appears that in the Des Moines outbreak the age distribution of cases more nearly approached that usual in outbreaks due to water than that in outbreaks due to milk-borne infection.

OCCUPATION.

The following table gives the occupations of the persons affected:

OCCUPATIONS	Male	Female	Total
School children	8	18	26
Watchmakers	1		1
Housewives		3	3
Telegraph instrument fixers	1		1
Telephone office clerks		2	2
Students (university)		2	2
Bookkeepers		1	1
Ice-wagon drivers	1		1
Salesmen and saleswomen		1	1
Seamstresses		1	1
Cashiers (store)	1		1
Waiters and waitresses (restaurant)		1	1
Firemen (city)	1		1
Newspaper-advertising solicitors		1	1
Laundresses		1	1
Milliners		1	1
No occupation		5	5
Total	13	37	50

It is evident that the disease was distributed through the population regardless of occupations in which persons were engaged.

CHARACTER AND GENERAL SANITARY CONDITION OF RESIDENCES.

Four of the cases were in persons living in rooming houses, 3 among persons in apartment houses, 4 among persons in public institutions (boarding schools), and the remaining 39 were among persons who lived at private residences. The disease certainly did not appear to prevail at a disproportionately high rate among persons who would be most closely associated with transient visitors to the city.

Twenty-three of the cases occurred at residences where the general sanitary conditions were good, 20 at residences where the general sanitary conditions were fairly good, and 7 at residences where the general sanitary conditions were rather bad. From these findings it appears that the disease did not prevail disproportionately among persons living in insanitary neighborhoods and, therefore, that in the causation of the outbreak faulty sanitary conditions at place of residence of persons affected did not constitute an important factor.

SEWAGE DISPOSAL.

Thirty-three of the cases occurred at residences connected with the city sewerage system and at which water-closets were used, and 17 at residences not connected with the city sewerage system and at which privy vaults or surface privies were used. No instance was met with in which it appeared likely that faulty plumbing or seepage from privy to well could have been responsible for the infection.

FOODS AND BEVERAGES.

The season of occurrence, the geographical distribution, and the general features of the outbreak taken together definitely eliminated flies and other insects and contact infection as major factors in the causation

of the outbreak, and from the outset it seemed on general principles, drawn from present knowledge of the modes of spread of typhoid fever, that the outbreak had been caused by infection in some beverage or foods which had been widely distributed over the city. Therefore, in the epidemiological investigation of cases it was endeavored to ascertain as nearly exactly as possible just what foods and beverages, liable to convey infection, had been used by the persons affected, in order to determine which foods and beverages could be eliminated and which involved as the principal source of infection.

MEALS—WHERE TAKEN.

Of the 50 cases, 45 were in persons who had taken meals within the 30 days prior to illness at their places of residence only, 3 in persons who had taken meals at their places of residences usually, but at restaurants occasionally, and 2 in persons who had taken meals usually at restaurants and boarding houses.

From these data it is certain that the outbreak was not caused by infection introduced into foods and beverages at public eating places.

MILK.

In cities where large milk dealers distribute their supplies over large territories extensive and widespread outbreaks of typhoid fever may be caused by milk-borne infection. Outbreaks caused by milk occur most frequently in the summer and early fall, but as milk is a favorable culture medium for the typhoid germs such outbreaks may occur at any season of the year. The likelihood of milk being the source of the infection causing the Des Moines outbreak, therefore was given particular consideration.

The 50 cases investigated gave the following history as to the way in which milk was used during the 30 days prior to illness:

As a beverage	18
In fruits or cereals, but not as a beverage	15
In hot tea or coffee only	14
As ice cream only	2
Not in any way	3

The proportion of cases giving a history of having used milk as a beverage is one point in the evidence that the outbreak was not due to milk, as in outbreaks due to milk the proportion of cases among milk drinkers is usually considerably larger.

There was no disproportionately large number of cases among the customers of any dairyman. Of the 50 cases specially investigated 2 used milk from their own cows only, 3 used no milk in any way, and the remaining 45 cases were distributed among the customers of 25 different dairymen. The source not only of the milk used habitually, but also of that used occasionally (as from grocery stores, for instance,) was ascertained as completely as possible for each case. Sixteen of the cases gave a history of having used habitually or occasionally milk sold by the largest dealer in the city and 8 of having used milk sold by the second largest dealer in the city. These two dealers sell about 50 per cent

of the milk distributed in Des Moines, so that the number of cases among their customers was entirely proportionate to their business. Groups of cases in widely separated parts of the city occurred synchronously and absolutely disconnected in respect to the source of milk used prior to illness.

Two or more cases developing at about the same time in the same household is of frequent occurrence in milk outbreaks, but this was of very infrequent occurrence in the Des Moines outbreak. In outbreaks due to milk a considerable proportion of cases, particularly in children, will have a sudden onset of illness without prodromal symptoms, while over 90 per cent of the cases in the Des Moines outbreak gave a history of prodromes.

In view of all these facts the milk supply can be eliminated, beyond reasonable doubt, as the chief and primary source of the infection which caused the recent outbreak in Des Moines. If milk operated as a factor it must have done so in a secondary way, the bottles or cans becoming infected by being exposed in some way to germs which had already been distributed through some other medium.

ICE CREAM.

Fifteen of the cases were in persons who had eaten ice cream within the 30 days prior to illness, 30 cases gave a history of not having eaten ice cream, and for 5 accurate information regarding the eating of ice cream was not obtainable. The 15 cases giving a history of having eaten ice cream were among the customers of several different ice-cream makers. Evidently ice cream can be eliminated as a considerable factor in the production of the outbreak.

RAW SHELLFISH.

Only one case out of the 50 gave a history of having eaten raw oysters or clams within 30 days prior to illness, so that raw shellfish may be definitely eliminated.

SODA WATER.

The history of the 50 cases in regard to the drinking of soda water within the 30 days prior to illness was as follows: Yes, 2; no, 44; not determined, 4. Soda water could not have been a considerable factor.

ICE.

Two cases were in persons who had used ice in beverages, while 48 gave a definite history of not having done so. Ice can be eliminated as a considerable factor.

RAW VEGETABLES AND FRUITS.

Most persons will give a history of having eaten some kind of raw fruits or vegetables within any period of 30 days, so as a rule these products can not be definitely excluded on the history of the cases alone as possible sources of infection. Yet when the history of the cases in respect to the eating of the different fruits and vegetables is considered along with the general features of the outbreak and the likelihood of any particular supply of possibly infected fruits or vegetables having been distributed so as to have reached the persons affected, reasonably definite conclusions may be formed. The history of the cases in regard to the eating of vegetables and fruits within the 30 days prior to onset of illness was as follows:

FRUIT OR VEGEABLE	Yes	No	Not definitely determined	Total
Celery	18	31	1	50
Lettuce	6	42	2	50
Radishes	1	48	1	50
Apples	29	5	16	50

Thus, the history of the cases along is sufficient to exclude all of these except apples as having been a possibly major factor in the causation of the outbreak. From what is known about the viability of the typhoid bacillus and the way in which apples are gathered and subsequently handled it would certainly seem highly improbable that apples could have been responsible for such an outbreak as the recent one in Des Moines, even if every case had given a definite history of having eaten apples. Furthermore, it was found that the apples eaten by the persons affected had been distributed from the storehouses of at least three of the large wholesale dealers in the city, and it is contrary to the laws of probability that each of these dealers, obtaining his supply of apples from different sources, would have been selling highly infected apples in November, 1910. In view of all the evidence, fruits and vegetables may be eliminated, beyond reasonable doubt, as having played a very considerable part in the causation of the outbreak.

CONTACT.

Only two of the cases gave a history of free association with previous cases in the febrile stage of the disease and were attributable to infection by contact. These two cases had onsets of illness on December 19 and December 20, respectively, and had lived in the same house with and helped nurse a case whose onset of illness was November 22. A considerable proportion of the cases occurring since the 10th of December probably would be found to be attributable to contact infection; but all the evidence indicates that in the outbreak, contact operated only as a factor secondary to some other, which was chief and primary.

WATER.

Of the 50 cases, 49 gave a history of having used the city water unboiled as the sole or principal source of drinking water during the 30 days prior to illness. The one case giving a history of not having used any city water not previously boiled was one of the cases attributed to contact infection and referred to above.

Of the 49 cases, 41 had used the city water solely, while 8 had used the city water principally, but water from some other sources, such as wells, occasionally. Thus the city water presents itself as a common factor, and certainly as a possible chief source, of the infection which caused the outbreak. Along with this fact the season of occurrence, the extent and the explosive character of the outbreak, the distribution of the disease in relation to the distribution of the water supply, and the exposure of the water supply to dangerous pollution constitute a very strong chain of evidence that the city water was the source of the infection which caused the outbreak.

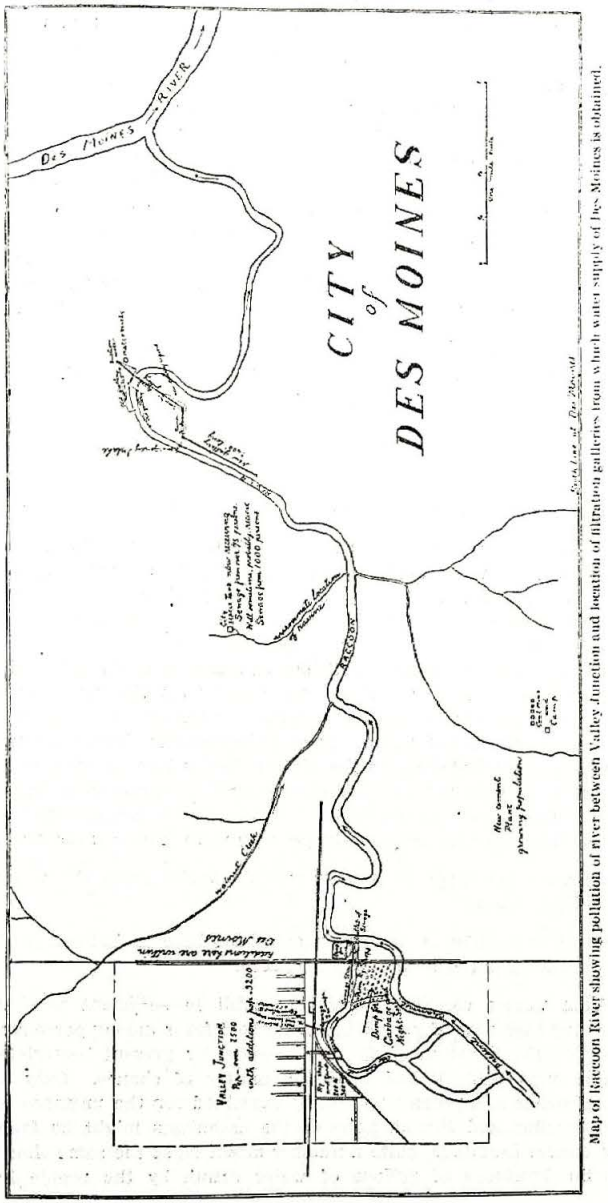
POLLUTION OF THE WATER SUPPLY.

As the water from a new gallery was turned into the city supply at about the same time as the outbreak occurred, and as it had been observed that proper sanitary arrangements were not provided for the men engaged in the work while the construction of this gallery was going on, it was assumed by many people of the community that the outbreak had been caused by infection in the water from the new gallery.

The officials of the Des Moines Water Co. state that none of the water from the new gallery could have entered the city supply before November 15, and that little if any water from the new basins could have entered the city supply before November 30, when the gate of the new gallery was opened and the water taken from the river and filtered through the new sand basins first entered the city supply. According to this information the water from the new gallery, although possibly contributing somewhat, could not have been the sole source of the infection which caused the outbreak, since the period of causation of the main outbreak, as determined by onset of cases, was from about November 5 or 10 to about November 25 or 30.

According to further information received from the water company the scraping away of the surface sand over the two filtration galleries crossing the river, which had been done from time to time throughout the summer and fall in order to secure more rapid filtration of the water from the river into these galleries, was done to a greater extent in the week ended November 5 than in any other week of the year. The next largest amount of scraping for any one week was in the week ended November 12, and the last scraping of the sand over the river galleries was done on November 26. Beginning on November 10 and continuing for some time thereafter a centrifugal pump was operated on the water in the river galleries. This pumping was for the purpose of producing a negative pressure in the galleries, so that the filtration of the river water through the sand over the galleries crossing the river would be more rapid. The time of the unusual amount of scraping of the sand over the river galleries, and the work of the centrifugal pump on these galleries in relation to the period of causation of the outbreak is very suggestive of cause and effect.

According to the description of the work as given by the water company it would seem that there was ample opportunity for dangerous pollution to enter the city water supply during the period extending from



Map of Raccoon River showing pollution of river between Valley Junction and beution of filtration galleries from which water supply of Des Moines is obtained.

November 5 to November 26, provided there was dangerous pollution in the water of Raccoon River as it flowed over the galleries at that time.

As to the dangerous pollution of the Raccoon River at points within a few miles above the location of the galleries there is no question whatever. The attached map, prepared by Prof. Lafayette Higgins, engineer of the Iowa State Board of Health, and based on observations made conjointly by Prof. Higgins and the writer, will give some idea of the pollution of the Raccoon River with human excrement at Valley Junction and at points between Valley Junction and the location of the galleries from which the water supply of Des Moines is obtained. Considering the amount of pollution which enters the river, there is no room for doubt that typhoid infection may more or less continuously reach the water of the river below Valley Junction and above (upstream from) the Des Moines filter galleries.

According to information received from the physicians of Valley Junction there were cases of typhoid fever under treatment in Valley Junction in October and November, 1910. The occurrence of cases as given was as follows: In September, 3; October, 4; November, 5; and in December, 1.

BACTERIOLOGICAL EXAMINATIONS OF THE DES MOINES CITY WATER SUPPLY.

Since the investigation was not begun until December 22, the bacteriological study of the water could not be expected to throw any very definite light on what was the condition of the water when the outbreak was caused. Therefore the bacteriological examinations were made with a view principally to determining if the filtration of the water under what may be called "normal" conditions of filtration could be relied upon entirely to remove from the river water and from the "ground" water obtained from the river basin such disease-producing micro-organisms as might be present in the water. Bacteriological examinations were not made of the river water above the filter galleries because they were not considered necessary, the sanitary survey of the river from Valley Junction down showing more unmistakably than bacteriological examinations could that the river is dangerously polluted with human excrement.

Efforts were not made to recover typhoid bacilli from the water for the following reasons:

1. Negative findings at this time would have been no indication of conditions at the time the outbreak was caused.

2. From waters containing typhoid bacilli in sufficient numbers to cause a very high rate of prevalence of typhoid fever among persons using such waters the isolation of the organism is, by present bacteriological technique, very difficult and largely a matter of chance. Only a few ounces of water a day can be properly examined for the presence of the typhoid bacillus and though none of the organisms might be found in the few ounces examined, quite a number might be at the same time present in the hundreds of gallons of water drunk by the people in the

community supplied; therefore, in a search for typhoid bacilli under such circumstances negative findings can be expected and such negative findings throw no light whatever on the situation.

Samples of water from the following sources were examined:

1. Siphon well, this sample representing the mixture of effluents from all the filtration galleries.

2. Pumping station, this sample representing the water just before it is pumped into the mains for distribution to the city.

3. Tap at the laboratory building, at Fourth and Center Streets; and

4. Tap at the city hall; the last two representing the water after it has traversed the city mains.

The dates and results of the examinations are presented in the following table:

Source of Sample	Date of Examination (planting)	Number of bacteria on agar plates from 1 cc. after 48 hours incubation at 37° C.	Number of red colonies on lactose litmus agar plates from 1 cc.	Fermentation with gas production after 48 hours in lactose bouillon				B. Coli in—			
				1 cc	5 cc	10 cc.	20 cc.	1 cc	5 cc	10 cc.	20 cc.
Laboratory tap	Dec. 25, 1910	16	----	+	----	+	----	+	----	----	----
Siphon well	Dec. 26, 1910	16	----	—	----	+	----	—	----	—	----
Pumping station	Dec. 26, 1910	14	1	—	----	—	----	—	----	—	----
Laboratory tap	Dec. 26, 1910	12	1	—	----	+	----	—	----	+	----
Laboratory tap	Dec. 29, 1910	3	----	—	----	—	----	—	----	—	----
City Hall tap	Dec. 31, 1910	2	----	----	—	----	----	----	—	----	----
Laboratory tap	Dec. 31, 1910	1	----	----	—	----	----	----	—	----	----
Laboratory tap	Jan. 2, 1911	----	----	----	----	----	—	----	----	----	—

It should be noted that the bacterial counts were made from the number of colonies on agar plates incubated at 37° C, and not on gelatin plates incubated at 20° C, the medium and temperature usually employed in making bacterial counts of water. Gelatin plates will usually give somewhat higher counts than will agar plates. The laboratory was not equipped for the use of gelatin plates.

The proportion of samples of the city water taken prior to December 29 which gave fermentation in lactose-bouillon and which contained colon bacilli is significant. The presence of colon bacilli in the city water in such numbers indicates that even at that time the filtration of the water was not efficient to remove from the river water whatever dangerous pollution it might have contained. That the filtration was still less efficient in the early part of November, when the filtration was being forced, is certainly a reasonable deduction.

The improvement in the city water, as shown by the results of the examinations of samples taken on and after December 29 is striking. The three samples examined on and after that date gave average counts

of two bacteria to the cubic centimeter, and none gave fermentation in lactose-bouillon or other indication of the presence of the colon bacillus. The results of the examinations of these three samples compare favorable with those usually from examinations of waters from deep wells of unquestionable safety. Should the water supply of the city of Des Moines be maintained constantly in the condition in which it was found to be at the time these last three samples were taken, it certainly would appear to be safe, so far as bacterial contents is concerned, and to need no boiling previous to use.

CHEMICAL TREATMENT OF THE WATER SUPPLY.

According to information received from officials of the water supply, chemicals were applied to the whole or a part of the city water supply from July 1 to December 25, 1910, on the following dates:

July 7 and 8, December 5, 7, 8, 14 and 15, and after 4.45 p. m. of December 26 the whole city supply was treated with hypochlorite of lime. Therefore the improvement of the city water noted in the samples examined on and after December 29 may be attributed to the use of hypochlorite and not necessarily to any extent to more efficient filtration.

On the evening of December 26 the writer was apprised by a representative of the water company of the use of and the contemplated continued use of hypochlorite in the water, and therefore the difference in finding in the examinations of the water made subsequent to that date occasioned no surprise.

GEOGRAPHIC DISTRIBUTION OF THE OUTBREAK IN RELATION TO THE DISTRIBUTION OF THE WATER SUPPLY.

So far as could be ascertained, the occurrence of cases in the outbreak was largely confined to persons living in districts supplied by the city water. Districts of the city, containing altogether probably about 10,000 to 15,000 of the city's population, not supplied with city water, but with water from wells, remained singularly free from the disease. Most of the cases learned of in these districts were found on investigation to be in persons who had used the city water on frequent occasions while on visits of a business or social nature to other parts of the city. Fort Des Moines, located 5 miles from the city, but supplied with water from the Des Moines supply, had 3 cases. These 3 cases had their onsets of illness as follows: Two on December 2 and 1 on December 19. The first 2 cases gave a history of not having eaten when on visits to the city any foods such as are considered likely to serve as media of typhoid infection. The last case to develop at Fort Des Moines gave a history of having drunk milk at restaurants in the city on several occasions within the two or three weeks prior to illness. The population of the fort is about 900, so that the disease evidently prevailed there during the outbreak at about the same rate as it did in the city. The distribution of the disease in relation to the city water supply is very significant.

CONCLUSIONS.

1. The outbreak of typhoid fever in Des Moines in November and December, 1910, was caused, beyond reasonable doubt, by infection disseminated in the city water obtained from the Raccoon River and Raccoon River basin. A small portion of the cases may have been caused by infection received immediately through personal contact, milk, vegetables, fruits, etc., but the vast majority of the cases resulted from infection distribution primarily and chiefly in the city water supply. This conclusion is based on the following points of evidence:

(*a*) The season of occurrence and the explosive character of the outbreak.

(*b*) The distribution of the disease in relation to the distribution of the city water.

(*c*) The pollution of the Raccoon River at points within a few miles upstream from the location of the filtration galleries.

(*d*) The results of the bacteriological examinations of the water, showing that even about a month after the scraping away of the upper layer of sand from over the filtration galleries crossing under the river and the working of a centrifugal pump on these galleries, in order to secure rapid or forced filtration, had been discontinued, the filtration was still inefficient to remove from the water, to a reasonably reliable extent, such disease-producing micro-organisms as the water in the river and the river basin may have contained.

(*e*) The correspondence in time between the period of special forcing of the filtration galleries and the period of main causation of the outbreak.

(*f*) The decline in the outbreak in due time, according to what is known about the viability of the typhoid bacillus in water and sand, after the forcing of the filtration had been discontinued and after the time in which the bulk of whatever infection may have reached the sand of the new basins, as a result of the lack of proper sanitary precautions while the work on these new basins was going on, probably would have elapsed.

(*g*) The results of the epidemiological studies of the cases, which implicate the city water supply and which definitely eliminate, except perhaps as secondary and minor factors, all other media which according to the whole history of the epidemiology of typhoid fever, could be reasonably considered to have served to convey infection causing an outbreak of such character.

2. The water supply as obtained from the filtration galleries is thoroughly susceptible to purification from whatever bacterial disease-producing organisms it may contain by the proper use of hypochlorite of lime; and when it is assured that the whole supply is being properly treated at all times with hypochlorite the water may be used, certainly with reasonable safety, for drinking and other domestic purposes without boiling previous to such use.

3. The milk supply and the general food supply of the city can be definitely eliminated as the chief and primary source of the infection which caused the recent outbreak, but it is readily conceivable, in view of the

way in which much of the milk in the city is handled, that cans and bottles and consequently the milk itself were exposed to whatever infection was in the water or upon the hands of persons working in public dairies; and, therefore, milk may have operated to some extent as a secondary factor. Milk and other food supplies of the city, as handled at present, are liable at any time in the future to be important sources of infection and therefore should be made subject to official inspection as soon as practicable.

4. Most of the privy vaults and privies in the city are of very faulty construction and constitute a menace to the health of the city in respect not only to typhoid fever but to all other diseases caused by organisms disseminated from faulty disposal of human excrement. The danger from these faulty privies will be greatest during the summer weather when flies and other insects are abundant.

RECOMMENDATIONS.

1. Safeguard the city's water supply.—To accomplish this the following measures are suggested:

(*a*) Protection of the Raccoon River on both sides from sewage pollution at points upstream from the location of the filtration galleries as far as Valley Junction certainly and as much farther upstream as practicable. The Des Moines sewers could be extended to receive the sewage from Valley Junction, or the sewage from Valley Junction could be subjected to purification before being discharged into the river. The dumping of night soil from the privies of Valley Junction at places where it will be liable to seep or be washed into the river should be prohibited. Special attention should be given to surface drainage toward the river from privies at settlements located to the south (the right bank) of the river and within 5 or 6 miles up country from the filtration galleries.

(*b*) The abandonment as soon as practicable of the filtration galleries which cross under the river and their replacement with closed conduits, so that the whole water supply will be received from the sand basin to the south side (right bank) of the river.

(*c*) Until the above changes, *a* and *b*, have been effected and until the safety of the water as then delivered has been determined by prolonged and careful bacteriological and chemical studies conducted by competent and officially appointed investigators, the whole water supply should be treated constantly and under official supervision with hypochlorite of lime applied in accordance with methods approved by unbiased expert opinion.

(*d*) Until definitely and officially assured that the water has been made safe by the use of hypochlorite of lime, the people should be advised to boil the city water before using it for drinking purposes.

The enactment of an ordinance requiring that all water sold in the city of Des Moines shall be within certain chemical and bacteriological standards of purity is suggested.

2. Use every effort to secure legislation which will acquire the prompt reporting of all cases of typhoid fever in the State of Iowa. This is urgently and immediately important. Without such law outbreaks due to readily removable causes may go on in different communities for some time before being discovered, and so cause much needless and preventable suffering and loss of life.

3. Secure official inspection of dairies and dairy farms and of other places where public food supplies are sold or prepared for sale. The enactment of an ordinance requiring the pasteurization of milk and sterilization of all milk cans and bottles, under official supervision, is suggested.

4. Abolish all faulty privy vaults and surface privies and replace them with privies provided with water tight vessels for receiving the excrement, and constructed so that flies and other insects will not have excess to the excrement.

5 Have all cases of typhoid fever investigated and the precautionary measures to prevent spread of infection from the bedsides of patients officially supervised by the local health officer.

REPORT OF EPIDEMIC OF TYPHOID FEVER IN OSKALOOSA AND VICINITY.

By Dr. Wade H. Frost, Past Assistant Surgeon United States Public Health and Marine Hospital Service.

The Honorable Mayor and City Council, City of Oskaloosa, Iowa:

I have the honor to present herewith a report upon the prevalence and causes of typhoid fever in this city during the months of March and April, 1912, as determined by a study, at request of the city of Oskaloosa and the Iowa State Board of Health, by Dr. M. F. Boyd of the State Board of Health and myself. While Dr. Boyd is not present to sign this report, nor to discuss it with you, he has reviewed it in abstract, and concurs in it. He has taken an active part in all the details of the collection and analysis of data, and this may be considered as a joint report.

TYPHOID FEVER IN OSKALOOSA IN PREVIOUS YEARS.

From the records of the Registrar of Vital Statistics of the State a report had been compiled by the Secretary of the State Board of Health, showing the number of deaths from typhoid fever each year, from 1902 to 1911 inclusive, in Oskaloosa and in the rest of Mahaska County. The figures furnished by him are as follows:

Deaths from typhoid fever (including typhoid pneumonia) in Oskaloosa, and in Mahaska County outside of Oskaloosa, 1902 to 1911 inclusive:

Year	Number of deaths in Oskaloosa	Number of deaths in Mahaska County exclusive of Oskaloosa
1902	1	1
1903	2	4
1904	2	5
1905	3	3
1906	5	1
1907	5	0
1908	1	1
1909	3	5
1910	12	4
1911	2	3
Total, 1902-1911	36	27

Since the case-mortality of typhoid fever seldom exceeds ten per cent, it is safe to estimate that these deaths represent about ten times as many cases; that there have been in Oskaloosa, in the last ten years, from 300 to 400 cases of typhoid fever—an average of 30 to 40 cases per annum. Since the population of Oskaloosa during this period has been something less than ten thousand, the average annual death-rate from typhoid fever has been about 40 per 100,000, a figure considerably greater than the annual death date (25.8 per 100,000) for all the cities of the registration area of the United States in 1908. According to the above figures typhoid fever has not been rare, during the last ten years, either in Oskaloosa or in the surrounding country; it has, in fact, been much more prevalent than it should have been, since it has been demonstrated that in cities in or above this latitude in the United States the annual death rate from typhoid fever may quite readily be kept below 20 per 100,000 and should not exceed 10 per 100,000 if careful preventive measures are consistently carried out.

During the first three months of 1910, there were nine deaths from typhoid fever in Oskaloosa, indicating the prevalence of a grave epidemic at that time. While I have been unable to secure a copy of the report upon this epidemic submitted by Dr. Henry Albert, of the Iowa State Board of Health, who investigated it, I am told that it was satisfactorily traced to infection of one of the dairies supplying milk in the city at that time.

During 1911, cases of typhoid fever occurring in Oskaloosa were reported to the Board of Health as follows:

In February	2 cases
In July	1 case
In August	1 case
In September	5 cases
Total	9 cases

From September, 1911, till the latter half of March, 1912, no cases of typhoid fever were reported in Oskaloosa, whereas, from the latter half of March to the present time there have been reported 72 cases in the city and immediate vicinity.

Of the 72 cases recorded, five have been in persons residing in the country near Oskaloosa, six in persons residing in the neighboring corporation, University Park, and sixty-one in residents of Oskaloosa. It is evident then, that since the middle of March there has been a sudden and great increase in the number of cases of typhoid fever in Oskaloosa and University Park. In the population of the surrounding country the proportion of cases during this period has been much less. While it may well be that the reports received from the country are incomplete, Dr. Morgan, the City Health Officer, has made inquiry of the physicians of the county and has been unable to obtain record of any cases other than the five mentioned above, so it is evident that there has not been a coincident epidemic in the county generally.

DIAGNOSIS.

As to the question of diagnosis, there can be no reasonable doubt that the majority of cases reported as typhoid fever have been correctly diagnosed, since the clinical course has been, in most of them, sufficiently characteristic. To confirm the clinical diagnosis, Widal tests have been made with the blood from twenty cases of clinical typhoid fever and suspected typhoid. These tests have been positive in 9 cases, suspicious in 5 cases, negative in 4, and unsatisfactory in 2 cases. The negative and suspicious results were obtained mostly with blood from suspected cases, early in the course of illness, at a time when the Widal reaction is by no means constant, and most of these cases have since been shown not to have been typhoid fever. Where the clinical diagnosis was definite, it was confirmed by the Widal test in as large a proportion of cases as could be expected. Unfortunately, there has been insufficient opportunity for the more accurate method of bacteriological diagnosis by blood-culture, but even so there is abundant evidence that the epidemic has been one of typhoid fever.

GENERAL DISTRIBUTION OF CASES.

The distribution of cases by time of onset as nearly as this could be ascertained is as follows:

Week ending March 16th	no cases
Week ending March 23rd	2 cases
Week ending March 30th	15 cases
Week ending April 6th	34 cases
Week ending April 13th	14 cases
Week ending April 20th	?

It is apparent that the epidemic had its beginning about March 19th, the date of the earliest reported case, reached its maximum during the first week of April, and had commenced to decline by the second week of April. It is too early yet to arrive at an accurate estimate of the cases having their onset in the last week, as it not infrequently requires a week or more to arrive at a diagnosis of typhoid fever. It is believed, however, that the number of new cases will be considerably less than for the previous week.

It is also impossible to make accurate predictions as to the occurrence of cases in the immediate future. It would appear, however, that the epidemic has passed, and that for the last week—perhaps for several weeks past, the original cause of the outbreak has not been operative. On the other hand, there is good reason to expect that without rigid preventive measures there may be a considerable number of secondary cases infected from persons now ill or convalescent.

The distribution of cases according to age and sex has not been unusual. In the following table are given the ages and sex of the sixty-five cases investigated:

AGE	Males	Females	Total
Under 1 year	0	0	0
1 to 5 years inclusive	2	5	7
6 to 10 years inclusive	5	4	9
11 to 15 years inclusive	10	5	15
16 to 20 years inclusive	4	4	8
21 to 25 years inclusive	5	1	6
26 to 30 inclusive	4	4	8
31 to 35 inclusive	3	1	4
36 to 40 inclusive	3	3	6
41 to 50 inclusive	1	1	2
Total	37	28	65

The proportion between children and adults affected in epidemics of typhoid is usually about that shown above, except that in milk-borne epidemics the proportion of children is frequently greater, since children, as a rule, use milk more freely than grown persons.

An analysis of the cases according to occupation fails to show any undue proportion among persons engaged in any particular kind of work, or among those employed in any section of the city. A very considerable number of the cases were among students and school children, namely, five cases among college students in Oskaloosa and University Park, and 28 cases among pupils of the Oskaloosa public schools. This apparently large number of cases among school children is not surprising, however, when considered in proportion to the total number of pupils. According to figures furnished by the superintendent of schools, the total attendance at the schools of the city is approximately 1,835. Twenty-eight cases among these pupils are equivalent to one in each 65 pupils. In the city as a whole, with an approximate population of 10,000, there were about 61 cases, equivalent to one case in each 165 persons. The higher rate in school children may quite probably be explained by the greater susceptibility of young people, between the ages of ten and twenty.

Maps have ben prepared showing the location of the residence of each patient. From a study of these maps it is apparent that the cases have been pretty generally and evenly distributed throughout the city, in a manner roughly proportionate to the distribution of the population. A map giving the location of cases according to dates of onset of illness shows no indication of a progressive spread of infection from one section of the city to other parts. The earliest cases as well as the later ones are widely separated. Mention has already been made of the fact that coincidently with the epidemic in Oskaloosa there was an outbreak in University Park. In this community of 500 to 600 persons there were six cases of typhoid fever during the period of this epidemic. The proportion of cases to total population was somewhat greater in University Park than in Oskaloosa. On the other hand, in the rest of Mahaska county, with a population more than twice that of Oskaloosa, there have occurred, during the same period, only five cases, so far as can be ascertained. Of these five cases two have been investigated, and one of them can be ascribed to the same cause as the epidemic in the city; the

other cannot be so accounted for. The third case has not been investigated, but the patient was employed in the city previous to illness. Definite information has not been obtained concerning the other two cases.

In attempting to find the origin of this epidemic the following considerations must be borne in mind:

(1) The epidemic was practically limited to Oskaloosa and University Park. The cause of the epidemic must, then, have been common to these two communities and limited to them.

(2) Within these two communities the distribution of cases was fairly uniform, affecting persons of various ages and occupations, living in all parts of the towns, under the most diverse conditions. The cause of the epidemic must therefore be expected to be something likewise uniformly distributed.

(3) The outbreak was sudden, affecting at almost the same time a large number of people who had little in common. This indicates a single common cause, since it is highly improbable that a number of different causes should have begun to be operative at so nearly the same time.

(4) So far as known, typhoid fever is usually, if not always, caused by the taking of typhoid germs into the mouth, most commonly in the food or drink. The germs are destroyed by the temperature usually employed in cooking food.

(5) Typhoid fever germs, wherever, found, have come recently from the bowel discharges or urine (or possibly the expectorations) of people infected with the germs. The infected person may be one sick at the time with typhoid fever, one who has recovered from an attack of the disease but continues to harbor and discharge the germs, or one in whose intestines the germs are present without causing symptoms of illness.

The most probable cause of the epidemic is, then, to be sought in some article of food or drink pretty uniformly distributed among the residents of Oskaloosa and University Park, distributed less commonly if at all among the residents of the neighboring country, likely to become contaminated with human sewage, and consumed without cooking.

INVESTIGATION OF CASES.

To ascertain if such a cause could be found a careful investigation has been made of 65 of the reported cases. Dr. Boyd has personally visited these cases, making careful inquiry of the patient or some member of the family as to the age, sex and occupation of each patient, the date of onset of illness, places visited within a month prior to illness, association with previous cases of typhoid fever, places where food and drink have been taken, the use and sources of milk, ice cream, raw fruits and vegetables, raw shellfish, ice and water. Note has also been made of the sanitary conditions at the various residences, with special reference to the sewage disposal. The cases investigated include six residing in University Park, two in the country, and fifty-eight in Oskaloosa.

IMPORTANT CASES.

The question may be raised as to whether a large proportion of the patients contracted their infection outside of the city. Eight of the patients living in Oskaloosa and University Park stated that they had been out of the city at some time during the thirty days preceding their illness. Most of these patients had been away for such a short period or at such a time as to make it highly improbable that they contracted the disease while away. One had been away the greater part of the time, and another had made several trips out of the city, and these may have contracted the disease elsewhere. The remainder of the cases investigated, except those residing in the country, had been in the city continuously during the thirty days preceding their illness. It seems probable that the number of cases exported, that is, contracting the disease here and developing it elsewhere, exceeds the number imported.

ASSOCIATION WITH PREVIOUS CASES OF TYPHOID FEVER.

Persons intimately associated with a typhoid fever patient, especially those living in the same house, are liable to contract the disease. The usual incubation period of typhoid fever is probably from seven to thirty days. Where two cases develop in the same family, if the interval between them is greater than seven days, there is always to be considered the probability that the second may have contracted the infection from the first. If the interval between the cases is less than seven days it is generally more logical to assume that both were infected from some other source.

Of the sixty-five cases investigated, six were found to have been intimately associated with previous cases in the same families. In three instances the interval between the first and second cases was greater than seven days, so there is a probability that these three cases may have been due to contact-infection.

Five other patients had probably been to some extent associated with previous cases at their boarding places, but in none of these instances was the interval between the first and last cases more than one week. Two patients had been intimately associated with persons who had recovered from typhoid fever less than a year prior, and fourteen lived in families of which one or more members had at previous time had typhoid fever, and who might therefore be "typhoid carriers." This, however, cannot be considered significant. Considering the prevalence of typhoid fever in past years, it is not surprising to find, in twenty per cent of families questioned, that some member had previously suffered from typhoid fever.

Probably there was some association at school between children in the early stages of infection and well children, but considering the sanitary conditions of the schools it is not probable that such contact could account for any considerable number of cases.

Altogether only three of the patients gave histories of such association with previous cases of typhoid as to justify the belief that they were probably infected in this way.

SEWAGE DISPOSAL AND GENERAL SANITARY CONDITIONS ON PATIENTS' PREMISES.

The provision for sewage-disposal on the premises occupied by patients was:

Water closet in the house in.....47 cases
Privy in the yard in.....22 cases

In four cases there were both water closets in the house and privies in the yard.

The general sanitary conditions on the premises occupied by patients were found to be:

Good in .....30 cases
Fair in .....25 cases
Poor in ..... 8 cases
Not determined in ..... 2 cases

It is evident that there was no disproportionate occurrence of cases among those living under poor sanitary conditions, with inadequate sewage-disposal and unclean habits.

MILK.

Milk, raw or commercially pasteurized, was taken as food to some extent by fifty of the sixty-five patients visited.

Milk was used as a beverage by 25 patients; on cereals or desserts, not as a beverage, by 14 patients; in tea or coffee only by 9 patients; extent of use not stated, 2 patients. Condensed milk only was used by 3 patients. No milk at all was used by 12 patients. Total 65.

The milk consumed by the fifty persons who used it was supplied from twenty-two different dealers, from two sources not definitely ascertained, and in four instances from cows owned by the patients' families. So far as could be ascertained no two of the dealers regularly obtained their supply from a common source. It is evident therefore that infection of a single dairy could not account for all the cases. Seven dairies had each more than one case of typhoid fever among their regular or occasional customers; but a careful comparison of the number of cases with the amount of milk sold by each dairy shows that generally the number of cases was roughly proportionate to the amount of milk distributed.

While it is, of course, possible that some of the cases may have been caused by infection of milk-bottles returned to various dairies from the homes of typhoid fever patients and refilled without proper sterilization, there is no evidence specific that such was the case, and such infection could not, at most, account for more than a small proportion of the total cases. The comparatively small number of cases on any single milk-route definitely excludes the probability that the epidemic was due to infection of any one dairy; and it is beyond all probability that a large number of them should have become simultaneously infected.

ICE CREAM.

Twenty-two patients stated that during the month preceding their illness they had eaten more or less of ice cream. In one case this was made at home, in two cases it was obtained from unknown sources and in the remainder from the six principal dealers in the city. There was no strikingly disproportionate number of cases among the customers of the cream of any singular manufacturer. Three of the five largest local manufacturers of ice cream had obtained some part of their supply of cream from a common source—one of the dairies retailing milk in the city. Altogether fourteen patients had eaten ice cream prepared by these three manufacturers. There is, however, no probability that the ice cream was the cause of their infection, since if there had been an infection of the dairy which was the only source of supply common to the three dealers it would almost certainly have been evidenced by a disproportionate number of cases among the milk customers of this dairy. In five cases it was not known whether ice cream had been taken or not, and in more than half of the cases, thirty-eight, it was definitely stated that no ice cream had been eaten within a month.

RAW FRUITS AND VEGETABLES.

In thirty cases it was stated that raw fruits or vegetables such as lettuce, celery, onions, radishes, tomatoes, etc., had been eaten previous to the attack of fever. In the rest of the cases it was stated that the patient had not taken such articles of food or could not definitely recall having done so. It is probable that typhoid fever may be contracted from raw vegetables grown in contaminated soil, or from fruits or vegetables contaminated by the hands of those who handle them. Considering the very various sources from which the supply of such foods comes it is altogether improbable that there would be a simultaneous infection of a sufficient number of these sources to cause such an epidemic as this one.

ICE.

Since freezing does not necessarily destroy typhoid germs, ice used in drinking water may be considered as a possible source of infection, though an improbable one at this season of the year, when the majority of people do not use ice in their drinking water. In thirty-three of the cases it was ascertained that no ice had been used. In most of the remainder no definite information was recorded on this point. It is understood that practically all the ice used in this city to cool drinking water is furnished by the local ice plant, which manufactures its ice from distilled water, and that the ice used during the winter and early spring months is taken from a supply kept in storage. The ice used during March was, therefore, from the same supply used during the winter, when there had been no epidemic of typhoid.

Some ice is said to be taken by various parties from the Skunk river and from ponds which are probably polluted, but in no case was information obtained that such ice had been used by any of the patients.

WATER.

All but two of the cases investigated were in persons who had drunk the public water-supply of Oskaloosa and University Park.

This water had been used for drinking at home by	56 patients
At place of business only by	4 patients
At school only by	3 patients
Total	63 patients

One of the two patients who had drunk none of this water lived in the country; the other had been out of town for a considerable part of the time prior to illness.

In order to show that a water supply used by the majority of the residents of a city has been the cause of an epidemic of typhoid fever, it is necessary not only to show that this water has been used by all, or the greater majority of the patients, but also that the occurrence of the disease has been approximately limited to the distribution of the water supply; that the water has been subject to probable pollution with typhoid germs; and, finally, to exclude other cases which might reasonably account for the epidemic.

In an explosive epidemic affecting a whole city, only two probable sources of infection can, as a rule, be seriously considered as capable of causing the outbreak, viz., water and milk.

As shown above, milk, raw fruits and vegetables, ice and contact with previous known causes may be quite definitely excluded as important factors in causing the epidemic in Oskaloosa. The sixty-five cases investigated occurred in persons widely scattered throughout the city, who had not been associated collectively in any way. The only food or drink common to these persons, as far as could be ascertained by a careful study, was their water supply. The character of the epidemic was similar to that of water-borne epidemics generally. Epidemics of typhoid fever due to water-borne infection occur most frequently in the late fall, winter or early spring months. They are usually sudden and explosive. Cases are generally pretty evenly distributed throughout the area of distribution of infected water without regard to sanitary conditions.

All these characteristics are presented by this epidemic. It remains to be seen whether the source of the water was such that it might probably have become sufficiently polluted to have produced such an epidemic.

WATER SUPPLY.

Oskaloosa and University Park have the same public water supply, obtained from three different sources, viz., from wells sunk in flats on the north bank of Skunk river opposite the pump house; from the Skunk river direct, and from a reservoir of about 5,000,000 gallons capacity, situated south of the pump house and at a considerable elevation above it. The water in this reservoir is pumped for the most part from the Skunk river, occasionally perhaps, from the wells. Accord-

ing to statements furnished by the superintendent of the water company, the capacity of the wells is approximately 1,000,000 gallons a day. It is probably at times somewhat less than this. The well water must, therefore, be supplemented by water from the river or the reservoir when the consumption in the city exceeds an average of 1,000,000 gallons per day. Also, it is necessary to turn water from the river or the reservoir directly into the city mains when the occurrence of a fire in the city necessitates raising the water pressure from the usual 40 pounds to about 90 pounds.

Under ordinary circumstances the water supplied to the city is passed through pressure filters located in the city, but when for fire protection it is necessary to raise the water-pressure, these filters are by-passed. A stand pipe of about 300,000 gallons capacity is connected with the filter water mains, serving as a reservoir for surplus water and to equalize the pressure.

A statement of the total amount of water pumped to the city, daily, from February 1st to date has been furnished by the Superintendent of the People's Water Company. According to this statement it was necessary for a part of this time to supplement the supply of the wells with water pumped from the river or reservoir. From February 1st to March 14th, such water as was needed beyond the capacity of the wells, was taken from the river direct; from March 15th to March 23rd, water from the reservoir was used, and from March 23rd to date, practically all of the water has been supplied from the wells, with only the occasional use, for a short time, of water from the river or reservoir in case of fires. The relative amounts pumped from the wells, from the river and from the reservoir during February and March cannot be exactly determined, and no attempt will be made to make an estimate.

The wells mentioned are twenty-two in number, each from forty to sixty feet deep. They consist of 4-inch or 6-inch iron pipes driven into the ground to the depth mentioned, and having at the lower end a so-called sand point. The wells pass through the top layer of loam, then through a variable depth of quick-sand into a water bearing layer of gravel which is said to immediately overlie solid rock. It has not been determined whether the water in this layer of gravel comes by seepage from the river-bed or from the opposite direction. In either case it must undergo a process of natural filtration. Four of these wells are connected with a large brick cistern about thirty feet deep and fifteen feet in diameter. This cistern was examined April 13th, at a time when the flats on which the wells are located were flooded, and it was found that surface water was draining freely through the mason work into it. At that time the cistern and the four wells connected with it had been out of service for several days, as they have been since that time. The remaining wells are connected directly with a main which passes under the river bed to the pumps. These wells have been recently opened, their depth ascertained and samples of water taken from several of them. One of them was found partially filled and presumably out of service; the remainder were reported to be in good condition.

The water of the Skunk river, like that of all rivers flowing through polluted areas, is necessarily subject to pollution with human sewage. So far as known, no city sewage is emptied directly into this river, below Colfax; but the surface drainage, not only of towns, but of the many farms on the water shed, finds its way eventually into the river. The extent of pollution of the river at any time will depend largely upon the amount and character of rain fall. Very probably the pollution is at its maximum immediately following the spring thaw.

The reservoir mentioned cannot be considered altogether satisfactory; it has been constructed by damming a natural ravine. Above the reservoir, on the south side, is a small pond into which the surface water drains from the hillsides above, on which are located some stables, a particularly filthy hog pen and an open privy receiving human discharges. This pond is separated from the reservoir only by a dirt embankment, through which seepage may possibly occur. After a very heavy rainfall there may even be a direct overflow from the pond into the reservoir, polluting the latter.

BACTERIOLOGICAL EXAMINATION OF WATER SAMPLES.

To determine the quality of the water from the three sources mentioned, and of the water supplied to the city, daily, bacteriological examinations have been made from April 14th to April 21st, inclusive. Altogether forty samples have been examined, including samples from the river at the intake, from the reservoir, from several of the individual wells, from the unfiltered water main at the filter plant, from the filtered water main at the filter plant and from taps in various parts of the city. In bacteriological examinations of water, an estimate is made of the total number of bacteria per cubic centimeter of the water, and tests are made to determine whether or not bacteria characteristic of sewage are present. The so-called colon bacilli are bacteria which are normally present in the intestines of man and the lower animals, and which are believed to have no other natural breeding place. The presence of colon bacilli in water indicates, therefore, pollution with the intestinal discharges of man or the lower animals. The extent of pollution may be approximately estimated by estimating the number of colon bacilli in a given volume of water.

It is not at present possible to determine by bacteriological examination whether the colon bacilli found in water have come from the intestines of man or from lower animals. To properly interpret the results of the bacteriological examination of water from a stream it is necessary to have some knowledge of its sources. If the water shed is a country sparsely populated but largely used for grazing, it would be inferred that the majority of colon bacilli present come from the intestines of lower animals. If, on the other hand, the water shed is thickly populated, and especially if the sewage from towns is known to empty directly into the river, the pollution shown by bacteriological examination may be inferred to be, to a greater extent, from human sewage and to be, consequently, more dangerous. The detailed results of the bacteriological examination of water samples are given in an appendix to this report.

A brief summary of the results of these examinations may be given here, as follows:

Four samples of river water examined showed an average of 5,225 bacteria per cubic centimeter. Colon bacilli, indicative of sewage pollution, were demonstrated in all four samples. The average number of colon bacilli present in these samples may be roughly estimated as about 30 per 10 cubic centimeters.

Five samples of water from the reservoir gave an average of 263 bacteria per cubic centimeter. Colon bacilli were present in all samples, but less abundant than in the water from the river. The number of colon bacilli may be roughly estimated as an average of five per 10 cubic centimeters.

Nine samples were taken from wells at the pump house, namely, seven from individual wells, and two from the main leading from the pumps to the city. The average number of bacteria present in these samples was 38 per cubic centimeter; the maximum number of any sample, 90; the minimum in any sample, 2 per cubic centimeter. There was no evidence of sewage pollution in any of these samples.

Six samples were taken at the filter plant, from the main leading to the filters. The average number of bacteria present was 53 per cubic centimeter; the maximum number in any sample 105; the minimum, 15. None of the samples showed evidence of sewage pollution.

Five samples takes from the filtered water main at the filter house showed an average of 39 bacteria per cubic centimeter, a maximum of 65 in one sample, a minimum of 5. None showed evidence of sewage pollution.

Four samples taken from city taps in various parts of the city showed an average of 16 bacteria per cubic centimeter, a maximum of 40, a minimum of 4. None showed evidence of sewage pollution.

These examinations show that during the week ending April 20th the water from the wells was of good sanitary quality, free from sewage pollution demonstrable by the methods used, and presumably safe for drinking purposes. The water supplied to the city during this time, probably almost wholly from these wells, was of approximately the same quality. Comparison of water taken from city taps with water taken from the mains and directly from the wells shows no evidence of serious or definitely appreciable contamination in the city mains.

Water taken from the reservoir above the pump house was found to be of very considerably better sanitary quality than water taken directly from the river, as was to be expected. A part of the water now in this reservoir has been pumped there from the wells; the remainder, probably the most of it, has been pumped from the river. It may be stated in this connection that small amounts of alum and lime have been added to at least a part of the river water now in the reservoir, as a coagulant, to assist in its purification by settling.

The water of the Skunk river is found to be quite considerably polluted with sewage, which, indeed, might safely have been asserted even without bacteriological examinations, as the river receives the surface-drainage of a wide and thickly populated territory.

EVIDENCE THAT THE WATER SUPPLIED TO THE CITY CAUSED THE OUTBREAK OF TYPHOID FEVER.

To summarize the evidence that the city water was responsible for the epidemic of typhoid fever.

1. This water was the only article of food or drink found to have been common to the great majority of the patients within the thirty days previous to their illness. All but two of the sixty-five cases investigated gave a definite account of having used this water.

2. The epidemic was pretty definitely limited to the area of distribution of this water-supply, namely to Oskaloosa and University Park.

3. Other probable causes for the epidemic can be excluded by a careful analysis of the data obtained from investigation of cases.

4. The epidemic presented the general characteristics of water-borne epidemics of typhoid fever, namely, sudden explosive onset, even distribution among the consumers of the water, regardless of occupation, sanitary conditions of their homes, and relation to previous known cases of the disease. The proportion between children and adults affected was about what has been found usual in water-borne epidemics of typhoid fever.

5. A part of the water supplied to the city during the thirty days preceding the outbreak came from a source subject to pollution, namely, the Skunk river. While it is not possible to definitely locate the exact source of pollution of the river in this instance, it is at least highly suggestive that about the middle of February a case of typhoid fever occurred in a person living about eight miles above Oskaloosa; and that, according to information obtained from the family, up to the first of March, that is, until the diagnosis of typhoid fever had been made, the discharges from this case were emptied, without draining directly into a small stream which flows into a creek tributary to the Skunk river. An associate of this patient was taken sick at about the same time, with what may have been a mild case of typhoid fever, though no definite statement can be made as to the diagnosis, as this case was seen by a physician only once. The stools and urine of this patient were likewise emptied upon the ground where they would probably have been washed eventually into the river.

6. The time of the beginning of the epidemic, about March 19th, would indicate that the infection of the water which caused the outbreak probably took place about March 1st, about the date of a considerable thaw, which might be expected to wash a considerable accumulation of sewage into the river.

7. The pumping of water from the river to the city was discontinued March 14th, and from the reservoir March 23rd, since which time very little water has been pumped from either source. At the present time, about four weeks after the discontinuance of this water the epidemic has apparently ceased.

RECOMMENDATIONS.

In making recommendations for the future prevention of typhoid fever in this city, it is considered that the prevention of an occasional epidemic is not more important than the prevention of the less noticed annual cases. Epidemics may be considered as accidents, which are to a certain extent preventable. The occurrence in a community of an excessive number of cases of typhoid fever year after year, cannot be considered an accident. In the course of ten or twenty years fewer cases occur in epidemics than occur in other times unnoticed by the public. It is, then, of even more importance to reduce the usual prevalence of typhoid fever than to prevent occasional epidemics, and this may be accomplished the more easily as the same general measures are effective in both directions.

WATER SUPPLY.

The prime requisite for a city, as a precaution against the excessive prevalence of typhoid fever, is a water supply which shall be at all times free from sewage pollution. It is not sufficient to have a supply which is usually safe. It must be so protected as to be safe every day in the year.

In recommending the measures for rendering the water supply of this city safe, it is necessary to consider first the temporary measures which can be adopted immediately, pending the more extensive changes necessary for a satisfactory, permanent system.

It is recommended that for the present the water supply be obtained as far as possible from the wells now in use. The brick cistern which has previously been used to receive the supply from three of the wells should be abandoned; these wells being connected directly from the main leading from the other wells to the pump.

It is almost certain, however, that the wells now in use will not prove sufficient at all times to afford a supply for the city, and it will be necessary from time to time to use water from other sources.

It is recommended that for a reserve supply, water be pumped from the river into the reservoir, or, preferably, if there is any surplus available from the wells that this be pumped to the reservoir. Storage of water in the reservoir will allow time for the natural processes of purification, viz., the settling of suspended particles, including particles of mud and bacteria, and the destructive action of sunlight upon bacteria.

To assist in the most important of the natural purification processes, sedimentation, it is recommended that a coagulant be added to the river water as it is pumped into the reservoir. For this purpose alum or

iron and lime may be used, as determined by careful chemical studies. When alum is added to water containing limestone (carbonate of calcium) the alum combines with a part of the limestone, forming jelly-like flakes of aluminum hydroxide; and at the same time part of the lime present combines with some of the constituents of the alum, forming an almost insoluble compound of lime. The result is, that instead of having lime and alum dissolved in the water, the alum, and to some extent the lime, are made insoluble and are precipitated. If the process is carefully regulated by a competent chemist, no alum at all should remain in the water. Under some circumstances it is more practicable and economical to add lime and sulphate of iron instead of alum. The lime and iron combine, as do the alum and lime, forming compounds which are not dissolved in the water and which settle to the bottom. The settling of these particles, whether alum or iron and lime is used, causes at the same time the settling of particles of mud, bacteria and other suspended matters, thereby clarifying and purifying the water treated.

The use of a coagulant, when properly regulated, is free from any reasonable objections. The waters of many rivers in this country can not be satisfactorily and at the same time economically filtered without the use of coagulants.

The choice of the coagulant to be used for any given water and the regulation of the amounts applied should be left to a competent chemist. The careless use of chemicals in water is sure to prove either ineffective or wasteful, and is likely to result in objectionable substances remaining in the water.

In addition to the materials added to the water to cause better sedimentation, which can be added best at the inlet, it is recommended that an apparatus be installed for applying to the water as taken from the reservoir small amounts of hypochlorite of lime. This is now used in many places for the destruction of bacteria in water. While it can not be recommended as a permanent substitute for effective filtration, it has, in many places, proven effective in reducing the numbers of bacteria present in water in rendering it safer for drinking purposes.

The application of this, as of the materials used for coagulant should be carefully supervised by a chemist, and the results controlled by frequent chemical and bacteriological examinations of the water. The exceedingly small amounts of hypochlorite usually necessary for water that is clear and fairly free from organic matter do not usually make any appreciable change in the taste or chemical composition of the water. The use of hypochlorite for the partial sterilization of water is now generally recognized as a valuable emergency process. The necessary apparatus is inexpensive, and can be very quickly installed.

In addition, the reservoir should be emptied, flushed and refilled, and should be protected by draining the pond above it, so that the drainage from the hillsides passes around the reservoir, instead of being held above it as at present.

With these changes it is expected that the water from this reservoir may be made reasonably safe for drinking, very much safer than water pumped directly from the river. It is recommended, however, that until the water supply shall have been proven, by careful and extended tests, to be quite uniformly safe, people be warned to continue boiling their drinking water.

To avoid the necessity of increasing the pressure in the water mains and by-passing the filters whenever it is necessary to take water for a fire, it is recommended that a fire engine be provided to furnish the necessary pressure. Even with the use of a fire engine, it will still be necessary, with the present arrangement, to increase the rate of pumpage to supply water sufficient to extinguish large fires, but if the standpipe is kept filled this will not be necessary in the case of small fires. There will thus be the advantage of having such water as is necessarily pumped from the reservoir passed through the filters.

The filters, as at present used, do not materially reduce the number of bacteria present in the well water which passes through them, and could not be relied upon to purify water from the river or reservoir. Filters of the type in use here are intended to be used in connection with a coagulant, as they are not sufficiently fine to remove bacteria and fine silt from water to which no coagulant has been added. The coagulant should be added before the water reaches the filters, allowing just time enough for the chemical reactions to take place before the water passes the filters. A basin or settling-tanks are usually provided for the purpose of allowing the coagulant time to act after it has been applied to the water and before it reaches the filters. As there is no such provision at this plant, it is doubtful whether a coagulant could be used to advantage, although possibly it might be added in the main a short distance before the filters are reached.

It is recommended that to avoid the possibility of raw river water being pumped into the city supply by the negligence of some employe, the valves leading from the river to the main pumps be sealed, also the valves leading to the city mains from the auxiliary pumps, which are used to pump from the river to the reservoir.

To permanently provide for a satisfactory supply of water, of good quality and sufficient in amount for the increasing consumption of the city, it is recommended that the wells be increased in number or provision be made for the proper filtration of water taken from the Skunk river, or else that another source of supply be sought. The advice of an expert engineer should be obtained as to the relative cost and practicability of these propositions.

Before it is decided to rely altogether upon wells such as are now in use, it should be definitely determined that they will give an abundant supply of water at all seasons, and that they will at all times furnish water of good sanitary quality. The examinations reported, extending over only one week, while they show that the well water has been of good quality during that time do not prove that it is safe at all times.

There are to be considered the possibilities that surface water may be drawn into the wells when they are flooded, and that under certain conditions the natural filtration which the water receives in passing through the sand and gravel to reach the wells may be insufficient to render it altogether safe.

If it is decided to take the supply in the future from the Skunk river altogether, it will be necessary to remodel the filtration plant. It would probably be necessary and at the same time economical to have the filter plant located at or near the intake, and to provide a setling basin to receive the water before filtration. It would also be necessary to provide a basin to receive the filtered water, holding a sufficient quantity for ordinary fire purposes. With a filtration plant properly constructed and operated it should be possible to obtain from the Skunk river water of good, safe quality.

It may be repeated that the planning of permanent improvements in the plant should be on the advice of a thoroughly competent sanitary engineer, and that the operation of the plant when constructed should be under the constant supervision of an expert capable of making and interpreting the necessary chemical and bacteriological tests. The chemical treatment and filtration of water are fairly complex processes, requiring constant adjustment to meet changing conditions, and to make such adjustments requires considerable technical knowledge. The purity and safety of the water from a purification plant depends upon the accuracy of its operation as well as upon the construction of the plant.

It is also recommended and urged that the city employ a competent bacteriologist to make examinations of the water at frequent intervals in order that the authorities and the public may be kept officially informed as to the quality of the water which they are receiving. The necessity of such examinations is generally recognized, and filter-plants supplying large cities usually have provision for examining numerous samples daily. The necessity for examinations of the water is no greater in a large than in a small city except for the greater number of people whose safety is being guarded.

SEWAGE DISPOSAL.

An abundant and absolutely safe water supply will not of itself insure the elimination of typhoid fever. It is necessary also to make such provision for sewage-disposal that no human discharges are disposed upon the ground or exposed to flies, chickens, etc. This is especially necessary at this time, when there are in the city a number of cases of typhoid fever, who during their illness and in some cases during their convalescence constitute a menace to the health of the community. To minimize the danger of the discharges from these patients being received into open privies and being carried by drainage or by flies to the food or drink of others, immediate attention should be paid to the rigid enforcement of an ordinance requiring sewer connection and water closets on all premises sufficiently near a sewer. The sewer system should be extended as rapidly as possible to provide for sections of the city not already

sewered. Until this can be done, a privy ordinance should be enforced, prohibiting the employment within the city of an open privy, and requiring all privies to be water-tight and fly-proof. The construction of a sanitary privy is a matter of small expense. A satisfactory model, approved by the board of health, should be required on all premises not provided with flush-closets.

The care of privies and the disposal of their contents should also be under rigid supervision.

FLY DESTRUCTION.

Typhoid fever may be conveyed by flies, which therefore become a danger in communities where typhoid fever is present and where sewage-disposal is inadequate. Flies do not originate typhoid fever; they merely carry the germs from discharges to which they have access. In preventing the spread of typhoid fever by flies it is of primary importance to so dispose of discharges that flies can not have access to them. It is also important, however, to reduce the prevalence of flies as far as possible. This is most effectively done by attacking their breeding places. Horse manure, which is a favorite breeding place, should be required to be kept in tightly closed receptacles, to which flies can not have access, and all stables in the city should be required to be kept clean. Garbage should also be kept always in closed vessels, the contents of which should be collected as often as necessary and safely disposed of by removal to a considerable distance or preferably by burning. Now, when flies are not abundant, is the time to begin a campaign against them.

SUPERVISION OF DAIRIES AND ICE CREAM DEPOTS.

Dairies supplying milk to the city should be subject to regulations requiring the strictest cleanliness and care in the handling of milk, and the prompt reporting to the board of health of all cases of illness in their families or among their employes. The past experience of this city should demonstrate the importance of such regulations. Even with the utmost care on the part of dairies there remains a danger of their milk becoming infected with typhoid fever germs, so long as the disease is prevalent in the community. It is recommended that efficient pasteurization, under official supervision, be encouraged, as the most effective safeguard against typhoid fever. Proper pasteurization destroys typhoid germs which may be present in milk; but unless the utmost precautions are exercised in the handling of the milk after pasteurization it is liable to subsequent infection.

SCREENING OF FOOD-STUFFS.

Food-stuffs exposed for sale, especially fruits and vegetables which are eaten raw, confectionery, etc., should be required to be kept protected from flies, which may carry typhoid germs. A screening ordinance is recommended for this purpose.

THE CARE OF TYPHOID FEVER PATIENTS.

Since every case of typhoid fever is a menace to his associates and neighbors, it is a legitimate and important function of the board of health to have supervision over the preventive measures carried out in the care of these cases. In order that this may be done it is necessary that all cases be promptly reported to the health officer, and it is recommended that a representative of the board of health be detailed to instruct the family of each case in the proper preventive measures, and, if necessary, to enforce their observance. It is economy on the part of the community to supply the poor the necessary disinfectants, and, in some instances, attendance.

The passage of ordinances covering the above points will be of little avail unless the board of health is provided with an executive organization sufficient to make the necessary studies of the prevalence and causes of typhoid fever and to enforce the observance of its regulations. It is only by continued, well-directed efforts that typhoid fever can be reduced to a minimum in a community. If, as the prevalence decreases, these efforts are continued, there is every reason to expect a progressive reduction with ultimately almost complete eradication of the disease.

The manufacture and sale of ice cream should be under supervision similar to that exercised over dairies. Public restaurants should also be under the supervision of the board of health, and required to be kept and conducted in such manner as to minimize the danger of infection through them.

In conclusion I desire to express for Dr. Boyd and myself the most hearty thanks for the cordial treatment and energetic co-operation of the city officials, especially the mayor, the health officer and the city engineer, also our appreciation of the courtesy of the physicians of the city, the interest they have taken in this work, and the invaluable assistance that they have given.

Respectfully submitted,

W. H. FROST,

Past Assistant Surgeon, U. S. Public Health and Marine Hospital Service.

Oskaloosa, Iowa, April 23, 1912.

TYPHUS FEVER AND TYPHOID FEVER.[1]—A REPORT ON PAPERS READ AT THE SOUTHERN MEDICAL ASSOCIATION MEETING AT JACKSONVILLE, FLA., NOVEMBER 12-14, 1912.

At the meeting of the Southern Medical Association in Jacksonville, November 12-14, 1912, a number of interesting papers having public health bearing were presented. Of very special interest was a paper presented by Dr. J. E. Paullin of Atlanta, Ga., on typhus fever. In this paper Dr. Paullin reports seven cases of typhus observed in Atlanta since 1910. The features of these cases are summarized by him as follows:

TYPHUS FEVER IN ATLANTA, GA.

Onset has been sudden, with chills, as a rule; intense aching pain in back and limbs; persistent and intense headache, in two cases severely distressing to the patient, and remaining throughout the course of the disease; delirium was present in one case; prostration has been quite marked in all of the cases. The eyes are generally bright and shiny, the face flushed, tongue heavily coated; between the fifth and eighth day of the disease the characteristic eruption appears first on the chest and abdomen, rapidly spreading to the back, arms forearms, hands, neck, face, legs and feet, although it is stated that frequently it is absent from the face. The rash resembles somewhat the typhoid roseola; it is more extensive and of a brighter color, maculopapular, varying in size from 1 to 12 mm. in diameter, appearing rapidly over the body, becoming petechial in places and not completely disappearing under pressure. In these case the rash had completely disappeared before the subsidence of the fever, leaving behind a darkish brown discoloration, which soon disappears. The rash has not been observed on the buccal mucosa. No subcuticular flushing has been noted in these cases.

The temperature is high from the onset and having within the first few days reached its fastigium maintains this with very slight remissions for 10 to 15 days, when it ends by lysis or crisis. With a normal temperature the patients feel well, and headache disappears. The pulse is, as a rule, full, good volume, occasionally dicrotic; slow in comparison with the height of fever.

The spleen has been palpable at the first examination in all of the cases except one, the percussion area of splenic dullness is here increased. The border is hard and firm. The largest spleen—Case VI—extended 3.0 cm. below the costal margin. All of the cases have shown slight leucocytosis, the highest count 12,400—the lowest 7,000. Repeated Widals with the *Bacillus typhosus* and *Bacillus paratyphosus* have been negative.

Blood cultures have been made on all cases except the first two, all remaining sterile.

Most patients have had a slight bronchitis at the beginning of the disease, and in two it persisted throughout its course.

There have been no relapses in these cases and no complications.

[1]Reprint from the Public Health Reports, Vol. XXVIII, No. 2, Jan. 10, 1913.

This paper is of very great practical importance because it emphasizes what Dr. Anderson and myself have several times stated—that typhus fever is endemic in the United States, a fact which physicians and sanitarians do not as yet sufficiently appreciate.

Two other papers of wide practical public health interest were presented in the section on preventive medicine, one "The present status of our knowledge regarding the transmission of typhoid fever," by Dr. A. W. Freeman, and the other, "Fly-borne typhoid fever and its control in Jacksonville," by Dr. C. E. Terry. These two papers are of such wide sanitary interest that I would recommend their publication in the public health reports and herewith transmit copies of them for that purpose.

THE PRESENT STATUS OF OUR KNOWLEDGE REGARDING THE TRANSMISSION OF TYPHOID FEVER.

By Allen W. Freeman, M. D., Assistant Commissioner of Health of Virginia.

With the possible exception of tuberculosis, there is no disease in all the long catalogue of those classed as infectious which has been more studied than has typhoid fever. Both diseases present complex epidemiology, and in both effective practical prevention has come only after long and arduous study. The epidemiology of typhoid fever has become more complex as our knowledge has increased. The infectious agent of the disease can survive for a long enough time and under sufficiently varied conditions to render the study of its transmission difficult in the extreme.

Prior to the discovery of the specific etiological agent of typhoid fever the studies which were made were for the most part fragmntary and unsatisfactory, and until the time of Budd, whose immortal work has never received the recognition which it deserves, nothing of great value in the specific prevention of the disease had been recorded. Budd, whose researches will always remain a model for pure epidemiology, clearly established the infectious nature of the disease, located the infectious agent in the excreta of the patient, and laid the foundation for our modern ideas regarding the disease. The discovery of the infectious agent, coming shortly after the publication of Budd's work, gave great impetus to the prevention of typhoid fever, and from that time to this the history of sanitary science records a continuous series of triumphs over the disease.

At the present time, in summing up our knowledge regarding typhoid fever, we may say without hesitation that it is caused by the *Bacillus typhosus* of Eberth. The work of Metchnikoff and Besredke, together with the results of anti-typhoid vaccination, have disproved forever the theory so frequently advanced that typhoid fever is of the same nature as swine cholera, and the typhoid bacillus only a secontary invader, the real infectious agent being a filterable virus to be found in the blood.

We may say, too, with certainty that the typhoid bacillus is of much wider distribution than was thought, even up to a few years ago. It is to be found in the discharges not only of the patient, but of many healthy persons, who may or may not have had the disease, and in the discharges of many persons who are sick with intestinal fevers so mild as to bear little or no clinical resemblance to true typhoid fever.

We have learned within the past few years that the typhoid bacillus is disseminated, not only as was formerly thought, by water and milk, and occasionally by other foods, but also by flies and fingers and in fact by

almost any material object which comes in contact with human filth, and directly or indirectly with human mouths. We have learned by sad experience that the measure of typhoid fever in any community is the measure of the distribution of human filth in that community, and that the dissemination of human excrement will inevitably result in the spread of typhoid fever.

Water has, of course, long been regarded as the great carrier of typhoid infection, and rightly so. Sometimes in epidemics, sometimes in the continuous infection of a large population, sometimes in scattering single cases, water must be held responsible for a considerable proportion of our typhoid. Without adequately protected or purified public and private water supplies, typhoid prevention is impossible.

Milk has, likewise, for many years been regarded as a most important vehicle for typhoid infection. Epidemics without number have been caused by infection of milk supplies. Experience, dearly bought, has demonstrated that even the most rigid inspection of milk supplies can not prevent the occasional infection of a public supply, and that real protection against typhoid fever from infection of milk supplies is to be purchased only at the expense of pasteurization under municipal supervision.

Other food causes of typhoid infection have received much attention, but in spite of much study little has been learned as to their real importance. We have seen much agitation of recent years in regard to the role played by shellfish, and particularly oysters, in the transmission of typhoid. A careful study of the evidence would seem to show that while an occasional outbreak of typhoid has been found to be due to infection of oysters, in such cases the pollution has been obvious and inexcusable, such as the fattening of oysters in the harbors of large cities or even at the mouths of sewers. We believe that for the most part the average market oyster is not the cause of any great proportion of our typhoid and is in fact about as safe as any of the foods which we are in the habit of eating uncooked.

TYPHOID FEVER IN CITIES AND TOWNS.

The studies which have been made of the prevalence of typhoid fever in the cities and towns of the United States have revealed much that is of value in the prevention of the disease. The relative value of water purification, general sanitation, and food protection has been worked out in detail and the practical prevention of the disease has been made almost an exact science.

Everyone knows that frequent explosive outbreaks of typhoid fever have occurred as a result of the infection of public water supplies. From such supplies the typhoid bacillus has been recovered so frequently as to leave no doubt of the accuracy of the results. It has been proved too many times to admit of further question that the use of an impure water supply by a community will result in a continuously high typhoid rate, and that purification of such a water supply will result in a marked and immediate lowering of the rate.

In cities in the more northern sections of the United States the purification of a public water supply of a city will result in the reduction of the annual typhoid death rate to a figure usually under 20 per hundred thousand. In the south the purification of the public water supply will in the absence of other measures seldom bring the figure below 50 per hundred thousand. In a southern city, possessing a pure public water supply, the sanitation of the city, and by sanitation is meant the complete protection from human filth in the community by perfect sewering or by rigid screening and supervision of dry closets, will usually result in reducing the annual typhoid death rate to the figure usually reached by the northern city from water purification alone, namely, 20 per hundred thousand. Unfortunately no figures are available as to the result of the perfect sewering of any southern city of considerable size, as, so far as we are aware, such a city is not to be found.

No more important addition has been made to our knowledge of the practical prevention of typhoid fever in urban communities than the facts which have come to light regarding the importance of protecting the people of any community against that infection which is not brought in from without the city gates but which is generated within and disseminated from foci close at hand. When we seek to work out a plan of protection for the citizens of any community against typhoid fever we should classify accurately our sources of infection into two groups. We should first consider those sources of exogenous infection without the city, from which infection is brought in, usually in water, milk, or other food, and which are guarded against by water purification and milk and food inspection. We should by no means neglect those sources of endogenous infection within the city, whence typhoid is distributed by an almost infinite variety of means, and which must be guarded against by what we speak of as general sanitary measures, such as sewerage, sanitary inspection, fly prevention, and, in addition, by the very especial supervision of the known cases of typhoid fever.

TYPHOID FEVER IN RURAL DISTRICTS.

It is to be regretted that our knowledge regarding the transmission and prevention of typhoid fever in rural districts as far from being complete as that regarding urban conditions. The subject is one which has been studied but little in this country, notwithstanding the fact that in many of our states typhoid fever is almost entirely a rural problem. We have learned, however, some facts regarding the transmission of typhoid fever in rural districts which are of value in practical prevention. We know that in most cases water infection has but little to do with the spread of the disease; that existing sanitary conditions in rural districts are utterly inadequate for the proper protection against human filth; and that the general dissemination of fecal matter consequent upon the presence of these insanitary conditions is inevitably followed by the presence of typhoid fever.

We know, too, that the country people at the present time have not learned those precautions which are absolutely necessary to prevent the spread of the disease from the bedside of the patient, and that frequently the disease is spread over large areas of country by contact alone. From our knowledge of the transmission of typhoid fever, taking into account the isolation and lack of intercommunication of the country people, we may confidently expect that an improvement in the sanitary arrangements of our farms, specifically in the building of a sanitary privy for every home and a more careful observance of the precautions of the sick room, will result in a marked decrease in the prevalence of typhoid fever in rural districts.

ANTI-TYPHOID VACCINATION.

The results already obtained indicate clearly that vaccination with killed cultures of the typhoid bacillus confers upon the individual marked resistance to typhoid infection. In military organizations the great value of this method of protection has already been demonstrated, and results are rapidly accumulating to show that in civil populations the method may also be of great service in the prevention of endemic and possibly of epidemic typhoid.

SUMMARY.

Summing up, we may say that the essential basis for the prevention of typhoid fever has been laid, and that we are now in possession of the information, biological and technical, necessary for the actual eradication of the disease from the urban communities of the United States. The basis for prevention in rural communities, while not complete, is sufficiently certain to insure a great reduction in present rates. The problem is no longer an investigative or scientific problem, but a problem of administration. When the people of the United States wish to pay for absolute protection against typhoid fever it can be bought with the full assurance that the goods can be delivered.

CONCLUSION.

As physicians and sanitarians, we are most interested in the practical question, Can typhoid fever be prevented? We know that it can. We know that our methods are certain, that they will yield the desired result in every case where they are properly applied. The problem remaining for solution is how to convince the American people that protection from typhoid fever is something worth spending money for.

FLY-BORNE TYPHOID FEVER AND ITS CONTROL IN JACKSONVILLE.

By C. E. Terry, M. D., City Health Officer, Jacksonville, Fla.

It is not my intention in this paper to present any new facts regarding the carriage of typhoid fever by flies nor to make any valuable contribution to the literature on fly transmission of intestinal diseases, but rather to state an experience which is unique, I believe, in municipal sanitation.

The source of the water supply of Jacksonville, as well as systematic bacteriological examination of this supply, have enabled us, we feel, to completely eliminate it as a factor in the spread of our typhoid fever. The entire absence of open wells, owing to a city ordinance prohibiting them, removes such source of water supply from consideration. The only other water supply that could have been questioned in individual cases are the driven surface wells, and here again local conditions, namely, a perfect sand filter, which our soil furnishes naturally, has enabled us, after repeated examinations for possible sewage contamination of these wells, to disregard them as factors in the spread of this disease.

The city water is artesian from flowing wells of an average depth of a thousand feet. As it issues from these wells it is practically sterile, and outside of contiguous breaks in sewer and water mains there appears no opportunity for its contamination. No facts connected with any of our cases of typhoid fever would indicate that such an accident had ever occurred. Below is a table of the bacterial counts taken from reservoirs and taps in different portions of this city for the past three years. It will be seen from a perusal of this table that our supply is of unusual purity.

Bacteria in city water during 1910, 1911 and 1912.

SOURCE OF SAMPLE	Number of Samples	Average Number Bacteria per c.c.	Bacillus Coli.
City taps	26	20	Absent
Reservoir	21	22	Absent
New reservoir	1	10	Absent
Reserve basin	9	116	Present
South aerating basin	9	19	Absent
North aerating basin	8	38	Absent

The average of all counts is 23 bacteria per cubic centimeter, exclusive of reserve basin. This basin is called upon only in case of emergency, such as large fires. It lies near Main street and is uncovered

Twice *Bacilli coli* have been found in it, due probably to dust from the street and birds. In none of the other basins have we ever found the colon bacillus.

Together with the elimination of the water supply as a possible carrier of our typhoid fever, I have been able, since January, 1910, to eliminate milk as a factor, with the exception of three cases during the spring of the present year. The milk supply of every case occurring since January 1, 1910, has been determined, and in no instance has there been reason to believe that any milk route was at fault. In fact, only 16.6 per cent of all cases during 1911 and 1912 used any cows' milk prior to the onset of the disease. Since January, 1911, a case record has been kept of all the local conditions surrounding each case, such as milk and water supply, location as to privy or sewer district, recent contact with known cases, eating places, screening, etc.

With the elimination of water and milk,, ordinarily the two main factors in the distribution of typhoid fever, it became apparent that some other common condition must be sought in order to account for the undue prevalence of the disease. There remained in my mind but two possibilities worthy of much consideration—contact cases and those due to fly carriage. My attention was first called while I was doing general practice in this city, prior to my appointment as health officer, to the possible agency of the fly, principally by the seasonal incidence of the disease. After my appointment, January 1, 1910, the distribution of the cases was found to be such as to corroborate this belief.

The conditions existing in the privy district at that time were such as to further in every way fly transmission of intestinal diseases. There were about 8,500 privies in the city, which accommodated 40 per cent of our population. Had these privies been confined to any particular locality their existence would not have entailed such a widespread distribution of infection; but they were about evenly distributed throughout every section of the city. In fact, there was at that time no point within the city limits of Jacksonville farther than nine blocks from one or the other of the privy districts, while about 75 per cent of the population lived either in this district or within three or four blocks of it, notwithstanding the fact that their own premises may have had sewer connections.

These 8,500 privies were such as are commonly seen in rural districts, and I can truthfully say that not a single one made the slightest pretense of protection against flies; indeed, so poorly were they constructed that many had no backboards and more than one householder objected to the visit of the city scavenger on the grounds that the chickens did his work to the entire satisfaction of the family. Few had seat covers, all had wide cracks and unscreened windows and many of these privies in the poorer negro settlements lacked even doors, denying to the occupant the privacy which the name would indicate could we rely on etymology for meaning. A large proportion of these privies existed in thickly settled districts where only a few feet separated the cottages and where small yards required the placing of the privy close to the kitchen

windows. In many instances, where a number of houses were owned by the same landlord, to economize space and money one community privy would be found within 25 or 30 feet of from three to six kitchens. Screens are not furnished to this class of tenants. Each privy was a reeking mass of filth swarming with flies, which abandoned it only when the odor of cooking attracted them through the near-by windows. Surely here were present the three essentials to fly carriage of intestinal diseases—exposed human excrement, unprotected food supplies, and an abundance of flies. Ignorance and disregard for decency could scarcely have devised more ideal conditions for the dissemination of intestinal infections.

I regret that prior to 1910 scarcely any case reports were made to the health office, so that I can not determine the distribution of the disease before that period. The deaths, however, furnish sufficient information to show that its seasonal prevalence was the same as for the past three years. In 1910 we had a considerable increase in the number of deaths over the preceding two years. I attribute this increase in part to more accurate data and to the fact that the city had grown so rapidly during this period that sewerage extension lagged far behind the requirements and each year the number of new privies constructed outnumbered the new sewer connections. At the same time in default of any law governing the construction and maintenance of these places, the old ones were falling constantly into a worse state of repair.

During 1910 our attention was early called to the distribution of the cases and it was also noted that a marked increase occurred after the onset of the fly season. Careful abservations on the prevalence of flies were made during this season about the public dumps and stables, and it was found that they reached their height about the end of the week in July, while the same month furnished the high-water mark of the typhoid cases reported.

Acting on this, we succeeded, in August, 1910, in securing the passage of an ordinance requiring all privies to be rendered fly proof. This ordinance was modeled after the one devised by Dr. Levy of Richmond. Its enforcement was begun at once, and by April 1, 1911, the beginning of the fly season, between 80 and 85 per cent of all privies had been reconstructed according to its requirements. The ordinance required tight construction, the screening of ventilating openings, self-closing doors and seat covers, and well-fitting hinged backboard. In order to avoid, as far as possible, imposing unnecessary hardships upon property owners, the law was so framed as to permit the repairing of privies already constructed where it was possible in this manner to insure fly proofing. Where, however, such repairs would not have accomplished the desired result entire new construction was required.

Beginning with January, 1911, the department has required that the sick room in every case of typhoid fever be screened and the flies destroyed by means of poison or sticky fly paper. This routine has been carried out by detailing an inspector to visit each case every other day

from the time of its reporting until convalescence is established. Where the financial condition of the family renders the screening of the sick room a hardship, mosquito netting, sticky fly paper, and disinfectants have been furnished by this department and their use has been strictly enforced and watched. Printed instructions supplement verbal ones in each case.

As a result, I believe, of the screening of the privies and sick rooms the number of cases of typhoid fever reported to the health department during 1911 was 158 against 329 for 1910, the deaths for the same years being 40 against 62. There was actually a greater reduction in the number of cases, as the reports for 1911 were more complete than those of 1910. Not only did this reduction occur, but we found that the distribution of the cases as to privy or sewer districts was practically reversed in 1911 from that of 1910, showing no disproportion of cases in the privy districts. The 1911 cases were distributed according to the population, regardless of methods of sewage disposal.

It is interesting to note that of the 158 cases occurring in Jacksonville during 1911, 88, or 55 per cent, were imported, the large majority from the surrounding country districts, where the privy and "back lot" unite to solve the question of sewage disposal. A large proportion of these cases are imported in the summer from rural communities where typhoid fever is continuously epidemic. In all of these settlements open privies are used. During 1911 the enforcing of the privy ordinance was vigorously pushed and by January, 1912, these places were in as nearly a sanitary condition as it is possible to keep them where 50 per cent of the population is composed of negroes devoid of responsibility, and others of the type which looks with ridicule upon the necessity for care in the disposition of human excrement, or is too indifferent to matters concerning the public welfare to observe more than the naked letter of the law.

The enforcement of this ordinance has cost property owners a large amount, and it was not accomplished without considerable opposition from various sources, but the results obtained have removed most of the objections and during the past year notices to repair or reconstruct dilapidated privies have generally met with prompt, if not always cheerful, response.

The most marked reduction in the typhoid case rate has taken place this year. At the present writing we have had only 87 cases reported with 16 deaths. Of these, 48 acquired their infection elsewhere and were brought here for treatment. In only 39 cases could the infection be charged to jacksonville. Three of these cases and one death were due to infected milk of a privately owned cow which supplied three families, a needless sacrifice to ignorance.

I am fully aware that the facts above stated do not furnish all the requirements of strictly scientific proof that our typhoid fever was for the most part fly borne, but it would appear that this was the case, as the only measures we have made use of to reduce our typhoid rate have been directed against this insect, and the only change in sanitary conditions throughout the city has been the fly proofing of the privies. Contact has undoubtedly played its part, as it does everywhere, but in view of the fact that our water and milk supplies could be eliminated, as already stated, I feel that we are justified in attributing the major portion of our cases, prior to the enforcement of the privy law, to the house fly.

There arises, in this connection, a point of considerable scientific interest, namely, just how the disease is transmitted by the fly. We have been taught that the fly infects food by means of the specific bacilli carried on its feet from infectious material. The commission appointed to investigate the causes of typhoid fever prevalence during the Spanish-American War call attention to the fact that flies "with their feet whitened with lime from the latrines" were seen walking over the food of the soldiers in the mess tents and kitchens. It has also been demonstrated by several investigators that flies fed on infected material will deposit the typhoid bacillus in their specks. Maj. N. Faichnie, Royal Army Medical Corps, in the November (1909) number of the Journal of the Royal Army Medical Corps, presents a most interesting paper on the exact source of this infection. It is his opinion that neither the legs of the flies "nor their excreta when they feed on the contents of latrines are common vehicles of fly-borne infection;" quoting further from Maj. Faichnie:

> But, on the other hand, the chief and most common method is by excrement when the flies are bred in an enteric infected material. By this I mean that one station may swarm with flies, bred only from the excreta of cows and horses, and yet have no enteric; while another place, where there are very few flies, but where these are bred from human excreta either in or out of the station, may have an epidemic, the source of infction being the excrement of the flies, and the insects themselves being carriers.

Maj. Faichnie, in his report, adduces considerable evidence to support his contention. In view of his observations and some experiments which Dr. McKay and I conducted in 1911, I am inclined to believe, at least, that the fly bred in infectious material is a carrier for a longer period and hence more dangerous than the insect obtaining its infection through contact or feeding after maturity. It is a matter that is worthy of careful investigation. The fly-proofing of privies, however, is protection against either mode of infection, and I am convinced from inspections made of these places prior to the passage of our screening ordinance that, second only to stables, they furnish the most prolific fly hatcheries in the city.

What is true of Jacksonville is, I believe, true of many of our southern towns and cities, where the sewerage systems are inadequate to the requirements and where the old type of privy is in common use, and in such communities I am convinced the screening of these places will bear fruit in reducing the typhoid-fever rate, as it has done in Richmond, Asheville, and this city. The old type of privy is an abomination, and even the best is but a poor substitute for the sewer; but in the South, where lack of public funds, the poverty of large numbers of our people, and, as everywhere, politics retard sewerage extension, and where climatic conditions prolong the fly season, the rendering fly-proof of these places is a necessity if we would secure even reasonable immunity from the infections they entail.

HOSPITALS AND THE HEALTH PROBLEM.—WITH SPECIAL REFERENCE TO THE NEEDS OF RURAL AMERICA.*

E. E. MUNGER, M. D., SPENCER, IOWA.

What is America's health problem? Briefly, it is to prevent preventable disease, cure curable disease, relieve suffering, prolong life and to do all these things in the most intelligent, satisfactory and economical manner possible. Toward the solution of this problem much is being done by states and cities through more and more efficient health departments; a part of the public press is giving generously of its space for the dissemination of knowledge pertaining to health and disease; the church is concerning itself with the problem in a manner that augurs well for the future, as, witness, Hospital Sunday, Tuberculosis Sunday, and health sermons based not on fads and fancies but on facts.

MORE COUNTRY HOSPITALS NEEDED.

It is not my purpose to deal with the question of prevention, except to point out how necessary it is to care for and cure disease in order to prevent it. I shall have accomplished my purpose in part if even in small degree my paper helps to fix attention on the necessities of rural America in the solution of the health problem and on the fact that the modern hospital is everywhere a necessary adjunct to the application of preventive and scientific medicine and surgery. Notwithstanding the advantages of natural environment, rural people have not the same opportunity for health conservation that urban residents have.

The mortality-rate for almost all diseases is lower in rural districts than in cities. It is probable that a considerable proportion of the difference is due to the fact that residents of the former, when critically ill, resort to the institutions and hospitals in cities for treatment, and when deaths occur they are registered in the cities and increase the mortality of the latter.[1]

One notable exception is typhoid. The mortality-rate for this disease in 1910 for cities in registration states was 22.4 per 100,000 population; for the rural part of registration states 23.3.[2]

*Read in the Symposium on Relations of the Hospital to the Public in the Section on Hospitals of the American Medical Association, at the Sixty-Third Annual Session, held at Atlantic City, June, 1912.

[1]Mortality Statistics, 1900-1904, Bureau of the Census.

[2]Mortality Statistics, Bulletin 109, 1910: "Of the registration cities of 100,000 population or over, in 1910, Omaha, Neb., had the highest rate, 86.7. Other cities with high rates for the year were Minneapolis, 58.7; Kansas City, Mo., 54.4; Atlanta, Ga., 50.1; Birmingham, Ala., 49.5; Nashville, Tenn., 48.9; Milwaukee, Wis., 45.7; Spokane, Wash., 45.4; and Baltimore, Md., 42. The lowest rates shown for the large cities were those of Bridgeport, Conn., 4.9; Paterson, N. J., 7.1; Cincinnati, 8.8; and Cambridge, Mass., 9.5. These rates approach the rates of typhoid mortality of the leading cities of Western Europe, examples of which for the year 1910 were as follows: London, four per 100,000; Edinburgh, two; Dublin, ten; Paris, seven; Brussels, nineteen; Amsterdam, seven; Copenhagen, three; Stockholm, four; Christiania, two; Berlin, four; and Vienna, four."

HOSPITAL TREATMENT FOR RURAL TYPHOID.

In view of the fact that rural typhoid in America is nearly always treated in the home, two significant statements are quoted:[3]

> This rural frequency is important for dwellers in cities. The water-supply and milk-supply, as well as many articles of food, are derived from the country. There is a constant going and coming between the city and country. An infected city may spread infection far and wide through the country, while from the country there may be a steady stream of infected persons into the city.
>
> The stamping out of typhoid fever is one of the great tasks before the profession of this country. The story is such an old one that little attention is paid to it. We of the profession shrug our shoulders and wonder at the apathy of civic authorities. Are we guiltless? Every patient with typhoid fever means infection from a previous one. If thorough disinfection were carried out in every case of typhoid fever this year, and the same next year, what a decrease there would be in the incidence of the disease! Disinfection is often in the hands of persons who do not realize the importance of its being thorough, and it is no easy task for the physicians to see that it is carried out. Too often he does not realize his own responsibility and is thoroughly satisfied if he brings the patient well through the attack, heedless of the danger to the community.
>
> If possible the patient should be treated in a hospital. The advantages of this are many, for in few houses can a patient be handled as satisfactorily as in a hospital. The nursing can be done in a better way, the complications may be recognized and treated earlier and the requisite disinfection carried out more thoroughly. In country practice and in many places hosiptals are not available and the best that can be done has then to be done.
>
> It has been estimated that probably 8,000 persons in the United States die every year from perforation of the intestine in typhoid fver and perhaps 2,500 of these can be saved by proper treatment.

In a country physician's practice, a typhoid patient with this complication has no more chance for existence than a snowball in a kettle of boiling water.

In 1910 the death-rate from tuberculosis of the lungs was 139.7 per 100,000 population; from pneumonia, 147.7; organic heart disease, 141.5; diarrhea and enteritis (under 2 years), 100.8; nephritis and Bright's disease, 99.0. In other words, there were in the United States in 1910, approximately 131,000 deaths from tuberculosis of the lungs; from pneumonia, 140,000; organic heart disease, 133,000; diarrhea and enteritis, 95,000; nephritis and Bright's disease, 93,000.

TREATMENT OF PREVENTABLE DISEASES.

On every hand we are being taught a great deal about tuberculosis; the instruction, most of it, is authoritative, timely and important, and is accomplishing results. Nevertheless, when it is known that the total number of deaths in the United States from the great white plague (all forms) is approximately 151,000, while from the other four diseases just mentioned it is about 461,000, one must inquire why tuberculosis should occupy the stage to the exclusion of the other characters whose

[3]McRae, Thomas: Osler's Modern Medicine, 1907, ii, 78, 71, 209, 208.

parts must be played if the sequel is not to be disappointing. Is not a man who has died of heart disease just as dead as the one from tuberculosis? True, the latter has had with him the infective element in larger measure and he is entitled to the title role; still, the deaths from other infections disclose the real tragedy of preventable disease.

"Heart disease in about 50 per cent of all cases is a sequence of caute endocarditis. Among 670 cases of chronic heart disease at the Leipsic clinic 58.5 per cent followed acute rheumatism. In the all-important endocarditic group of the acute infections, rheumatic fever plays the important role. There is no single problem of greater importance in preventive medicine than the reduction of the enormous waste of life in children in consequence of the rheumatic infection."[4]

Here is one of the peculiarities of mortality statistics: If a patient with a crippled heart contracts pneumonia, typhoid or other disease and dies because his limited heart-power is not sufficient to carry him through the crisis, death is attributed to the preceding acute disease. If he dies from heart-disease some time after apparent recovery from the acute infection which caused it, the latter is infrequently mentioned as even a contributory cause of death. Hence we find the death-rate from rheumatism only 7.4 per 100,000 of population, while it is responsible for more than one-half the cases of chronic heart-disease.

In no disease is it more important than in rheumatism that the physician "should be a watchman all the time," for on the early detection of heart complications may depend the life or future usefulness of a patient. If it were possible in the beginning of the attack to remove patients with acute rheumatism from their unhygienic surroundings to hospitals near at hand and there find proper diet and facilities for care and treatment, including that important adjunct to modern medicine, the trained nurse, all would be done that can be done toward lessening the severity of the attack, adding to the comfort of the patient and preventing the disastrous complications, of which heart-disease is the most common.

Rarely, indeed, can one find in a rural district a patient with rheumatism receiving the benefits of hospital care, or one who can be prevailed upon to provide for himself early and suitable nursing at home, or tolerate on the part of the physician the watchfulness so necessary for sensible and successful treatment.

The rural pneumonia portion of the health problem can be solved in part, at least, if suitable hospital provision for its treatment can be made. It is well known that when we are dealing with this disease "the scenes change rapidly and the passage of an hour or two may present an entirely different picture. The obvious lesson of this is that pneumonia patients should be watched carefully and seen by the attending physician at frequent intervals, especially during the latter part of the disease, when judicious and well timed medication may tide the patient over the crisis to recovery."[5]

[4]Osler and Gibson: Osler's Modern Medicine, 1908, iv, 205, 256.
[5]Musser and Norris: Osler's Modern Medicine, 1907, ii, 636.

How is the country physician to follow this sound advice? The reasons why he cannot are perfectly plain to both the patient and the physician. In cases of diarrhea and enteritis and other children's diseases, the rural hospital, with its complement of visiting nurses, can materially help to solve the infant-mortality part of the health problem.

Time does not permit a discussion of the whole question, yet your attention is asked to two of its minor, but none the less important, elements:

In 1910 there were approximately 8,000 deaths from appendicitis in the United States—not a large number when compared with deaths from other causes, but rather formidable in the light of this indictment by one of the world's greatest surgeons.[6] He says:

It seems to me that every death from appendicitis is chargeable directly to the people, for not calling in the physician sufficiently early after the onset of the symptoms, or to the physician and surgeon for not acting promptly when they are called. We are sorry to admit that the latter represents the greater percentage. We should have no deaths from appendicitis, but we are having them. We should accept the force of numbers and experience to guide us against the culpable, if not criminal, error of delay in this class of cases.

Granted that delay is both culpable and criminal, blame should not be laid entirely on the people or on the physician, or even on both; it is due rather to the want of instruction relative to the achievements of scientific medicine and surgery. Some there are who, practicing what they teach, cure every case of appendicitis with colon tube and olive oil—excepting only those that die of peritonitis.

In a great city, living under the very eaves of a modern hospital, a physician who would allow a patient to die from appendicitis for the want of timely surgical treatment is no doubt culpable in a degree approaching criminality. In the country, when one has any serious sickness, especially if the trouble is appendicitis, procrastination is as common as it is dangerous. An operation in the home is never consented to excepting as a last resort; in order to get to the hospital the patient must endure a variety of hardships incident to a long railway journey for a very sick person. The patient dies while waiting to recover sufficiently to be able to go away; the death certificate is made out as best suits the exigencies of the occasion, and thereby hangs a tale which mortality statistics do not tell.

In 1910 approximately 15,000 mothers died from diseases and accidents incident to childbirth; nearly 7,000 of these from puerperal septicemia. There were 70,000 deaths from premature birth and diseases and injury peculiar to early infancy—a total of 85,000 mothers and infants dying annually in the United States from causes which all authorities agree are largely preventable or curable. These cold figures do not disclose their sorrowful story; the resulting desolation, woe and despair beggar description.

[6]Murphy, J. B.: Keen's Surgery, 1908, iv, 778.

HOSPITALS AND SANATORIUMS

OF THE UNITED STATES.

STATE	Proportion of Beds to Population		Public		Private		Tuberculosis				Corporation		Total Hospit'ls
							Public		Private				
	Population	Beds	Hospitals	Beds	Hospitals	Beds	Hospit'ls	Beds	Hospit'ls	Beds	Hospit'ls	Beds	
Alabama	2,138,093	2,774	10	1,627	30	1,036	2	49			2	62	44
Arizona	204,354	893	5	58	20	478	2	58	6	225	1	74	34
Arkansas	1,574,449	2,236	14	991	15	907	1	74			1	264	31
California	2,377,549	13,709	96	6,326	183	6,032	5	397	13	606	2	258	299
Colorado	799,024	4,759	30	1,743	48	1,535	4	214	10	787	4	480	96
Connecticut	1,114,756	4,407	24	2,349	27	1,401	1	110	5	547			57
Delaware	202,322	448	6	402	1	38	1	8					8
Florida	752,619	1,066	20	540	17	406					2	120	39
Georgia	2,609,121	3,076	16	1,809	40	880	2	82	5	205	1	100	64
Idaho	325,594	1,157	19	643	21	374			1	100	1	40	42
Illinois	5,638,591	18,285	95	7,028	140	8,497	2	1,835	4	815	2	110	243
Indiana	2,700,876	6,231	45	2,791	74	3,001	2	110	4	122	2	207	128
Iowa	2,224,771	4,890	60	2,396	64	2,260	2	144	1	20	1	70	128
Kansas	1,690,949	3,382	30	1,535	58	1,711			2	21	2	115	92
Kentucky	2,289,905	2,751	27	1,930	36	651	1	50			1	120	65
Louisiana	1,656,388	2,718	7	1,613	20	1,055			2	50			29
Maine	742,371	1,542	21	1,159	14	283			1	100			36
Maryland	1,295,346	4,866	33	3,023	22	990	2	600	3	235	3	18	63
Massachusetts	3,366,416	15,474	69	6,974	158	6,367	9	1,482	13	651			249
Michigan	2,810,173	7,237	69	2,612	91	4,075	2	322	1	48	1	180	164
Minnesota	2,075,708	6,286	57	3,678	85	2,118	4	260	3	75	2	155	151
Mississippi	1,797,114	1,061	9	429	22	632							31
Missouri	3,293,335	7,849	33	3,516	96	4,011	1	150	1	22	1	150	129
Montana	376,053	2,384	15	606	25	1,630					5	148	45
Nebraska	1,192,214	4,166	26	3,543	35	713							61
New Hampshire	430,572	1,102	22	775	12	222	1	35	2	70			37
New Jersey	2,537,167	6,700	48	4,434	33	1,663	4	445	1	158			86
New Mexico	327,301	947	8	89	19	263	2	52	3	445	3	98	40
New York	9,113,279	42,904	180	23,012	234	16,035	15	2,817	16	906	2	134	447
Nevada	81,875	498	9	296	7	173					3	29	19
North Carolina	2,206,231	2,364	19	725	50	1,367	1	50	7	185	2	37	79
North Dakota	577,056	1,200	17	611	23	589							40
Ohio	4,767,121	15,126	109	11,338	107	2,990	6	294			1	4	223
Oklahoma	1,657,155	1,245	10	270	40	963	1	12					51
Oregon	672,765	2,109	11	795	29	1,212	1	62	1	40			42
Pennsylvania	7,665,111	29,340	83	22,643	92	4,289	7	1,962	4	396	1	50	187
Rhode Island	542,610	1,628	8	305	11	921	4	402					23
South Carolina	1,515,400	834	8	332	17	431	2	65			1	6	28
South Dakota	583,888	1,069	10	442	19	613	1	14					30
Tennessee	2,184,789	2,753	18	1,365	49	1,822			2	66			69
Texas	3,896,542	7,444	30	1,726	90	5,277	1	60	5	256	4	125	130
Utah	373,351	1,327	9	920	11	395					2	12	22
Vermont	355,956	965	6	521	14	400			1	44			21
Virginia	2,061,612	2,870	22	1,076	43	1,545	2	131	2	27	1	91	70
Washington	1,114,990	4,285	42	3,012	49	1,210	1	31	1	32			93
West Virginia	1,221,119	2,078	12	657	42	1,376					2	45	56
Wisconsin	2,333,860	6,015	54	3,084	80	2,584	2	190	3	107	1	50	140
Wyoming	145,965	394	7	286	8	90					1	18	16
District of Columbia	331,069	1,799	8	895	6	734	2	170					16
Totals	91,944,925	260,643	1,586	139,340	2,424	97,745	96	12,737	128	7,451	58	3,370	4,292

*Insane hospitals, reformatories, homes for aged, feeble-minded, blind and orphans, show in a general way the number of kinds of hospitals in the United States and the

UMS OF UNITED STATES*

county poor farms and similar institutions included. The table was prepared to proportion of beds to population. No claim is made for more than approximate accuracy.

Mortality statistics for maternity hospitals confirm the following statement:[7]

> The hospital is now the safe place for a woman to be delivered in; it is in the private dwellings that danger lurks. The poorest, the dirtiest, the most dissolute women are safely confined in a hospital; the richest, the youngest, the purest and the loveliest sometimes succumb in giving birth to a child in their own homes.

HOSPITAL LEGISLATION IN IOWA.

In 1909 the Thirty-Third General Assembly of Iowa became interested in the hospital and health problem; its members recognized that rural communities, in dealing with accident and disease, do not have the same advantages as urban residents. Little argument was required to convince this body of intelligent and earnest men that any considerable number of people should have at least the right to work out their common health problem. They scarcely listened to the contention that such a privilege would result in a tax on the many for the benefit of the few. Proportionate taxation for the benefit of all admitted of no argument, and this legislature deliberately enacted the law making possible, in Iowa, the ultimate establishment of an adequate supply of hospitals with equal rights to all and special privileges to none.[8]

The author of this law had in mind the necessity that exists, and it was his purpose to establish a public hospital with a board of trustees that will become a board of lay sanitarians who, in formulating such rules and regulations as will enable the hospital to be of the greatest good to the greatest number, will become informed about health matters and will be influential factors in the solution of the community's health problem.

There will be neither incentive nor opportunity to make such a hospital a money-making institution. Crime and graft in the form of illegal and unnecessary operations, wrong diagnoses for the sake of prolonged treatment, unwarranted division of fees and other evils cannot go on undiscovered and unexposed. It will furnish its care at the lowest price

[7]Garrigues: Quoted by Dobbin, Handbook of the Medical Sciences, 1907, v. 379.

[8]Some Fundamental Truths: (1) A number of people will have a varying amount of sickness. (2) Of this amount of sickness, a fairly definite and constant portion requires and should have the advantages of hospital treatment. (3) A given disease presents the same general characteristics and is the same thing wherever it exists. (4) Whatever is known to be the very best treatment of any disease should be made available to all persons afflicted with disease. (5) Of the total number of persons who are ill a few may have homes and the means that will enable them to be fairly well cared for, but the vast majority are not so situated. (6) In all cases of serious sickness, whether medical or surgical, nursing, diet and sanitary environment are of prime importance in treatment. (7) While trained nursing is an essential part of the treatment, the cost of such nursing is so high that it is next to impossible for any but the very well-to-do to avail themselves of its great benefits. (8) People are needlessly dying, suffering, and being handicapped both physically and financially every year, every month, every week and every day, because of the lack of hospital advantages within their reach and means. (9) Every human being, with only enough exceptions to prove the rule, having arrived at the age of discretion, regards his health as his most valuable possession and his life as the one thing for which he is willing to exchange all else. (10) Hospitals, to fulfil their missions, should be established with reference to a given number of people, be maintained by the people and conducted primarily for the people.

requisite for proper maintenance; it will not concern itself with the fees of its physicians and surgeons except in those cases in which patients are subjects for charity. It may, however, frown on exorbitant and extortionate charges. It will be conducted on a strictly ethical basis and be made the health center for a community—a center from which health information will be disseminated by both precept and example. Its equipment will be complete with every facility for up-to-date work; it will have a pathologic and bacteriologic laboratory, which should be auxiliary to the laboratory of the state board of health. An ambulance service will be provided. A necessary and most important adjunct will be a training school for nurses. An x-ray laboratory will confer great benefits on both patients and physicians. At such a hospital the fact will be recognized that there are many specialists of signal ability whose services may be required from time to time. In order that the people of a community may, on occasion, have the benefit of their skill and experience, a consulting staff acceptable to the people will be selected by its physicians and surgeons.

It was not the intent of the law to supplant standard hospitals; all have the common function of caring for the sick and disabled. Some perform a dual service by reason of their affiliation with medical colleges, furnishing the practical training for surgeons, physicians and nurses. Many are of high class, others are good, some tolerable, some merely boarding-houses with "operating room" and "rooms for rent," and some are positively bad. The present and urgent need is the establishment of an adequate supply of reputable hospitals, all to be standardized and inspected as the logical sequence to the same processes for medical colleges and their graduates. As a result the great surgeon will become greater and the good physician and surgeon better. The poor, careless, indifferent few who endanger society and who are the curse of reputable medical men will be driven out of the profession, removing the point of attack for carping critics who, under the auspices of the league for medical riot, go about the country, disguised with the cloak of freedom, noisomely assailing the honor and integrity of the entire medical profession and offering themselves as a substitute for safety.

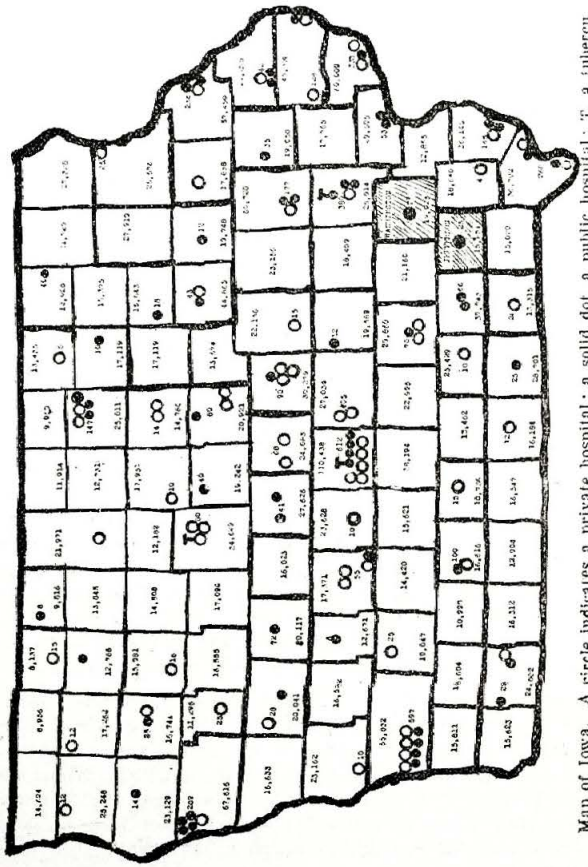
It is noteworthy that the first hospitals built under the Iowa law were located in counties bearing the names of Washington and Jefferson. The table shows the hospital situation in the United States, and the map the number and location of public and private hospitals, the number of beds and the proportion of beds to population in Iowa.[9] In studying this bear in mind that "those best qualified to judge seem to be of the opinion that every civilized community requires one hospital bed for each 100 inhabitants."[10]

Women and children first on the sea! What of mothers and infants on the land? We stand aghast at news of an appalling Titanic disaster, telling of over 1,500 lives lost at sea. The governments of two nations instantly prepare for an investigation of causes and quickly fix

[9]Compiled from American Medical Directory, 1912, Ed. 3.

[10]Ochsner and Sturm: The Organization, Construction and Management of Hospitals, 1909, p. 11.

responsibility. There is no delay. The court of inquiry has convened beside the sea and is the port of entry for survivors. This alertness is striking, compared with the dilatory tactics pursued when measures are proposed for the remedying of needless waste of life on land.



Map of Iowa. A circle indicates a private hospital; a solid dot, a public hospital; if, a tuberculosis hospital; the figures indicate population and total number of beds in each county.

If we think of each state as a gigantic Titanic carrying its cargo of human souls across the sea of life, having in mind the icebergs that hazard the voyage from birth to death, we are blind, or will not see, if we do not pay attention to the insufficient number and uncertain character of some of each ship's life-boats.

CONCLUSION.

In conclusion, and in order that more and better means may be provided for the safety of passengers and crew, competition here and there and now and then should reasonably yield to co-operation for health conservation; there should be developed a public hospital system fashioned somewhat after the public-school system, and our national health should be made an ever-increasing national asset. With these ends in view Congress should enact into law the measure creating a national department of health with as many bureaus as may be necessary to enable it to perform its main function of "enlightening and directing public opinion in regard to the broad problems of hygiene and representing to the world the practical accomplishments of scientific medicine." Congress should realize that such legislation will promote the physical welfare and domestic tranquility of our people and clearly be in accord with the high ideals of the fathers who wrote these words into our constitution.

PUBLIC HEALTH ADMINISTRATION—ITS DEPENDENCE UPON REPORTS OF CASES OF SICKNESS.[1]

By JOHN W. TRASK, Assistant Surgeon General, United States Public Health Service.

The accomplishment of effective public health work depends largely upon the use of information obtained from the notification of cases of the preventable diseases. Adequate notification shows the occurrence, prevalence, and geographic distribution of these diseases, and without this knowledge attempts at their control are to varying degrees ineffective, and the proper protection of the health of the community is impossible.

Originally the duties of the health officer were very simple, and related only to the control of certain diseases associated with popular dread. As knowledge, however, of the causes of diseases and their means of spread has been acquired, the responsibilities of the health department have rapidly increased, so that at the present time the health department is properly the guardian of the community's health in so far as health can be conserved by the prevention or control of disease.

Only those diseases may be properly classed as preventable or controllable of which something is known of the cause or means of spread. Given this knowledge, the first and essential step in their prevention or control is the securing of information of the occurrence and location of the factors that produce disease and of the foci from which disease may spread. Of the communicable diseases a knowledge of the existence and location of cases is necessary, as each such case constitutes a focus from which the disease may spread. Of the diseases that are preventable but not communicable, a knowledge of the occurrence of cases and of the conditions under which they are occurring is necessary, as it shows the existence of the conditions which produce these diseases. This knowledge can be obtained only when the occurrence of cases is made known to some authority—that is, when cases are reported. Any attempt at the prevention of disease will be at best incomplete and in large measure a makeshift unless it is based upon a knowledge of the occurrence and prevalence of disease.

The health department in a community is able to control disease in proportion to the completeness and exactness of its knowledge of the occurrence of cases. With full information of existing cases it can work effectively; it can direct its efforts at prophylaxis against the disease itself; it can work in the light of knowledge of the situation. Without such information its attempts at control must be of a general nature, sometimes effective, more often not, for it is working in the darkness of ignorance of the location and prevalence of that which

[1]Reprint from the Public Health Reports, Vol. XXVIII, No. 1, Jan. 3, 1913.

it is attempting to control—as well hunt birds by shooting into every green bush, a practice that would cost much in ammunition and yield but poor results. If they are not reported there may be hundreds of cases of typhoid fever, or infantile paralysis, or scarlet fever, or smallpox in a locality, and the health officer not be aware that there are any present.

Tuberculosis is a communicable disease. With the exception of the relatively small proportion of cases contracted through milk from diseased cows each case is contracted directly or indirectly from some pre-existing human case. To control this disease effectively, it is necessary that each case be known to the health department so that it may ascertain that the patient is not unnecessarily exposing others to infection. Tuberculosis is usually chronic in nature, and those affected frequently remain for months and sometimes years a focus from which the infection may spread to others. To control this disease the health department should make sure that the patients understand how to so conduct themselves that others may not be infected and that those associated with the sick know the manner in which the disease is spread and how to protect themselves from it. Then, too, the health department should know of those suffering from tuberculosis, as those so affected, for the protection of the community, should not engage in certain occupations in which they would be especially apt to spread the disease.

Typhoid fever is another disease in which the health department should be informed of the occurrence of each case. Every case of typhoid fever has potential possibilities for harm to the community through the contamination of water, milk, or other food supply. A knowledge of all cases is necessary for the protection of others, for each case is a focus from which, under suitable conditions, an outbreak may arise. When there are a number of cases of this disease, there is usually some one or more sources from which it is being spread, and it is only when cases are reported that the health department can ascertain their relationship to each other or their common source of infection when such exists. It is only through the notification of cases that outbreaks due to infected milk or the infection of a common water supply can be recognized and proper remedies applied or that typhoid-bacillus carriers can be traced and controlled.

Scarlet fever is another common disease in which the need for the notification of cases is universally understood. Every case of this disease comes from some pre-existing case. No community would expect and no health department would attempt to control this disease in the absence of the notification of the cases that were occurring. The same is true of plague, yellow fever, and cholera. There are many other diseases, however, in which the importance of the reporting of cases has not been generally appreciated, but in which the necessity is just as great if they are to be prevented. The necessity for notification exists in all preventable diseases. Their causes or methods of spread may be different and the measures necessary to prevent them may vary, but the

notification of the occurrence of cases is essential in all for their successful control. The health department can not prevent the spread of diseases of the existence of which in the community it is uuaware.

For purposes of public health administration, cases of the communicable diseases may be divided into four groups, namely: first, the well-marked cases; second, the mild, concealed cases; third, the mild unrecognized cases; and, fourth, the well, or apparently well, carriers. To prevent the spread of these diseases control of all four groups is necessary. The control of only the first group by quarantine or other means, a practice these diseases, as the well-marked cases usually comes less in contact with others than do the cases of the other groups, and are likely, therefore, to be less potent factors in spreading infection. The well-marked cases are presumably usually reported. The mild cases should also be reported. The notification of the cases in the first two groups should enable a well-organized health department to discover most of those in the other two by a careful study of the conditions under which the reported cases occur. To find the unrecognized cases and carriers, to which is largely due the spread of the communicable diseases, is a prime duty of the health officer. The accomplishment of this requires intelligence and watchfulness and will be possible in proportion to the completeness with which the recognized cases are reported.

But the health department of a city, township, or county needs to know not only of the occurrence and prevalence of disease in its own jurisdiction, but also of the prevalence of disease in neighboring cities, towns, and counties, so that it may be informed of the possibility of the introduction of disease from other communities. The prevalence of infectious diseases in every city and county has an important bearing on the welfare of every other city and county in a state. In a well-organized state, therefore, the local health authorities keep the state health department currently informed of the prevalence of disease in their respective jurisdictions, that the information may be made available to the various local authorities and that the state department, acting in its broader field as the agent and representative of all localities and all the people, may perform its proper functions in the prevention and control of disease. Without the information of the prevalence and geographic distribution of disease obtainable in this way the state health department will remain in ignorance of the sanitary condition of the state, and, because of this lack of knowledge, will be unable to perform its proper functions and will therefore constitute a health department largely in name only.

In addition, a state health department needs for the proper performance of its functions a knowledge of the prevalence of disease more extensive than that of its own state. It needs to know of the prevalence of disease in neighboring states and even in those more remote. It is as necessary that one state should know of the prevalence of disease in other states as that a city should know of the prevalence of disease in surrounding communities. Therefore, to complete the usefulness of the health organization it is important that the states report to some national agency the occurrence of disease in their various jurisdictions,

that the information may be made available to the several states, and that the national health service, acting as the representative of all the states, may, when occasion arises, perform those functions with which it has been intrusted and for which it has been made responsible. A resolution providing for reports of this kind by the states for the purpose of making available current information of the prevalence and geographic distribution of the notifiable diseases was adopted in June, 1912, by the state and territorial health authorities in conference with the United States public health service.[1]

Thus, it is apparent that the notification of cases of the preventable and controllable diseases is the only satisfactory foundation upon which public-health work—local, state, or national—can be builded. There is no other foundation upon which work that will yield a proper return for the amount expended can rest, nor is there likely to be for a long time to come. Public health work based upon the knowledge furnished by the notification of cases is not only the only rational and effective work, but is the only one that gives results commensurate with the outlay and effort made.

A discussion of either public health organization or the notification of disease—morbidity reports—would be incomplete without a consideration of the relation of the practicing physician to the subject. The person responsible in most cases for the reporting to the proper authorities of the occurrence of cases of the notifiable diseases is necessarily the practicing physician who first comes in contact with such cases. The practicing physician constitutes the picket of the health organization, the sentinel who must give the first notice of the presence of disease and upon whom rests the responsibility of discovering and reporting new cases as they occur. The practicing physician, therefore, constitutes in reality an essential part of any plan of health administration.

The physician is engaged in a work which placed him in a position of especial and peculiar responsibility to the community, a work which carries with it moral and usually statutory obligations, upon the proper fulfillment of which depends to a large degree the ability of the health department to perform its functions. The requiring of those desiring to practice to pass an examination and to be duly licensed and registered is a partial recognition of this, and presumably such licenses are given on the assumption that the recipient will comply with the requirements imposed upon physicians by law, among which is invariably the duty of reporting cases of certain diseases coming to his knowledge. The physician who does not comply with such statutes not only places himself in the class of those who violate the law, but shows himself indifferent to his moral obligations as they affect the welfare of the community. It would be well to give more definite recognition to the relationship the physician holds to the health department and to the

[1] See Public Health Reports, Vol. XXVII, No. 23, June 7, 1912, p. 895.

community. Such recognition would undoubtedly be agreeable to physicians and bring them into closer co-operation with the health authorities in whose jurisdictions they practice.

The citizen also should co-operate with the health department. The individual who objects to complying with the requirements regarding the notification of disease when they apply to himself or his household can not expect his neighbors or associates to report the cases in their families. The moral obligation of the individual to his neighbors and the community is such that he should make the same effort to protect them from his illnesses as he expects them to make to protect him. The health officer needs the assistance of the people at least to the extent of complying with the health laws, and the requirements for the notification of sickness are among those to which especial attention should be paid. The health officer is the servant of the community. He is the one employed by the people to look after their health interests, taken in the aggregate. It is no more rational to employ a health officer and then not give him every facility and assistance for accomplishing the things for which he has been employed than it would be to hire a gardener and then not supply him with tools.

As the local health department expects to have cases of the notifiable diseases reported to it by physicians, so it should give every assistance to the state health department by keeping the state department informed of the sanitary status and occurrence of disease in its local jurisdiction. If there is law or regulation requiring the city, town, or county authorities to notify the state, this is sufficient reason. In the absence of law, however, the importance of the matter, and the fact that both state and local health departments are working for a common end, is sufficient reason why the local authorities should give all possible assistance to the state, and especially should report the occurrence of the preventable diseases in so far as they have the information. No city can be so large nor its health department so efficient that it is relieved of this obligation. The larger the city and the better equipped its health department the greater the obligation to the state, just as the more influential and prominent the citizen the greater his obligations to the community. The local health department that does not co-operate with the state authorities has but little moral right to expect the citizens within its jurisdiction to render to it any assistance beyond that insisted upon by the courts or inspired by fear of fines or imprisonment. The local health department and its jurisdiction are to the state department what the individual and his household are to the local department.

On the other hand the state, too, in so far as the control and prevention of disease is concerned, is but a unit. Disease is no more a respecter of state boundaries than it is of those of counties or municipalities. It ignores such boundaries established by man. What the household is to the municipality, and the city and county to the state, the state is to the nation.

With the several states alone responsible under the constitution for the sanitary conditions and public health administration within their respective boundaries in so far as these do not affect the welfare of other states, and with a large part of this responsibility in many instances delegated by the states to local authorities, a comprehensive plan of public health administration will need to be one of co-operation. Within the states it will need to be one of co-operation of the local authorities acting with and through the state health departments, and for the nation a co-operation of the state health authorities with the federal public health service.

FEDERAL PUBLIC HEALTH ADMINISTRATION—ITS DEVELOPMENT AND PRESENT STATUS IN THE UNITED STATES.[1] [2]

By J. W. KERR, Assistant Surgeon General, United States Public Health Service.

The jurisdiction of the federal government in public health matters extends over foreign intercourse, interstate intercourse, federal territory, and federal administrative affairs, including protection of the Indian tribes.

FEDERAL HEALTH ADMINISTRATION IN RELATION TO FOREIGN INTERCOURSE.

Federal health administration had for its fundamental object the prevention of the introduction of pestilential diseases. As long ago as May 27, 1796, a national law authorized the president to direct the revenue officers and revenue cutters to aid in the execution of quarantine, and also in the execution of the health laws of the states. As a further means of aiding foreign commerce, provisions were made in successive navigation laws to promote the health and comfort of passengers at sea, and in 1798 provision was also made for the care and treatment of persons employed in the merchant marine.

Foreign and insular quarantine.—The necessity for more and more extensive federal supervision over international traffic was made apparent by repeated epidemics. The first permanent quarantine law, passed April 29, 1878, was a result of the widespread and severe epidemic of yellow fever during the previous year. The passage of the law of February 15, 1893, was intimately associated with the outbreak of cholera in Europe in 1892, and the quarantine act of June 19, 1906, followed the epidemic of yellow fever in the Southern States in 1925. Under the above-mentioned laws and a few minor ones, there was finally developed the national system of quarantine as it exists to-day—a system the development of which occupied approximately 100 years.

All quarantine operations are conducted under the supervision of the federal government, and, with two or three exceptions, all stations are conducted by federal officers. Under the above-mentioned laws, regulations have been issued which automatically become operative on the occurrence of outbreaks of infectious diseases. The necessity for the promulgation of quarantine against a particular foreign port is thus obviated.

[1] Presented at the Fifteenth International Congress on Hygiene and Demography, Washington, D. C., Sept. 24, 1912.

[2] Reprint from Public Health Reports, Vol. XXVIII, No. 3, Jan. 17, 1913.

Quarantine regulations prescribe the measures that shall be observed at foreign ports, at sea, and at domestic ports to prevent the introduction of infectious diseases. In foreign ports these regulations are required by law to be enforced by American consular officers, and at certain ports medical officers of the United States public health service are detailed by the president for duty in American consulates to issue bills of health to steamships and to make reports on sanitary conditions and the prevalence of diseases. Among the ports where such medical officers are stationed may be mentioned Santiago, Chile; Callao, Peru; Guayaquil, Ecuador; Rio de Janeiro, Brazil; La Guaira, Venzuela; Habana, Cuba; Libau, Russia; Naples, Italy; Calcutta, India; Hongkong and Shankhai, China; and Yokohama, Japan. In order to facilitate the shipments of fruit, these officers are also on duty during certain seasons of the year in the ports of Central America and the West Indes.

Officers of vessels en route to the United States are required to observe specific regulations to preserve health, and, in the event of outbreaks of disease aboard, to take precautions to prevent its spread.

On arrival at domestic ports from abroad vessels are subject to quarantine inspection. The detailed requirements specified in quarantine regulations are not here described. Suffice it to say they include the hygienic measures to be taken with vessel, cargo, crew, and passengers to prevent infection from being carried ashore. The provisions of law relating to quarantine apply not only to the continental United States but to its island territory, and possessions.

International sanitation.—With the view to aiding commerce by the prevention of the spread of disease, the federal government participates in the benefit derived from international sanitary agreements. It contributes annually to the support of this work, the public health service conforms to the agreements entered into, and through official channels strives to perfect them. As a means to this end, representatives of the public health service are assigned as delegates of the United States to international sanitary conferences.

Sanitary supervision of immigration.—A long series of immigration laws have been enacted between the periods March 20, 1819, and February 20, 1907, their general objects from a hygienic standpoint being the improvement of the health and comfort of arriving aliens, and the development of a stronger race in the United States.

The medical inspection of immigrants is a federal function performed by federal officers. Some of these inspections are made abroad. In addition, the ship's manifests are required to contain certain data respecting the physical and mental condition of each alien, and reports must be made by the ship's officers of all diseases, injuries, births, or deaths occurring during the voyage.

On arrival at domestic ports, all aliens are required to undergo medical inspection, and for those suffering with disease, hospitals are maintained. The object of the medical supervision of immigration is to exclude the physically and mentally unfit, and especially the latter, who will endow their offspring with an unstable mentality, thereby bringing about the further increase of insanity in the United States.

FEDERAL HEALTH ADMINISTRATION IN RELATION TO INTERSTATE INTERCOURSE.

The administration procedures in international sanitation having been established, and their further improvement assured, the great public health problems of the nation are now of an interstate and intrastate character.

The federal public health statutes are based upon, or are carefully in accord with that clause of the constitution which gives the right to congress to regulate commerce between the states. On account of the far-reaching effect of interstate intercourse on our national life, the field for public health activities on the part of the federal government is wide. But it must not be occupied in such manner as to usurp the power of the states or impair the efficiency of state and local public health authorities.

The first federal statute relating to the public health provided that there should be co-operation between federal and local authorities, and this principle has been recognized in all subsequent legislation and followed in its enforcement.

Quarantine and sanitation.—Under the quarantine act of February 15, 1893, the secretary is authorized to issue regulations for the prevention of the spread of infectious and contagious diseases from one state to another, where the regulations of the states are inadequate. These regulations may be enforced by state and local authorities, but the federal public health service is authorized to co-operate in their enforcement, and should the states fail or refuse, the president may adopt such measures as in his judgment shall be necessary.

The powers under the above-mentioned statutes are broad, and the extent of their enforcement by the federal government depends on the facilities provided, the necessities in each case, and the state of public opinion in respect to the advantages of sanitation. Examples of work of this character that may be mentioned are co-operative measures for the collection and examination of rodents to prevent plague; anti-typhoid campaigns in urban and rural districts, and sanitary surveys of interstate and international waters in relation to the prevention of the spread of typhoid fever. There are great possibilities of extending work of this character, and it is along these lines that federal public health work may be expected to advance.

There is necessity not only of quarantine measures to prevent the spread of communicable diseases, but sanitary measures to prevent their propagation. These include the sanitation of trains and vessels and the supplies used aboard, the regulation of conditions under which the employes of common carriers work, and the exclusion of dangerous or infected merchandise from transportation. The limitations of the federal laws in this respect may be determined only by judicial interpretation.

The control of epidemics.—On account of the relation of epidemics to the hygienic and commercial welfare of the country, the federal public health service may, under the provisions of the above-mentioned law,

assume responsibilities in respect to their control under the direction of the secretary of the treasury and the president. In the event of outbreaks of cholera, yellow fever, smallpox, plague, or typhus fever in any part of the United States, the president is also authorized to cause sanitary regulations to be issued and enforced to prevent their spread, and an epidemic fund of approximately half a million dollars is appropriated annually for expenditures of the federal public health service in suppressing epidemics of these diseases.

It is under such authority that the epidemics of yellow fever in the southern states, the outbreaks of plague in California and our island possessions, and similar outbreaks have been handled. In every instance, however, there has been thorough co-operation on the part of the federal, state, and local authorities. The equity of our form of government requires that the two latter shall exercise their police powers to the fullest extent, and it is on request of these authorities that the federal government goes to their assistance. This may be advisory in character, or may assume a more active form.

When material aid is extended, the government's funds are required to be expended by officers of the federal public health srvice, and these latter are therefore placed in charge, and have the co-operation of state and local officials as well as officers of the federal government.

The occurrence of epidemics affords opportunity for investigations of an epidemiologic character, and advantage is taken of such situations. As an example may be mentioned the studies of plague in California and typhus fever in Mexico City.

Control of biologic products in interstate traffic.—The dangers to the public health from the exploitation of contaminated or inert biologic products impelled congress to pass the act of July 1, 1902, regulating the propagation and sale in interstate traffic of viruses, serums, toxins, and analogous products. By its provisions, licenses are issued to establishments to engage in such traffic. Prior to the issue of licenses inspections are made of each establishment by officers of the United States public health service, and examination is made of all products for which license is desired. These examinations are repeated from time to time, samples obtained in the open market being used.

Under the law, regulations are issued governing inspections of establishments, examinations of their products, the issue of licenses, and the compliance with adopted standards of purity and potency. Samples accompanying each importation of any of the biologic products in question are required to be examined before release by customs officers. By this means only is it practicable to prevent the dissemination of those biologic products which may be the means of conveying infections that give rise to disease.

Supervision of foods and drugs.—In the interest of foreign commerce, meat products prior to shipment abroad have for some years been subject to inspection, and on June 30, 1906, provision was made by congress to prevent the use in interstate traffic, as well as foreign traffic, of meat

products which are unsound, unwholesome, or unfit for human food. The enforcement of these laws devolves upon the bureau of animal industry of the department of agriculture. All establishments affected by the law are required to be inspected; the animals slaughtered and the meat produced from them are also subject to inspection, and regulations are prescribed for the sanitation of establishments engaged in the meat industry.

On June 30, 1906, there was also enacted by congress the law to prevent the manufacture and sale in interstate traffic of impure foods and drugs. This law is enforced by the secretary of agriculture through the bureau of chemistry of that department.

COLLECTION AND COLLATION OF SANITARY INFORMATION.

The successful administration of public-health laws depends essentially upon a knowledge of the existence and current prevalence of communicable diseases, the conditions that favor their propagation and spread, and the measures that are required for their control.

Information is received by the federal public health service from American consuls throughout the world regarding dangerous diseases that exist or are epidemic in foreign ports. For this purpose the telegraph is resorted to, and in addition reports are made weekly by mail. In addition, special reports are made of matters pertaining to hygiene in the respective foreign countries.

Of even greater importance to the health of the country are the collection and collation of sanitary information and reports regarding the prevalence of diseases and the occurrence of epidemics within the states. This work on the part of the federal government is carried on with the voluntary co-operation of state and local authorities.

Reports of births and deaths are compiled by the census bureau. Sanitary information and reports of the occurrence and prevalence of disease are collected and published by the United States public health service.

The extent to which notification of cases of sickness can be carried depends upon the facilities provided the federal public health service and, primarily, upon the development of local health organization within the respective states. The difficulties encountered in the enforcement of the notification of cases of disease in the United States are not unlike those encountered by sanitary authorities abroad, but in overcoming them there will be performed the most important duty in connection with the preservation of the public health.

INVESTIGATIONS OF MATTERS PERTAINING TO THE PUBLIC HEALTH.

Another important function of the federal government in relation to the public health, and perhaps the most important one, is the conduct of scientific investigations. By this means federal administration in public health matters is simplified and rendered more accurate; local authorities are likewise aided, and through them the people are benefited by being taught the degree of sanitary excellence that may be attained.

By an act of March 3, 1901, investigations of contagious and infectious diseases and matters pertaining to the public health were given definite status in law. Provisions was made whereby laboratory investigations would be systematically carried on. Through this provision and in connection with the enforcement of the quarantine laws investigations have been made in Washington and different parts of the country. In order to comply with the law, however, this work was carried on largely through the hygiene laboratory.

By an act of congress approved August 14, 1912, broader powers were conferred on the public health service to "study and investigate the diseases of man and conditions influencing the propagation and spread thereof, including sanitation and sewage and the pollution either directly or indirectly of the navigable streams and lakes of the United States."

There is thus abundant authority for both laboratory and field investigations by the public health service. As in the past the investigations will be conducted by officers specially trained and with such co-operation as state and local health authorities may be able to render. But in order that the great needs of the country may be met, more men and more money must be provided and the public health service must have the active support of individuals, professional associations, and other organizations to be benefited.

Many highly important problems await solution. Among them may be mentioned the standardization of biologic and other therapeutic products, the determination of the conditions causing pellagra and certain other diseases, the extent of the migrations of tuberculous and other patients from one locality to another, the ascertainment of the influence of artificial illuminants on health, the determination of the relation of housing and other conditions to labor efficiency, and the prescribing of reasonable standards to control stream pollution.

Requests are received daily from all parts of the country for information regarding sanitary problems and their method of handling. These requests are an excellent indication of the amount and extent of work to be performed in the immediate future. In one section of the country the question of the pollution of streams is pressing for solution; in another, it may be industrial accidents and poisoning; in another, the question of the reduction of infant morbidity; and in still another, the measures that must be taken to eradicate malaria or other communicable disease. Federal health administration involves a wise selection of the problems to be investigated and the securing of appropriations necessary to carry them on.

DISSEMINATION OF INFORMATION RELATING TO THE PUBLIC HEALTH.

Sanitary reports and statistics and the results of scientific investigations are of value only as they are made public and used. An important administrative measure, therefore, is the distribution of public health literature and the presentation of public health lectures and exhibits. By

these means the federal public health service has been able to disseminate a considerable amount of sanitary information and participate in the educational propaganda.

Among the publications issued are the hygienic laboratory bulletins, bulletins of the yellow fever institute, public health bulletins, the weekly public health reports, and miscellaneous documents. The hygienic laboratory bulletins represent the results of scientific investigations conducted in the laboratory. The public health bulletins are more popular in character, and are utilized to convey sanitary information to health officials and to the public generally. The weekly public health reports are issued primarily for the benefit of health authorities as in aid in administration. Their utility is recognized throughout the world, and their improvement as contemplated will render them the most useful organs in health administration in this country.

The public health bulletins are to be further popularized and made of interest to individuals, and they should be distributed by millions. The recognition by the secretary of the treasury of the value of public health education, and his deep interest in sanitary administration generally, has been responsible for a material increase recently in the amount of public health literature issued and, indeed, in the amount of scientific and practical sanitary work performed.

HEALTH ADMINISTRATION IN RELATION TO FEDERAL TERRITORY AND FEDERAL ADMINISTRATIVE AFFAIRS.

Administrative measures taken in the interest of international and interstate sanitation, and the investigations conducted in relation thereto, have a direct or indirect value in connection with federal administration generally. But in federal territory and in relation to federal administrative affairs special provision is also made. The sanitation of the military forces is performed by their respective medical corps. Sanitary inspections of government buildings and workshops to control tuberculosis devolves on the public health service, and through cooperation it performs under regulations sanitary duties for other bureaus and departments.

The extent to which the co-operation may be rendered depends on the number of officers available, since the comptroller of the treasury has decided in effect that officers of the public health service may undertake public health duties for other bureaus providing the expenses are borne by those bureaus. Under this provision, for instance, steps are being taken for the sanitary betterment of the Indian in Alaska, and inspections have been made of mines and the mining industry with particular reference to lung diseases among miners and the measures necessary for their control.

ORGANIZATION OF THE FEDERAL PUBLIC HEALTH SERVICE.

The federal public health service is a bureau of the treasury department. Through successive acts of congress it has undergone a process of evolution so that all of its duties are essentially of a public health character, and it is organized with a view to their performance.

The central bureau at Washington, which is presided over by the surgeon general, has seven divisions, as follows:

1. Personnel and Accounts.
2. Foreign and Insular Quarantine and Immigration.
3. Domestic (Interstate) Quarantine and Sanitation.
4. Sanitary Reports and Statistics.
5. Scientific Research.
6. Marine Hospitals and Relief.
7. Miscellaneous.

Each of the six divisions first mentioned is in charge of an assistant surgeon general, who is directly responsible for administrative matters in connection with his division. In the absence of the surgeon general the officer next in rank acts in his stead. This is the officer who has charge of the division of personnel and accounts, and who has immediate supervision of the entire personnel and appropriation, and the preparation of the annual estimates therefor.

Through the division of foreign and insular quarantine and immigration are administered all matters relating to maritime quarantine and medical inspection of aliens. In the field this division is represented by 44 quarantine and inspection stations scattered along the several coasts in the continental United States, 25 insular stations, and 37 stations located at foreign ports, and 83 immigration stations.

Through the division of interstate quarantine are administered all matters relating to the control of contagious and infectious diseases in interstate traffic. In the field this division is represented by officers engaged in the inspection of government buildings, suppression of plague outbreaks, and control of epidemics of typhoid fever and other diseases in co-operation with State and local authorities.

The division of sanitary reports and statistics handles all matters relating to the collection of morbidity reports, reports of epidemics, and of information pertaining to the geographic distribution of disease, and to climate in relation to health and disease. It prepares and publishes the weekly public health reports and reprints therefrom.

In the field it is represented by officers of the service wherever stationed, and through the department of state by American consuls at foreign ports. In the United States it depends largely on the voluntary cooperation of state and municipal authorities to furnish information and forward reports of sanitary conditions within their respective jurisdictions.

The division of scientific research administers all matters relating to investigations of contagious and infectious diseases and matters pertaining to the public health wherever made. In the field it is represented by the hygienic laboratory with its four divisions, the plague laboratory in San Francisco, the leprosy investigation station in Hawaii, the pellagra investigation station at Savannah, Ga., the station at Wilmington, N. C., for the investigation of the parasites of man, and by officers engaged in investigations of typhoid fever, Rocky Mountain spotted fever, poliomyelitis, etc., in different parts of the country, and sanitary surveys of navigable waters wherever conducted.

In the division of marine hospitals and relief are adminstered all matters connected with the care and treatment of seamen and recruiting for the several bureaus of the department. In the field it is represented by 22 marine hospitals and 121 relief stations.

In the miscellaneous division are handled all matters in relation to the care and distribution of publications, and to the examinations of surfmen of the life-saving service, and to claims for disability in that service.

To-day the public health service has a corps of approximately 450 medical officers, 50 pharmacists, and a total personnel of about 2,000.

Advisory conferences on administrative matters.—Under the constitution and existing statutes, the federal public health service is restrained from assuming duties that properly devolve upon state and municipal authorities. But their relations are so intimate that congress has made provisions not only for co-operation, but for conferences on public health matters. In the public health law of July 1, 1902, provision is made for annual conferences between the public health service and state boards and departments of health. Provision is also made for special confer ences with all or a part of the state health organizations, and upon the application of not less than five state health authorities, a special conference must be called. The deliberations pertain particularly to administrative measures. In effect, there is thus provided an advisory council on administrative matters, which in its development will insure co-operation and be an arbiter on vexed sanitary questions, and in which each state is entitled to representation.

Advisory conferences on scientific matters.—In the previously mentioned law congress also provided for an advisory board for consultation relative to investigations to be inaugurated and the methods of making them in the hygienic laboratory. This board consists of 9 members, 4 of whom are officers of the government, the remaining 5 being scientists eminent in laboratory work and connected with the leading endowed institutions of the country. By this means the service is brought in touch with the great scientific laboratories, and may avail itself of advice from the highest sources.

Congress has thus made provision for councils in respect to both administrative and scientific matters. Their utilization in the highest degree is one of the most important means of development of public health organization and public health work.

The foundations have been laid for further development and for the performance of a greater amount of efficient sanitary work. In order that health administration shall be effective, however, it must be adequately supported by appropriations, and it is the securing of these and their wise expenditure that constitute efficient administration.

PLAGUE—THE RELATION BETWEEN TRAFFIC AND THE SPREAD OF PLAGUE.[1][2]

By W. C. Rucker, Assistant Surgeon General, United States Public Health Service.

Sanitary science in the ultimate analysis resolves itself into a defense against the animal and vegetable forms of life which produce disease in man. It is a manifestation of the law of the survival of the fittest through the erection of bulwarks of one sort and another against those agencies which will exterminate man if man does not control them. All nature is at war one with the other. Each species has its natural enemies. Man in particular has been assailed since the beginning of time by a myriad of hostile lower-life forms, and it is to the constant whetting of the wits in this struggle for supremacy that he owes the development of his superior intelligence.

With the dawn of reason came traffic, and man as the only animal that sells and barters has been obliged to erect special barriers to prevent his vegetable and animal foes from attacking him through the avenue of commercial intercourse. Disease, which, after all, is but an outward and visible presentment of this never-ceasing battle, has always been recognized as the constant companion of commerce, and of no disease in particular is this more true than of plague. Who can doubt that at some remote age plague was confined to some small valley, from which it has been carried to all parts of the globe by the roads of trade "which lead you o'er the world?" What galley seeking Cornish tin brought the first plague rat to England just as the Ark of the Covenant carried the disease to the Philistines?

The relation of traffic to the spread of bubonic plague is a simple equation, the one being to the other directly as the opportunity which traffic affords for the spread of rats from plague foci. It may therefore be taken as axiomatic that if we would prevent traffic from spreading plague we must concentrate our efforts on the prevention of the migration of rodents in traffic. If we successfully control the peregrinations of the murinae we will control the spread of plague, because for all practical purposes man may be disregarded as a great factor in the grand tactics of plague. It is true that human pneumonic plague has been held responsible for certain outbreaks, and it is also a fact that verminous persons suffering from the septicemic form of the disease have acted as infection nidi, but these are local matters only and bear no vital relation to the world-spread of plague. Plague usually passes from rats to man, not from man to rats.

[1]Read before the joint sessions of Section V and VII, Fifteenth International Congress on Hygiene and Demography, Washington, D. C., Sept. 27, 1912.

[2]Reprint from the Public Health Reports, Vol. XXVIII, No. 4, Jan. 24, 1913.

It were better that the sanitary authorities had constant and accurate information as to the existence of rodent plague in the various ports, but unfortunately such knowledge is not always obtainable, or is perhaps obtained too late to prevent an exodus of the disease from a previously unrecognized focus of rodent plague. The measure then is obvious—let there be a world-wide embargo on rats. Let no rat take passage on any ship whatsoever, and if at the port of destination any rat is found on board, the penalty which he shall suffer is death. Every ship-borne rat must be regarded as a potential enemy not only to be life but also to the prosperity of man. Emphasis may be laid on the ship-borne rat because the overland spread of plague is not of material influence on the end result. Plague does not follow the caravan routes by reason of the transportation of rats; in fact, it is more than probable that verminous persons act as disseminating agents in such a situation; the carriage of infected rodents by freight trains undoubtedly does occasionally occur, but these are matters of minor consideration in the universal spread of plague in which the chief agent is the ship-borne rat.

We have laid too much stress in the past on the human passenger, and we have paid too little attention to the rodent passenger. It is futile to examine and detain persons who have been exposed to plague infection and to neglect rodents which actually have the disease. It is equally absurd to quarantine against passengers from infected ports and to permit the landing of rats from ports which are considered safe merely because plague has not been reported from them. There is only one policy which we can logically pursue; that is to regard all ship-borne rats as elements of danger and to prevent their entering or leaving ships, and to confine our operations against passengers to the prevention of embarkation by persons actually suffering from the disease or in a verminous condition. It is time that there was a revision of the regulations of the international sanitary convention of Paris to meet the present-day interpretation of the method of the dissemination of bubonic plague. It is the plague rat which we must prevent from taking passage, and we should not confine our attention to the human passenger.

The first element in preventing rats from entering ships is a rat-proof water front. This is not only a matter of importance in relation to the spread of plague by traffic; it is also an insurance against the fire and destruction losses which rodents cause. Rat-free vessels need not be obliged to breast-off from rat-proof, rat-free wharves. This facilitates the handling of cargo, because vessels may then discharge at the dock on one side and to lighters on the other.

It is equally necessary that vessels be prevented by other means from receiving rats while tied up to the wharf and from discharging them under similar conditions. For this purpose the use of proper rat guards on mooring lines is to be recommended, care being taken that the guards are always perpendicular to the line, and that they are of sufficient diameter to prevent rats from leaping over them. It is entirely practical to construct a wharf and vessel in such a way that rats will be captured almost as soon as they get on them. For this purpose, when the dock is built, or the ship is laid down, suitable runways, which

will entice the rats, should be installed. By means of swing doors, which operate from a platform, it is very easy to capture all the rats on board of a ship, or on a dock, in this way. The rats are imprisoned in the runways and can at any convenient time be driven by smoke or other means into a common chamber, the doors of which can be shut, and the rodents asphyxiated.

It is not, however, practicable at the present time to secure an immediate world-wide adoption of the measures above referred to. This is a matter for the coming years, one demanding and deserving our careful and continuous labors. In the meantime, the periodic fumigation of ships for the purpose of killing the rats thereon is a most desirable measure. This may be accomplished by the use of sulphur dioxide, produced by the old pot and pan method, or injected by one of the various types of machines devised for this purpose. The corrosive effect of this gas, however, and the deterioration which it produces on fine fabrics, are serious objections to its frequent use, particularly upon vessels of the finer type. Carbon monoxide has been successfully used for this purpose, and recently the United States public health service has adopted a special apparatus for this purpose. If the larger steamships could be induced to install this apparatus on board, and to use it themselves at frequent intervals, many of the difficulties of the eradication of the ship-borne rat could be overcome. Just one point about the fumigation of ships to kill rats. No portion of the vessel should be overlooked. Lifeboats should be swung out, and any rats contained therein should be driven out with live steam. Unless such measures are enforced with the greatest care, a few rats remain in spite of repeated fumigations.

In conclusion, it may be stated that where trade will go, there rats will go, and where rats will go, there plague will go. The relation between traffic and the spread of bubonic plague, therefore, resolves itself into the relation between traffic and the spread of rats. If this murine enemy of man can be banished from the highways of the world—if his isolation from the human species can be made complete and lasting—then shall we have won the victory over plague. That such a culmination will crown the labors of the working, teaching, sanitarians of today is not beyond the bounds of possibility; but we must work and we must teach, and we must by wise rules and regulations bring about an antipathy toward the rat which is greater than the present antipathy toward the snake. We must inculcate the lesson that the rat is the most expensive animal which man maintains, and that the limitation of this species, its isolation from the dwelling place of man, and the control of its migrations are as important from an economic as from a humanitarian standpoint.

HOOKWORM DISEASE—PROPORTION OF MALES TO FEMALES IN THE AMERICAN HOOKWORM (NECATOR AMERICANUS), BASED IN 13,080 WORMS FROM 102 CASES.[1] [2]

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The point was raised by Leichtenstern in 1885 that by counting the male and female hookworms passed by a patient and drawing the proportion, the clinician has a practical clue to the completeness or incompleteness of the cure effected. This point was based upon the premises that the males and the females are present in relatively fairly constant proportion and that the males are more difficult to expel than are the females.

This view of Leichtenstern, based upon the old World hookworm (*Ancylostoma duodenale*), appears to be one that might in certain cases be of practical importance, and it seemed wise, therefore, to test it as applied to our American hookworm.

The opinion seems to prevail that in case of *Ancylostoma duodenale* the female worms are much more numerous than the males. Bearing on this point the following data are found in our notes (absence from library facilities at present prevents us from consulting some of the original articles):

Bilharz (1853, 55), Heller (1876b, 778), and R. Blanchard (1888a, 765) report 1 male to 3 females. White (1867, 427) states that the males are less numerous than the females. The following cases are reported with the number of males and females passed:

Number of—				Author
Cases	Worms	Males	Females	
1	169	38	131	Leichtenstern, 1885, 501.
1	45	10	35	Leichtenstern, 1885, 501.
1	306	83	223	Leichtenstern, 1885, 501.
1	695	235	460	Leichtenstern, 1885, 501, Schumacher's case.
1	142	0	142	Leichtenstern, 1886, 217, Schulthess's case.
1	647	188	459	Leichtenstenn, 1886, 217, Schulthess's case.
1	64	13	51	Leichtenstern, 1886, 217, Schulthess's case.
1	250	0	250	Leichtenstern, 1886, 217, Schulthess's case.
1	153	1	152	Leichtenstern, 1886, 217, Schulthess's case.
1	135	20	115	Leichtenstern, 1886, 217, Schulthess's case.
1	230	8	222	Leichtenstern, 1886, 217, Schulthess's case.
11	2,836	596	2,240	

[1] Reprint from the Public Health Reports, Vol. XXVIII, No. 1, Jan. 3, 1913.
[2] Read at the XV International Congress on Hygiene and Demography, Washington, September, 1912.

In the foregoing 11 cases it is clear that the females (78 per cent) are in excess of the males (21 per cent). In 7 cases from Schulthess the females and males were about 6 to 1.

Leichtenstern (1886, 216-217) quotes two series of cases from Schulthess, as follows:

Number of—			
Cases	Worms	Males	Females
26	6,134	1,811	4,323
(?)	4,111	1,367	2,744
26+	10,245	3,178 31 per cent.	7,067 68 per cent.

In these two series also it is clear that the females (68 per cent) are in excess of the males (31 per cent). In the series of 26 cases the variation was between 10 males to 360 females and 10 males to 11 females.

Leichtenstern remarks that the males may roll themselves up in the feces and be overlooked. He also states that cases occur in which only the females appear for two days after the anthelmintic; then the males appear.

From the foregoing statistics, based upon *Ancylostoma duodenale*, we were prepared to find similar conditions in the case of *Necator americanus*, especially since Lutz (who probably had *Necator* before him) is quoted as reporting for 3,000 worms a proportion of 3 females to 2 males.

In hospital work we usually have hookworm patients under observation only one day per week. It becomes necessary to inquire, therefore, into the number and proportion of worms passed in successive stools and on successive days in order to have an indication of the proportion of worms that escape collection on the day of treatment.

Number of worms and proportion of sexes found in successive stools on day of thymol treatment.—The stools may follow each other so slowly or so rapidly, namely, so ununiformly, that a tabulation by actual stools has been followed in only a very few instances.

Case No. 3 (age 21 years) of our 1911 series shows the following data on day of treatment; dose, 45 grains of thymol:

Stool	Males	Females	Total
First	29	4	33
Second	(?)	(?)	61
Third	0	1	1
Total, 3	29+	5+	95

Although in the second stool the males and females were not separated, it is clear that in the first stool the males were greatly in excess of the females, and therefore that they were not more difficult to expel.

Case No. 63 (age 16) of our 1911 series shows the following data on first treatment; dose, 10 grains of thymol. (The patient had received one treatment before he came to the marine hospital.)

Date and Number of Stool	Males		Females		Total Worms	Per cent. of 347
	Number	Per cent.	Number	Per cent.		
Aug. 4:						
First	1	50	1	50	2	0.57
Second	50	39.6	76	60.3	126	36.3
Third	48	44	61	55	109	31.4
Fourth	18	60	12	40	30	8.6
Fifth	21	36.8	36	63	57	16.4
Aug. 5:						
Sixth	13	68	6	31	19	5.4
Seventh	2	50	2	50	4	1.1
Total	153	44	194	55	347	100.00

In this treatment it is clear (a) that the female worms were in excess of the males for the total treatment (7 stools) and for stools Nos. 2, 3, and 5; (b) that the males and females were equal in stools Nos. 1 and 7; and (c) that the males were in excess in stools Nos. 4 and 6.

The two cases cited do not seem to give us any clue of practical value in use of statistical data as to sexes in their order of expulsion in a given treatment.

In our notes we find two literature references for comparison. E. Parona, according to R. Blanchard (1888a, 765) reports a case as follows: First stool contained 8 males and 104 females, total 112 worms; second stool contained 16 males and 19 females, total 35 worms; third stool contained 107 males and 66 females, total 173 worms.

Blanchard (1888a, 765)) also reports a case from Leichtenstern as follows: First stool contained 10 males and 124 females, total 134 worms; second stool contained 28 males and 7 females, total 35 worms.

It is not clear to us whether Parona's case involved 3 courses of treatment or 3 stools after 1 course of treatment, but our notes give the following data for Leichtenstern's (1885, 101) case: First treatment, 15 extr. fil. mar.,[1] first 4 days; 10 males and 124 females, total 134 worms. Second treatment, 10 extr. fil. Mar.,[1] 28 males and 7 females, total 35 worms. Total, 38 males and 131 females. Grand total, 169 worms.

Accordingly, positive data for comparison between *Necator americanus* and *Ancylostoma duodenale*, in respect to the point under discussion, are not available to us at present.

[1]German equivalent for Oleoresina aspidii of the United States pharmacopœia.

Duration of passage of worms after thymol.—In hospital work the average hookworm patient is, as stated above, usually under observation for only about 18 to 24 hours at a time. He is admitted to the wards late in the afternoon or early in the evening. He takes his thymol the next morning. By 1 to 4 o'clock in the afternoon he is over the effects of the salts and thymol to such an extent that he either desires to go home or from a financial (administrative) point of view there is little or no justification in retaining him longer. Accordingly, under ordinary circumstances, opportunity is presented to collect the worms passed only up to 3 or 5 p. m. of the day of treatment. While this permits, doubtless, the collection of most of the worms, a number escape the observer, for they continue to pass for three or four days or more, as the follwing cases show.

CASE NO. 63.

DATE	Thymol	Worms				Total	Per cent of total of each treatment
		Male		Femafe			
		Number	Per cent.	Number	Per cent.		
August 4	10	138	42.5	186	57.5	324	86
August 5	0	15	65.2	8	34.8	23	6
August 6	0	6	22.2	21	77.8	27	7.2
Total	10	159	42.5	215	57.5	374	
August 8	10	1	25	3	75	4	80
August 9	0	0	0	1	100	1	20
August 10	0	0	0	0	0	0	0
Total	10	1	20	4	80	5	

CASE NO. 179.

DATE	Thymol	Worms					Per cent of total of each treatment
		Male		Female		Total	
		Number	Per cent	Number	Per cent		
July 3	15	19	43.1	25	56	44	95.6 per cent of 46.
July 4	0	0	0	1	100	1	2.2 per cent of 46.
July 5	0	0	0	0	0	0	
July 6	0	0	0	0	0	0	
July 7	0	0	0	0	0	0	
July 8	0	0	0	1	100	1	2.2 per cent of 46.
Total	15	19	41.3	27	58.7	46	
July 21	25	29	41	41	58	70	77.8 per cent of 90.
July 22	0	4	100	0	0	4	4.4 per cent of 90.
July 23	0	4	50	4	50	8	8.9 per cent of 90.
July 24	0	0	0	1	100	1	1.1 per cent of 90.
July 25	0	3	50	3	50	6	6.7 per cent of 90.
July 26	0	0	0	1	100	1	1.1 per cent of 90.
Total	25	40	44.4	50	55.6	90	
July 27	30	5	22.7	17	77.3	22	73.3 per cent of 30.
July 28	0	0	0	0	0	0	
July 29	0	0	0	2	100	2	6.7 per cent of 30.
July 30	0	1	25	3	75	4	13.3 per cent of 30.
July 31	0	0	0	0	0	0	
August 1	0	0	0	0	0	0	
August 2	0	1	50	1	50	2	6.7 per cent of 30.
Total	30	7	23.3	23	76.7	30	
August 3	30	6	35.3	11	64.7	17	100 per cent of 17.
August 4	0	0	0	0	0	0	
Total	30	6	35.3	11	64.7	17	

CASE NO. 200.

DATE	Thymol	Worms					Per cent of total of each treatment
		Males		Females		Total	
		Number	Per cent.	Number	Per cent.		
August 12	45	273	46.8	312	53.1	587	96.2
August 13	0	0		0		0	
August 14	0	7	53.8	6	46.1	13	2.1
August 15	0	3	30	7	70	10	1.6
August 16	0	0		0		0	
Total	45	285	46.7	325	53.2	610	100
August 17	45	43	52.7	43	47.2	91	96.8
August 18	0	0		0		0	
August 19	0	1	33.3	2	66.2	3	3.1
August 20	0	0		0		0	
August 21	0	0		0		0	
Total	45	49	52.1	45	47.8	94	100
August 22	45	10	47.6	11	52.3	21	77.7
August 23	0	0		0		0	
August 24	0	5	83.3	1	16.6	6	22.2
Total	45	15	55.5	12	44.4	27	100
August 25	45	0		2	100	2	100

From the foregoing cases it is clear that all worms expelled by a given course of treatment need not necessarily be passed on the day of treatment, but while about 75 to 95 per cent of the specimens expelled may be passed within 12 hours after the drug is administered, worms may continue to pass for 5 or 6 days.

It further seems evident from the foregoing records that the males and females do not follow any regular order in passing which can be used as a practical indication as to the completeness or incompleteness of the cure.

Two practical conclusions are to be drawn from the foregoing data.

(1) Since 75 to 95 per cent of the worms pass during the first 12 hours after administration, all hospital records that give the number of worms collected during this period are subject to a theoretical error of about 5 to 33 per cent; that is to say, the actual number of worms passed may be from one-twentieth up to one-third larger than actually reported. This point should be borne in mind when comparing statistics derived from treatment with statistics derived from autopsy not preceded by treatment.

(2) It occasionally occurs that on the day of treatment not a single worm is collected, but later microscopic examination is negative. Probably the correct conclusion is that the worms have been passed after the patient has been discharged.

Proportion of male and female hookworms passed after thymol treatment.—In nearly all of the following cases the worms were collected within 12 hours (namely, by 6 p. m.) after the first dose of thymol (which is given at 6 a. m.).

Two groups of cases, each with three subgroups, may be compared.

In the first group are found 58 cured male cases, arranged in three subgroups according to the preponderance of male worms, equal number of males and females, and preponderance of female worms.

Of these 58 patients, 18 cases (or 31 per cent) showed more male (59 per cent) than female (40 per cent) hookworms; 5 cases (8 per cent) have an equal number of male and female worms; 35 cases (60 per cent) have an excess of females. Thus, on a basis of these cases, the chances are about 6 out of 10 that there will be an excess of females, but this percentage is not high enough to put to any practical account in determining, by counting the males and females collected, whether or not the patient is entirely freed from his worms. In fact, the labor involved would be much greater, more tedious, and more disagreeable than the labor involved in making a new microscopic examination a few days later.

The 18 cases with an excess of males showed 1,378 worms, 821 of which (or 59 per cent) were males, and 557 of which (or 40 per cent) were females.

The 5 cases with equal numbers of male and female worms were all light infections, everaging only 11.6 worms each.

The 35 cases with more females than males showed 6,524[1] worms, 2,797 of which (or 43 per cent) were males, and 3,727 of which (or 57 per cent) were females.

Of the total 7,960[1] worms collected from the 58 cases, 3,647 specimens (or 45 per cent) were males, and 4,313 specimens (or 54 per cent) were females.

In respect to number of worms present, the cases with equal males and females averaged the smallest number of worms (11), those with an excess of males came next (76), and those with an excess of females came next (186). The average was 137 worms. Thus, in general, the heaviest infections were those with the largest number of females, but this is not of much significance since only 9 of the 35 female-excess cases were about the average (139) in number of worms present, while 2 of the 18 male-excess cases were above the average.

The "cured"[2] cases are given in the following table:

[1]Plus 26 worms, the sex of which was not determined.
[2]"Cured" means that later microscopic examination was negative.

TABULATION OF 58 CURED MALE HOSPITAL CASES ACCORDING TO TOTAL NUMBER OF WORMS AND PREPONDERANCE OF SEX OF PARASITES.

A. EIGHTEEN CASES WITH EXCESS OF MALES.

Case No.	Worms			Case No.	Worms		
	Total	Males	Females		Total	Males	Females
111	474	277	197	31	37	21	16
26	143	74	69	55	9	6	3
163	138	82	56	139	8	5	3
11	111	65	46	58	7	6	1
144	97	58	39	92	7	4	3
29	95	68	27	73	6	4	2
66	72	37	35	15	1	1	0
67	68	36	32	125	1	1	0
103	62	45	17				
165	42	31	11	Total (18)	1,378	*821	†557

B. FIVE CASES WITH EQUAL MALES AND FEMALES.

42	44	22	22	169	2	1	1
53	6	3	3	62	2	1	1
170	4	2	2	Total (5)	58	‡29	‡29

C. 35 CASES WITH EXCESS OF FEMALES.

78	2,251	1,049	1,202	80	17	4	13
110	1,142	564	578	75	14	5	9
63	633	234	399	52	11	5	6
39	538	254	284	87	8	3	5
24	509	173	333	90	7	3	4
23	295	99	196	108	7	3	4
27	170	77	93	109	6	2	4
41	167	52	115	93	5	1	4
119	150	43	107	13	4	1	3
44	113	55	58	7	3	0	3
83	92	16	76	89	3	0	3
34	80	35	45	172	2	0	2
56	73	27	46	153	2	0	2
21	72	32	40	91	1	0	1
92	58	24	34	140	1	0	1
32	28	11	17	88	1	0	1
70	24	9	15				
157	21	10	11	Total (35)	§6,524	¶2,797	‖3,727
74	19	6	13				

*59 per cent; †40 per cent; ‡50 per cent; §Plus 26, sex not counted; ¶43 per cent; ‖57 per cent.

D. SUMMARY OF 58 CURED CASES.

	Cases	Total	Worms	
			Males	Females
A	18	1,378	821	557
B	5	58	29	29
C	35	*6,524	2,797	3,727
Total	58	*7,960	†3,647	‡4,313

*Plus 26, sex of which was not determined; †45 per cent; ‡54 per cent.

For comparison with these 58 complete cures, 44 male hospital cases can be presented in connection with which it is either definitely known that later microscopic examination (in 1911) was positive (hence the cure was incomplete), or through failure to obtain specimens the completeness or incompleteness of the cure was left in doubt.

Of these 44 cases, 19 patients (or 43 per cent) showed an excess of males; there was a total of 2,738 worms, 1,468 of which (or 53 per cents) were males and 1,270 of which (or 46 per cent) were females. These percentages are not very different from those of the corresponding cured cases.

Of the 44 cases, 4 patients (or 9 per cent) showed an equal number of males and females. All were light infections, averaging only 10.5 worms each.

Of the 44 cases, 21 patients (or 47 per cent) showed an excess of females; of a total of 2,340 worms, 1,001 specimens (or 42 per cent) were males, and 1,339 specimens (or 57 per cent) were females.

The cases in question are tabulated as follows:

TABULATION OF 44 MALE HOSPITAL CASES, SOME WITH INCOMPLETE CURE, SOME WITHOUT FINAL DATA AS TO CURE, ARRANGED ACCORDING TO TOTAL NUMBER OF WORMS AND PREPONDERANCE OF SEX OF PARASITES.

A. NINETEEN CASES WITH EXCESS OF MALES.

Case No.	Worms			Case No.	Worms		
	Total	Male	Female		Total	Male	Female
85	710	387	323	20	11	6	5
57	695	353	342	46	10	7	3
94	366	188	178	65	9	5	4
69	315	163	152	115	7	4	3
141	172	89	83	95	5	5	0
12	158	82	76	79	5	3	2
9	85	60	25	97	5	3	2
47	70	39	31	145	3	3	0
88	58	31	27				
3	34	29	5	Total (19)	2,738	*1,468	†1,270
143	20	11	9				

B. FOUR CASES WITH EQUAL MALES AND FEMALES.

158	18	9	9	104	4	2	2
74	10	5	5	Total (4)	42	‡21	‡21
118	10	5	5				

C. TWENTY-ONE CASES WITH EXCESS OF FEMALES.

68	366	158	208	116	32	10	22
30	347	163	184	72	16	7	9
45	315	128	187	35	15	5	10
10	267	109	148	126	9	3	6
99	256	125	131	33	7	3	4
117	199	91	108	136	5	0	5
16	170	62	108	105	4	0	4
2	113	39	74	137	4	1	3
1	93	43	50	6	4	1	3
71	86	40	46	154	3	0	3
5	39	13	26				
				Total (21)	2,340	§1,001	¶1,339

*53 per cent; †46 per cent; ‡50 per cent; §42 per cent; ¶57 per cent.

TABULATION OF 44 MALE HOSPITAL CASES, SOME WITH INCOMPLETE CURE, SOME WITHOUT FINAL DATA AS TO CURE, ARRANGED ACCORDING TO TOTAL NUMBER OF WORMS AND PREPONDERANCE OF SEX OF PARASITES—Continued.

D. SUMMARY.

	Cases	Worms		
		Total	Male	Female
A	19	2,738	1,468	1,270
B	4	42	21	21
O	21	2,340	1,001	1,339
Total	44	5,120	*2,490	†2,630

*48 per cent; †51 per cent.

Comparing these statistics with the sex statistics of the cured cases, it is not evident that the proportion of the sexes gives us any practical clue to the question whether our patient is or is not cured.

Combining the two sets of statistics we have the following table:

	Cases	Total	Male		Female		Average per case
			Number	Per cent.	Number	Per cent.	
Cured	58	*7,960	3,047	46	4,313	53	137
Others	44	5,120	2,490	48	2,630	51	116
Total	102	*13,080	6,137	46	6,943	53	128

*Plus 26 worms, sex of which was not determined.

Proportion of male and of female worms passed in different treatments of 58 cases.—The following 58 cases of complete cures give data as to sex of parasites passed in successive treatments:

A. FORTY-THREE CASES CURED IN ONE TREATMENT.

Case No.	Age	Thymol	Worms collected				
			Total	Males		Females	
				Number	Per cent.	Number	Per cent.
134	14	25	0	0	0	0	0
70	24	60	24	9	37	15	62
144	37	60	97	58	59	39	40
119	14	20	150	43	28	107	73
7	16	30	3	0	0	3	100
41	28	60	167	52	31	115	68
165	8	10	42	31	73	11	26
91	10	20	1	0	0	1	100
74	10	20	19	6	31	13	68
93	7	15	5	1	20	4	80
140	13	25	1	0	0	1	100
139	30	60	8	5	62	3	37
21	20	45	72	32	44	40	55
13	14	30	4	1	25	3	75
90	12	30	7	3	42	4	57

A. FORTY-THREE CASES CURED IN ONE TREATMENT—Continued.

Case No.	Age	Thymol	Worms collected				
			Total	Males		Females	
				Number	Per cent.	Number	Per cent.
53	20	30	7	6	85	1	15
157	12	25	21	10	47	11	52
31	19	45	37	21	57	16	43
55	14	25	9	6	66	3	33
22	36	50	58	24	41	34	58
42	25	45	44	22	50	22	50
73	26	42.5	6	4	66	2	33
170	11	25	4	2	50	2	50
169	11	25	2	1	50	1	50
125	13	25	1	1	100	0	0
109	12	25	6	2	33	4	66
97	9	20	7	4	57	3	42
88	5	7.5	1	0	0	1	100
53	60	50	6	3	50	3	50
87	33	50	8	3	37	5	62
172	7	15	2	0	0	2	100
29	21	60	95	68	71	27	28
163	13	20	138	82	59	56	40
80	31	60	17	4	23	13	76
153	9	20	2	0	0	3	100
89	9	20	3	0	0	3	100
108	14	30	7	3	42	4	57
32	38	60	28	11	39	17	60
56	16	20	73	27	37	46	63
62	11	15	2	1	50	1	50
52	20	45	11	5	45	6	54
34	29	60	80	35	43	45	56
26	21	60	143	74	51	69	48
Total		1,485	1,418	660	46	758	53

B. SIX CASES CURED IN TWO TREATMENTS.

75	5	10	13	4	30	9	69
		10	1	1	100	0	0
Total		20	14	5	35	9	64
67	12	20	63	34	54	29	46
		20	5	2	40	3	60
Total		40	68	36	53	32	47
11	13	20	97	59	60	38	39
		25	14	6	42	8	57
Total		45	111	65	58	46	41
110	15	25	1,094	539	49	555	50
		25	48	25	52	23	47
Total		50	1,142	564	49	578	51
83	18	50	83	16	19	67	80
		50	9	0	0	9	100
Total		100	92	16	17	76	82
15	27	60	1	1	100	0	0
		60	0	0	0	0	0
Total		120	1	1	100	0	0
Aggregate (6)		375	1,428	637	48	741	51

C. SIX CASES CURED IN THREE TREATMENTS.

Case No.	Age	Thymol	Worms collected				
			Total	Males		Females	
				Number	Per cent.	Number	Per cent.
103	6	7.5	23	17	73	6	26
		10	20	15	75	5	25
		10	19	13	68	6	31
Total		27.5	62	45	72	17	27
111	10	20	449	266	59	183	40
		20	22	11	50	11	50
		20	3	0	0	3	100
Total		60	474	277	58	197	41
44	12	10	113	55	48	58	51
		10	0	0	0	0	0
		20	0	0	0	0	0
Total		40	113	55	48	58	51
27	18	20	122	56	45	66	54
		20	25	12	48	13	52
		30	23	9	39	14	60
Total		70	170	77	45	93	54
66	14	20	54	28	51	26	48
		20	8	4	50	4	50
		25	10	5	50	5	50
Total		65	72	37	51	35	48
39	16	20	359	183	49	186	50
		25	162	68	41	94	58
		30	7	3	42	4	59
Total		75	528	254	47	284	52
Aggregate (6)		337.5	1,429	745	52	684	47

D. ONE CASE CURED IN FOUR TREATMENTS.

78	17	25	2,246	1,048	46	1,198	53
		25	26	(?)	(?)	(?)	(?)
		25	2	1	50	1	50
		25	3	0	0	3	100
Total		100	2,277	1,049+	47	1,202+	53

E. ONE CASE CURED IN FIVE TREATMENTS.

23	10	12	54	40	74	14	25
		15	11	5	45	6	54
		12.5	218	52	23	168	76
		15	1	1	100	0	0
		20	11	1	9	10	90
Total		74.5	295	99	33	196	66

F. TWO CASES CURED IN SEVEN TREATMENTS.

24	12	20	109	49	44	60	55
		20	267	91	34	176	65
		20	53	15	28	38	71
		25	24	6	25	18	75
		25	36	10	27	26	72
		25	8	2	25	6	75
		25	9	0	0	9	100
Total		160	509	173	34	333	65

F. TWO CASES CURED IN SEVEN TREATMENTS—Continued.

Case No.	Age	Thymol	Worms collected				
			Total	Males		Females	
				Number	Per cent.	Number	Per cent.
63	16	10	374	159	42	215	57
		15	5	1	20	4	80
		25	218	67	30	151	69
		15	0	0	0	0	0
		25	15	2	13	13	86
		30	19	4	21	15	78
		30	2	1	50	1	50
Total		150	633	234	36	399	63
Aggregate (2)		310	1,139	407	35	732	64

Tabulating the summaries according to the number of treatments, we obtain the following:

	Cases	Treatments to cure	Worms collected				
			Total	Males		Females	
				Number	Per cent.	Number	Per cent.
A	43	1	1,418	660	46	758	53
B	6	2	1,428	687	48	741	51
C	5	3	1,429	745	52	684	47
D	1	4	†2,251	1,049+	46	1,202+	53
E	1	5	295	99	33	196	66
F	2	7	1,189	407	35	782	64
Total	*59	96	†7,960	3,647+	46	4,313	53

*The 58 cases given on p. 14, plus 1 case, in which worms were not found in the stools.
†Plus 26, sex of which was not determined.

From these tables it is not evident that the greater the percentage either of males or of females the greater the number of treatments necessary. Accordingly, it is not evident that there is any striking difference in difficulty in expelling males or females, so far as the number of treatments is concerned.

Summary.—In view of the statements published in reference to the proportion of the sexes in *Ancylostoma duodenale*, a study of the statistics in 102 cases of infection with *Necator americanus* is distinctly disappointing, and the conclusion seems justified that whatever may the the practical value of estimating the sexes of *A. duodenale*, from a standpoint of obtaining a clue as to whether or not the cure is complete, this method of procedure, as applied to the average hospital case of *N. americanus*, does not appear to present any practical advantage. In fact, the method is much more tedious, more time consuming, and less reliable than our present method of microscopic examination, and therefore its adoption in our hookworm-eradication campaign is not to be recommended.

As a purely academic matter, it is interesting to note that of 13,080 specimens of *Necator americanus* collected from 102 cases 46 per cent of the specimens were males and 53 per cent were females; but the proportion for different cases varied, some cases presenting more males than females, others more females than males.

Of 102 cases examined 37 presented an excess of males, 9 presented an equal number of males and females, and 56 presented an excess of females.

In 58 cured cases in New Hanover county, N. C., the greatest number of worms collected from any one case was 2,277; the smallest number 1; the average number 135.

About 75 to 95 per cent of the worms of a given course of treatment may be passed within 12 hours after the early (6 a. m.) dose of thymol, and worms may continue to pass for several, apparently for at least 6, days following.

From this latter fact the important practical conclusion may be deduced that treatment once per week, as is usual at present, is as frequent as it seems either necessary or wise to give it. Treatment more often than once a week may be entirely unnecessary, even if eggs be found the fifth day after treatment; and since the factor of safety to the patient should be constantly held in mind, thymol treatment oftener than once a week seems justified only in exceptional cases which may present special features or circumstances that indicate the practicability of more frequent dosage.

HOOKWORM DISEASE—NUMBER OF TREATMENTS AND NUMBER OF FULL DOSES OF THYMOL ADMINISTERED IN 61 HOSPITAL AND 22 HOME-CURED CASES OF HOOKWORM INFECTION.[1][2]

By CH. WARDELL STILES, Professor of Zoology, and GEO. F. LEONARD, Assistant,[3] Hygienic Laboratory, United States Public Health Service.

In this paper the term "cured" means that a week or more after treatment a microscopic re-examination of the patient gave negative results.

In practical hookworm-eradication work the question is frequently asked, "How long does it take to cure a case?" This question has a practical basis from the standpoint of the patients, for many of them refuse to take a second course of medication. From the standpoint of the person giving the treatment the question has a double significance: (1) The greater the number of patients who can be cured in a single treatment the more rapidly will a certain—and a very important—part of the work be finished. (2) Many patients are, however, very ignorant and can not be relied upon—as experience shows—to carry out directions; accordingly, the clinician has his choice between (a) assuming a certain amount of risk by giving a larger dose, and (b) giving repeated treatments with smaller doses, thus giving to himself and to the patient a greater amount of trouble but at the same time increasing the factor of safety for his patient; running the risk, however, that his patient will not return for more than one treatment, and therefore possibly leaving one more uncured case at large to infect other people.

There are known to us not less than 11 deaths in this country, due, so far as it has been possible to determine, either to following thymol with castor oil instead of with salts, or to carelessness in respect to following out the usually adopted procedure. But whatever the explanation of these deaths may be, the fact remains that many patients whom we treat are exceedingly ignorant and illiterate and are unreliable when it comes to following out instructions.

It is therefore more than an academic matter to determine how small a dose can cure or does cure a case of hookworm infection, and the extent of the infection in question.

The present paper contains two series of cases—one series treated in the hospital, the other at home.

[1]Reprint from the Public Health Reports, Vol. XXVIII, No. 3, Jan. 17, 1913.
[2]Read at the XVth International Congress on Hygiene and Demography, Washington, September, 1912.
[3]With North Carolina State Board of Health since June 1, 1912.

In a certain cotton mill village in eastern North Carolina, 267 inhabitants (140 males, 127 females) out of a population of 700 volunteered for microscopic examination. Thus 38.1 per cent of the population volunteered.

Of these 267 (white) inhabitants, 140 persons (or 52.4 per cent) were found infected with hookworms.

Of 140 males, 79 persons (or 56.4 per cent) and of 127 females, 61 persons (or 48 per cent) showed hookworm infection.

Most of the patients mentioned in this paper came from the cotton mill in question.

Number of treatments of females.—A number of the females were treated at their homes, with a mill nurse to visit them during the day of medication. In some instances it was impossible to obtain specimens to determine whether or not the treatment was complete in results, but the following data may be reported.

Total number of females examined, 127; found infected, 61 persons, or 48 per cent; treated, 52; cured, 19; data incomplete in 33; not treated, 9.

Treated 1 or more times, 52; cured in 1 treatment, 12; not cured in 1 treatment, 21; data incomplete in 19.

Treated 2 or more times, 21; cured in 2 treatments, 7; not cured in 2 treatments, 5; data incomplete in 9.

Treated 3 or more times, 5; cured in 3 treatments, ?; not cured in 3 treatments, 1; data incomplete in 4.

Treated 4 times, 1; data incomplete.

Number of treatments of males.—The following tabulation gives the male cases treated at the hospital and also [in brackets] male cases treated at home.

Treated 1 or more times, 94 [+9]; cured in 1 treatment, 45 [+3]; not cured in 1 treatment, 15 [+1]; data incomplete in 34 [+5].

Treated 2 or more times, 29 [+1]; cured in 2 treatments, 6; not cured in 2 treatments, 14 [+1]; data incomplete in 9.

Treated 3 or more times, 14 [+1]; cured in 3 treatments, 6; not cured in 3 treatments, 6 [+]; data incomplete in 2.

Treated 4 or more times, 6 [+1]; cured in 4 treatments, 1; not cured in 4 treatments, 5 [1].

Treated 5 or more times, 5 [+1]; cured in 5 treatments, 1; not cured in 5 treatments, 3 [+1]; data incomplete in 1.

Treated 6 or more times, 3 [+1]; cured in 6 treatments, 0; not cured in 6 treatments, 2 [+1]; data incomplete in 1.

Treated 7 or more times, 2 [+1]; cured in 7 treatments, 2; not cured in 7 treatments, [1].

Comparing the male hospital cases with the male home cases and the female (home) cases, it is clear that a greater proportion (45 in 94 equal 47.8 per cent) of cures on 1 treatment are known for the hospital than for the home cases (15 in 61 equal 24.5 per cent). That this result is not due entirely to incomplete data is rendered probable by two facts: (1) That there is a smaller number of known incomplete cures in 1 treatment (15 in 94 equal 15.9 per cent) for the hospital than for the home cases (22 in 61 equal 36 per cent), and (2) in leaving thymol at the home the tendency in all cases is to leave smaller doses so as to increase the factor of safety to the patient, in view of the risks necessarily connected with leaving the drug among people who can not be relied upon to carry out directions, even when printed directions are given. In other words, a larger dose of thymol given under hospital conditions involves less of a risk to a patient in a given physical condition than it does to the same patient at home, and we are fully justified in giving larger doses in hospital practice.

Total size of dose used.—Tabulation of the cured cases in question, according to the total amount of thymol used per age of patient, gives the following results:

TABULATION OF NINETEEN FEMALE CASES CURED AT HOME.

A&E	No.	Basic maximum single dose of thymol	First dose	Second dose	Total dose of thymol	Portion of sinhle basic maximum dose for age
7½ years	1	15	5	5	10	0.66
12 years	1	30	10	----	10	.33
12½ years	1	30	12½	----	12.5	.41
13 years	1	30	15	----	15	.50
15 years	2	45	20	----	20	.44
16 years	1	45	12½	12½	25	.55
16 years	1	45	30	30	60	1.33
17 years	1	45	25	----	25	.55
18 years	1	45	40	----	40	.88
18 years	1	45	35	35	70	1.55
19 years	1	45	35	----	35	.77
20 years	1	60	35	----	35	.58
21 years	1	60	40	40	80	1.33
22 years	1	60	50	----	50	.83
23 years	1	60	40	40	80	1.33
25 years	1	60	45	45	90	1.50
26 years	1	60	30	----	30	.50
45 years	1	60	30	----	30	.50
Total	19	825			717.5	.87

From the foregoing tabulation it is seen that of 19 complete cures in home treatment, 12 had only one treatment and 7 had two treatments each; 14 were cured with less than a full dose of thymol, and 5 had above one full dose, but not over one and one-half full doses.

Illustrating the possibilities of accident, even when the patients are cautioned as to details, it may be stated that a few moments after one of the children took her thymol, some kind neighbor learning that the child had had no breakfast attempted to give to the patient some wine: It was only by a mere chance that the good intentions of the kind neighbor were frustrated, and thereby that probable accident was avoided.

Although it was not feasible to draw a comparison in these cases between the size of the dose and the number of worms passed, the table shows that some cases may be cured at home in one course of treatment with even as low as one-third of the present standard dose.

AGE	Number	Basic maximum single dose of thymol	First dose	Total thymol given	Portion of single maximum dose given
5 years	1	15	3	3	0.2
6 years	1	15	5	5	.33
7 years	1	15	7½	7½	.5
Total	3	45	15½	15½	.34

In case of these children it was distinctly unwise to give the maximum dose for the age group, and all three were cured with half a dose or less. In one other case, seven home doses (small) failed to effect a complete cure.

It was not feasible to count the worms in these cases.

TABULATION OF SIXTY-ONE CURED HOSPITAL MALE CASES, ARRANGED ACCORDING TO AGE AND DOSE.

Age	No.	Basic maximum dose	First dose	Second dose	Third dose	Fourth dose	Fifth dose	Sixth dose	Seventh dose	Total thymol	Portion of single maximum dose given	Worms collected
5 years	1	15	7.5	----	----	----	----	----	----	7.5	0.5	1
5 years	1	15	10	10	----	----	----	----	----	20	1.33	14
6 years	1	15	7.5	10	10	----	----	----	----	27.5	1.83	62
7 years	1	15	15	----	----	----	----	----	----	15	1	2
7 years	1	15	15	----	----	----	----	----	----	15	1	5
8 years	1	15	10	----	----	----	----	----	----	10	.66	42
9 years	1	15	20	----	----	----	----	----	----	20	1.33	2
9 years	1	15	20	----	----	----	----	----	----	20	1.33	3
9 years	1	15	20	----	----	----	----	----	----	20	1.33	7
9 years	1	15	20	----	----	----	----	----	----	15	.5	0
10 years	1	30	15	----	----	----	----	----	----	20	.66	1
10 years	1	30	20	----	----	----	----	----	----	20	.66	19
10 years	1	30	20	----	----	----	----	----	----	74.5	2.48	295
10 years	1	30	20	15	12.5	15	20	----	----	60	2	474
10 years	1	30	12	20	20	----	----	----	----	15	0.5	2
11 years	1	30	15	----	----	----	----	----	----	25	.83	2
11 years	1	30	25	----	----	----	----	----	----	25	.83	4
11 years	1	30	25	----	----	----	----	----	----	25	.83	21
12 years	1	30	25	----	----	----	----	----	----	25	.83	6
12 years	1	30	25	----	----	----	----	----	----	30	1	7
12 years	1	30	30	----	----	----	----	----	----	40	1.33	113
12 years	1	30	10	10	20	----	----	----	----	40	1.33	69
12 years	1	30	20	20	----	----	----	----	----	160	5.33	506
12 years	1	30	20	20	20	25	25	25	25	20	.66	138
13 years	1	30	20	----	----	----	----	----	----	25	.83	1
13 years	1	30	25	----	----	----	----	----	----	25	.83	1
13 years	1	30	25	----	----	----	----	----	----	45	1.5	111
13 years	1	30	20	25	----	----	----	----	----	70	2.33	170
13 years	1	30	20	20	30	----	----	----	----	20	.66	150
14 years	1	30	20	----	----	----	----	----	----	25	.83	0
14 years	1	30	25	----	----	----	----	----	----			

TABULATION OF SIXTY-ONE CURED HOSPITAL MALE CASES, ARRANGED ACCORDING TO AGE AND DOSE—Continued.

Age	No.	Basic maximum dose	First dose	Second dose	Third dose	Fourth dose	Fifth dose	Sixth dose	Seventh dose	Total thymol	Portion of single maximum dose given	Worms collected
14 years	1	30	25							25	.83	9
14 years	1	30	30							30	1	4
14 years	1	30	30							30	1	7
14 years	1	30	20	20	25					65	2.16	72
15 years	1	45	25	25						50	1.11	1,142
16 years	1	45	20							20	.44	73
16 years	1	45	30							30	.66	3
16 years	1	45	20	25	30					75	2.33	538
16 years	1	45	10	15	25	15	25	30	30	150	3.33	633
17 years	1	45	25	25	25	25				100	2.22	2,277
18 years	1	45	45							45	1	(?)
18 years	1	45	50	50						100	2.22	92
19 years	1	45	45							45	1	37
20 years	1	60	45							45	.75	11
20 years	1	60	45							45	.75	72
20 years	1	60	50							50	.83	7
21 years	1	60	60							60	1	95
21 years	1	60	60							60	1	143
23 years	1	60	60							60	1	167
24 years	1	60	60							60	1	24
25 years	1	60	45							45	.75	44
26 years	1	60	42.5							42.5	.70	6
27 years	1	60	60	60						120	2	1
29 years	1	60	60							60	1	80
30 years	1	60	45							60	1	8
31 years	1	60	60							60	1	17
33 years	1	60	50							50	.83	8
36 years	1	60	50							50	.83	58
37 years	1	60	60							60	1	97
38 years	1	60	60							60	1	28
60 years	1	45	50							50	1.11	6
Total	61	2,355								2,722	1.15	12,980

From the foregoing table it will be seen that of 61 cured hospital cases in this series 45 received 1 treatment; 6 received 2; 6 received 3, 1 received 4; 1 received 5, and 2 received 7 courses of treatment. If, however, we base the comparison on the standard maximal dose for the age group in question, the following results are obtained: 4 cases were cured with a total of 0.5 of the maximal dose or less; 21 with between 0.5 and the maximal dose, 16 with the maximal dose, 10 with a total dose of between 1 and 2 maximal doses; 8 cases with a total dose of from 2 to 2.48 maximal doses; 1 case was cured with 3.33 maximal doses; and 1 with 5.33 maximal doses; a total of 61 were cured with a total dose averaging 1.15 maximal dose.

Comparing now the 61 hospital with the 22 home cases it is seen that while, from a standpoint of caution, a smalled number of home cases were cured on 1 treatment, the cures in general were effected with smaller sized doses (average 0.84) than those used in the hospital cases (average 1.15).

From the hospital cases it is seen that in the cure of 58 cases 2,637 grains of thymol were used and that from the stools of these patients 12,980 worms were collected. Thus, on an average, 1 grain of thymol expelled at least 4.7 worms. This conclusion it not, however, of any significance, for in 1 case 60 grains expelled only 1 worm, while in one course of treatment 25 grains expelled 2,246 worms (an average of 89.8 worms per grain of thymol).

CONCLUSIONS.

The general conclusions from the foregoing study seem to be:

(1) The present more or less frequently expressed desire to increase the dose of thymol considerably in excess of the present generally accepted maximal doses is not entirely unnatural, in view of the fact that so many patients fail to follow out the treatment until all the worms are expelled, and therefore a considerable number of persons continue to distribute the infection.

(2) Many cases of hookworm infection are cured by less than one maximal dose for the age group in question.

(3) When the thymol treatment is properly carried out, namely, when it is given under proper precautions, and the margin of safety to the patient is properly safeguarded, the present maximal doses seem to be entirely safe.

(4) The fact can not, however, be ignored that many of our patients are ignorant and illiterate, and can not be relied upon to carry out directions, and if the thymol dose in home treatment is in general increased this must be done with a distinct risk that involves a totally unnecessary danger to a large number of patients who may be completely cured with less than the present maximal dose.

(5) In view of the fact that not less than 11 deaths have occurred in the United States because of following thymol with castor oil instead of with salts or because of carelessness on the part of the patient or his family, we do not consider it wise to have a general increase in the size of the dose of thymol in the home-treatment cases. We entirely concur with the field men who in clinic practice cut the doses down below the present accepted maximal dosage.

(6) With an increase of sanitary privies, or with a repetition of smaller doses, the same eventual curative result will be obtained as would follow with an increased single dose of thymol; and while the former plan will take a longer time, it involves less risk and the improved sanitation will give additional results in other diseases.

SOCIAL HYGIENE VS. THE SEXUAL PLAGUES

By the Indiana State Board of Health.

Do you know that gonorrhea is said to be the most widespread disease among the adult male members of the human family, and in the light of increased knowledge is held to be doing more harm to the race than syphilis?

Do you know that medical observation indicates that 80 per cent of males, between the ages of 18 and 30 years, contract gonorrhea?

Do you know that a majority (some hospital authorities assert 70 per cent, others 85 per cent) of abdominal and pelvic surgical operations on women are the result of gonorrheal infection, in many cases ignorantly transmitted by the husband?

Do you know that a husband may infect his wife with either syphilis or gonorrhea long after he may think himself free from the disease?

Do you know that gonorrheal infection is responsible for 20 to 30 per cent of blindness? (Formerly an asserted 80 per cent until the discovery of the Crede method of applying a solution of nitrate of silver to the eyes of the new-born.)

Do you know that gonorrhea is the principal cause of race suicide? (This from superinducing certain abnormal changes in the reproductive tract of the male by which the process of fertilization is interrupted.)

Do you know that gonorrhea permanently maims one in a hundred—kills one in two hundred?

Do you know that practically every prostitute is infected, if not today then tomorrow, and continuously as long as she follows prostitution.

Do you realize the extent of this dangerous disease in high school, college, university, private and preparatory school—in store, mill, shop, office and boudoir? Per examples: A girl, in an Indiana school, recently seduced and contaminated thirteen boys attending the school. But a short time ago, the mayor of an Indiana city called a meeting of fathers, to place before them the alarming extent of infection among the boys of the community.

You are asked the foregoing questions in order that you may be brought to realize the wide extent by which the homes of the American people are being invaded by one of the most dangerous diseases known to the human family. The social diseases, shielded by what has been termed the "Anglo-Saxon sense of prudery," are doing enormous damage to the race. The lack of correct information among the masses of the people as to their extent and danger, constitutes one of the most menacing problems of American civilization. Has not the time come for parents, and in fact for all thoughtful citizens, to abandon the false delicacy, the prudery, which, by surrounding sex nature with absurd mystery, invites the destruction of national health?

Young men are taught in school the physiology of the brain, heart, lungs, stomach, and other vital organs. Why should such instruction cease when it comes to the most important function of the body—that of reproduction on which depends the perpetuation of the species? The health of the reproductive organs also has an important effect on the other organs of the individual. Is it not social stupidity to insist on the education of young men in arithmetic, geography, grammar, and in other branches which fit them for business life, and at the same time deny them proper knowledge of a function, the impairment of which constitutes a most destructive assault upon their physical and mental capacity and unfits them for success?

If four-fifths of the young men of the United States contract gonorrhea, may not one of these young men be your son? It is asserted that from 8 to 18 per cent (there are no official statistics) of American young men contract the syphilitic infection. May not one of this latter percentage be your son? Have you ever warned him as to the malignant and widespread character of the social diseases? If you have not, are you not in part responsible for the great misery that may come to him? Why permit a son ignorantly to contract the poisons of diseases which have injured or destroyed more lives than any other disease? Is the young man not entitled to social protection, to warning, to knowledge, to moral exhortation?

If the subject is too "delicate" for you to discuss in your home life, if your "moral susceptibilities" will not permit you to establish such a confidential relation with your son, why not dispose of the matter in a sensible way and turn the problem over to the school educators? They stand ready and willing to give you such instruction as soon as you say the word. Since a young man must learn of his sex nature some time, which is the better for him—the wholesome and noble truths of science and morality, or misleading, degrading street or "curb-stone" information that today often constitutes his sole knowledge? Which kind of information is best designed to strengthen a young man in moral resolution, to help him in a determination to remain pure in heart and body, to guard him between the ages of 12 and 21, when the will is unstable, and during which period many contaminations are incurred? It has been established that a large number of contaminations among young men are the result of sheer "curiosity." Without knowledge as to the seriousness and universality of prostitutional disease, thousands of young men fall into the venereal trap practically without warning, and thus become infected with poisons which may cause them lifelong anguish. Ignorance is always a curse and knowledge a blessing.

Bacteriologists tell us that not many disease germs known to them can survive a few hours of sunlight. Tuberculosis shows a statistical decline under the light of popular knowledge. Widespread information

will certainly do much to minimize the virulency and extension of venereal infection. Secrecy, with its 80 per cent of young men infected with gonorrhea and from 8 to 18 per cent infected with syphillis, has certainly forfeited any rights it may once have had as a sane social or public policy.

Earnest physicians and scientists who make a study of the difficult problem stand almost as one in the opinion that when a broad system of popular education in sexology or social hygiene is established, the first step will have been taken in intelligent public warfare against the venereal scourges. Our best physicians are thoroughly alarmed over the vast extent of venereal infection. The great cities, themselves rapidly becoming venerealized, are serving as centers for the distribution of infection to the population outside the cities that previously has remained comparatively free from contamination and from which the nation in the past has drawn its reserve strength. This is a development caused by the passing of rural isolation with its condition of enforced sex probity. The trolley, good roads and cheap transportation have made communication easy between the city and country. Public health is paying the price. A wide national effort is now being made to arouse parents to the seriousness of the situation. Should you not do your part in preventing the advance of the social scourges?

There are some well meaning people who still cling to the old-fashioned moralist view that venereal affliction is the just punishment of those who violate the Seventh Commandment, and therefore nothing should be said or done. The weakness of this view is that the evil worked is not confined to the transgressor. The infection is often brought home and transmitted to innocent wife and child. It will hardly be contended that the Supreme Intelligence ever intended a human being should contract a loathsome disease and then infect the innocent. The so-called moralist view will not stand the light of twentieth century analysis. The truth made manifest shall make men free.

Prince A. Morrow, A. M., M. D., Emeritus Professor of Genito-Urinary Diseases in the University and Bellevue Medical College and Surgeon to the City Hospital, New York, president of the American Society of Sanitary and Moral Prophylaxis, has written much and ably in an effort to get the fearful venereal truths before the people. In a talk before the Y. M. C. A., Indianapolis, April 10, 1907, Dr. W. N. Wishard, Professor of Genito-Urinary Surgery in the Indiana Medical College, quoting Dr. Morrow, said in references to the venereal diseases:

> We may well ask why certain infectious diseases are elevated to the dignity of a danger to the public health and every effort made to prevent their spread, while another class of diseases, compared with which the morbidity of the former is but a molehill to a mountain, is completely ignored.

The venereal diseases are social assassins. They spare neither virtue nor innocence. Who deny the existence of an assassin by professing to ignore his presence? Is that wise, brave, or in any sense good policy? It would seem to be very much like the policy of the silly ostrich which, hiding its own eyes to danger, believes it is secure.

REPORT OF COMMITTEE OF SEVEN.

In pursuance of a resolution adopted by the Medical Society of the County of New York in 1901, a Committee of Seven was appointed for the "Study of Measures for the Prophylaxis (prevention) of Venereal Diseases." Dr. Morrow acted as chairman of the committee and Dr. L. Weiss as secretary. A report of the committee was issued from the press of the Medical News, New York City, December 21, 1901. The report states that circulars were sent to each of the 4,750 resident physicians and to all hospitals, dispensaries, etc., in greater New York, making inquiry as to the character and extent of venereal infection. The figures are:

Total new cases gonorrhea and syphilis for one year.....243,000
Total old and new ones.....800,000

The foregoing figures do not include the destructive chancroidal infection. The United States census figures give greater New York, for 1900, a population of 4,113,043. Thus it will be observed that about every fifth person in New York, men, women and children included, is or has been infected with venereal poison.

Notwithstanding the terrible import of these statistics, they appear to hold little, if any, meaning to the New York Board of Health. In an article contributed to the Journal American Medical Association, Chicago, Ill., March 4, 1905, Dr. Morrow says he approached two successive administrations of the health department of New York City and urged the adoption of a method of sending out circulars of warning to the general public somewhat after the manner of diffusing popular knowledge as to tuberculosis. Dr. Morrow says his request was refused on the ground that such circulars would "offend the moral susceptibilities of the community."

Thus it goes on year after year, from 250,000 to 300,000 persons residing in or near New York City initially infected annually with the poisons of diseases fully as deadly in eventual race effects as any scourges known to mankind But nothing must be said. It might "offend the moral susceptibilities of the community." Think of the unborn generations that must bear the stigmata, the physical ills and deterioration as the result of such tender "moral susceptibilities." It would seem these "moral susceptibilities" are not very tender when it comes to injuring the innocent.

The Committee of Seven in its report sadly says:

> The estimate of the fruits of prostitution in New York City takes no cognizance of its incidence among the strangers within our gates. Among the million or more of the floating population of this city it is well known that many are worshippers at the shrine of Venus and carry with them to their homes sad souvenirs of their sojourn in the metropolis. In this rich harvest field of infection they often reap more than they sow.

Which paragraph means nothing more or less than a visitor to New York becomes contaminated, carries the infection back to his home, perhaps to wife or unborn, perhaps bringing a pure wife to the operating table; injury done to self and home; divorce—a marred business career.

Health, happiness and social dignity all dumped into the rot-pot of venereal poison. In justice to the unfortunate, he probably did not know that practically all prostitutes are infected. No one ever told him that.

It is only fair to state in behalf of New York, that it is not greatly worse than other large cities.

SYPHILIS.

The Century Dictionary defines syphilis as: "An infectious venereal diseases of chronic course communicated from person to person by actual contact with discharges containing the virus or by heredity. The initial lesion at the point of inoculation is the hard or true chancre; this after a short period is followed by skin affections of varied form, sore throat, with mucous patches and swelling of lymphatic glands and later by diseases of the bones, muscles, arteries and viscera." This disease is also known as the "pox."

The germ of syphilis is the spirochetae pallida, or the "pale, spiral-shaped" germ. It was established in 1895 by Schaudinn and Hoffman of Germany and is now generally accepted by the medical world. Metchnikoff, successor to Pasteur in Paris, states that the syphilitic germ has the effect of hastening old age. The spirochetae pallida is a very stubborn germ and destroys the phagocytes, or life-preserving scavenger police-cells of the blood, which are often unable to cope with such a stout adversary and the victim quickly ages. A syphilitic child often has the weazened face of an old man.

Medical view as to syphilis is being revised constantly. The disease has been thought curable, but since the isolation of the organism, the germ has been found in the brain and other parts of the body twenty years after the infection has been contracted.

Physicians say this disease is exceedingly infectious in its first stage and certain phases of the second stage.

L. Duncan Bulkley, A. M., M. D., New York City, in his book "Syphilis in the Innocent," states that the disease can be acquired from "kissing, biting, scratching, use of spoons, knives, forks, cups, glasses, tobacco, pipes, cigars, cigarettes, troches, candy, underclothing, masks, towels, sponges, toothbrushes, syringes, the implements used by glass-blowers, assayers, weavers, musicians, cooks, furriers, upholsterers, shoemakers and servants."

This is the disease responsible for an asserted 90 per cent of locomotor ataxia, a large per cent. of insanity (syphilis, acquired and hereditary,) for a great number of still-born children and for a heavy percentage of premature deaths of children, for apoplexy, paralysis and sudden death long after the disease is supposed to have been eliminated. Insurance actuaries hold that on an average syphilis shortens life one-third. Yet because of ignorance of the terrible character of this disease, it is not uncommon to hear a young man laughingly boast to a companion as if it were something to be proud of: "I've caught a dose of chancres." What a mockery!

This disease has been found not infrequently in the public schools and colleges. Yet no word as to its character or existence is permitted to be said in some of the schools even to more mature pupils. How long must such a debauchment of American manhood continue? What an enormous bill of damages is laid to the door of prudery—"social cowardice," if you please!

Again, it is not permitted to say to a young man: "If after being warned you go deliberately to the prostitute and contract this disease, you should consider yourself a social menace until informed that you are no longer an infectious agent. Moreover, young man, you have no moral, physical, or social right to enter into the state of marriage until you have been pronounced free from it, for if you are not free from it you may infect your wife, bring dead or diseased children into the world, this inflicting a wrong not only on the innocent, but on society."

Has not the time also come when a woman shall have the tacit right to say to a young man who may ask her hand in marriage: "You demand chasity from me. In return, I ask that you certify that you have the physical right to become my husband and the father of a family.

GONORRHEA.

The Century Dictionary defines gonorrhea as follows: "In pathology a specific, infectious, muco-purulent inflammation of the male urethra or the female vagina or urethra."

The belief that gonorrhea and syphilis were but the different expressions of a single disease held sway from the earliest knowledge of the disease, 2,000 years before Christ, until the year of 1838, when they were finally differentiated. In 1879, a physician named Niesser discovered the specific organism of gonorrhea. The organism or germ is called "Niesser's gonococcus." Gonorrhea is also known in vernacular as "clap," from the old French word "clapior," meaning "to flow."

J. Bayard Clark, M. D., surgeon to Bellevue Hospital, New York, in an address before the Medical Society of the county of Westchester, at Yonkers, November 21, 1905, address published in the New York Medical Journal, March 3, 1906, said:

> It was not many years ago that gonorrhea was looked upon as a local inflammation which ran in a majority of cases a mild course ending in complete cure. Today we recognize in gonorrhea a formidable infection, which has invaded every tissue of the human body and from which no class of society is immune. Gonorrhea is said to be the most widespread and universal disease affecting the adult male population.

Following are some of the things that gonorrhea has done to many males and may do to any male who becomes infected and neglects the disease:

Causes stricture or narrowing of the urethra. The inflammation leaves a scar. The urine not being able to pass freely sets up an annoying irritation in the urethra. A stricture often can be removed only by a long course of painful treatment. A surgical operation is sometimes necessary.

Causes epididymitis or inflammation or swelling of one or both of the testes. Where there is double inflammation complete sterility may and often does result. Exceedingly painful and dangerous. Victim often suffers distinct loss of moral tone. Mental disturbances.

Causes inflammation of delicate ducts and vesicles in deep urethra, sometimes superinducing an abscess, very grave and painful, necessitating dangerous operation. Sterility is again sometimes the result. Often loss of moral tone and mental disturbance.

Causes gonorrheal rheumatism, one of the most painful diseases in medical knowledge. Here the germ enters the blood, finds a home in the joints, which swell to enormous size, with extreme suffering. Ankylosis, or stiffening of the affected joints, is not infrequent, leaving the sufferer a permanent cripple.

Causes gonorrheal ophthalmia. Gonorrheal pus transferred to the eye may extinguish sight in a few hours. It is an exceedingly stubborn and dangerous affliction.

Causes disease of the prostate gland. The prostate gland situated at the neck of the bladder, is the "heart of the sexual system." Infection of that organ may be the cause of the disease becoming chronic or incurable with destructive effects on the generative function. Abscess sometimes results, necessitating a serious surgical operation. Deep melancholy and suicidal tendency sometimes develop.

Couses of tendency, it is thought, toward tuberculosis of prostate gland and testes, resulting in dangerous and often fatal surgical operations.

In woman, causes inflammation of the ovaries, the Fallopian tubes and the uterus, often necessitating radical surgery to save life of victim. Barrenness and life-long invalidism are, of course, the result.

Yet this is the disease referred to by many misled men who say: "I would just as leave have it as a bad cold." Think of the vicious popular ignorance that permits of a statement like that! Think of the youth of the country being brought up on such carrion talk! Well may it be said in the words of Sir Oliver Surface, as he raises his hands to heaven: "Mercy upon me! I shall never forgive him this! Never!

It has been learned that the gonococcus may sometimes remain in a quiescent or attenuated state in the urethra for a considerable period—often for years; that the infected may suffer no immediate inconvenience; in fact, he or she may consider themselves free from the infection, but when this germ is transplanted to a virgin or fresh soil it may resume its malignancy. The fact that many unhappy wives have undergone severe or fatal surgical operations, places a seal of truth upon this statement. A majority of these wives were clean and virtuous women; they married men "who had gone the pace;" these men brought to their wives the "germ of debauchery," in most cases unwittingly, only to learn, too late, they have ruined the woman of their choice.

In justice to the human race it must be maintained there are but few men, however immoral or debased, who would deliberately infect their wives. It is ignorance,—lamentable, fearful, widespread ignorance that is largely responsible for these disasters to pure womanhood—certainly not wilful intent. Does not every principle of human justice, of real morality, call for decent public enlightenment?

In the "Critic and Guide," Dr. Wm. W. Robinson, editor, New York City, May, 1907, is the story of "Rose and Edward." There is nothing in life quite so tragic as this type of story. There are thousands of similar incidents. The story is told in popular vein and in brief is as follows:

Rose was 22, bright, cheerful and joyous of the future. It was her happiest day, for she had just married Ed, a rising young lawyer, age 28. Ed was a kind-hearted gentleman—a real gentleman in the finest sense of the word. Just the man for Rose. They were married in October. They expected to stay away three months on their honeymoon, but they returned after about three weeks. Rose was not feeling well. Hotel life had not agreed with her. She looked haggard and fagged out. Rest did not seem to do her any good. She began to fail rapidly, and was suddenly seized with severe pain. The physician announced that in order to save her life an immediate operation was necessary. On January 5 at midnight the bride was removed to a private hospital. The operation was a success, but you would not know Rose now. She aged ten years in ten weeks. She is making no plans; she has no hopes; she is dreaming no dreams. Never again will she be the happy Rose that she was before she became a wife. Never will her home be gladdened by the noise, romp and laughter of little children. A confidential talk was had by the physician with Mr. Edward. Ed couldn't remember at first, but finally admitted under persistent questioning, that he had suffered from a little "strain" about two years before. It was mild. It had not bothered him much. He had gone to a physician who "fixed him up in a couple of weeks." Edward was requested to submit to an examination. The examination showed the presence of the fatal gonoccus. The despair of Mr. Edward that he was the unwitting cause of his wife's ruin can be better imagined than described.

As to the terrible wrong done innocent children by the gonorrheal infection, the following is quoted from a lecture delivered by Prof. J. O. Stillson, Oculist and Surgeon to the Indianapolis City Hospital and the Protestant Deaconess Hospital, Indianapolis, before nurses and internes, May, 1898:

Someone has said that the surgeon to be really worthy of the name must have the eye of an eagle, the courage of a lion, the hand of a maiden and the heart of a dove. Certainly one can say that if ever in the life of a physician there comes a time when all the sterling qualities of his character are called for and put to the severest possible test, it is when he is brought face to face with one of those cases of gonorrheal eye disease of the new born infant in a cultured and refined family. Here the oculist needs to be, yea, has to be! brave, shrewd, tactful, skillful, gentle, firm, pliable, severe, diplomatic, frank, sincere and truthful all at the same time; in fact, absolutely dependable. He is, to use a common phrase, "up against it, and no mistake." Generally it is the fourth or fifth day, sometimes the tenth or fourteenth day after birth. The family physician has done his best, the poor nurse has borne the blame of "having taken the baby to the light too soon," or she "neglected to properly clean it" or somebody "put breast milk in its eyes," etc. Vanity of vanities; all is vanity, sayeth the preacher! Behold that beautiful young mother as she lies there in all her purity, innocence and sweetness! The eloquence of her agonizing countenance melts your heart. Oh, yes, Mr. Oculist, you must now begin your deception. "It is a very mysterious case. There is no way in the world to account for it," etc. What is the use of poisoning her heart and wrecking her hap-

piness and blasting all her life! This is no time to talk. The less said is the easiest mended. There also stands the husband. Look at his knees: how they smite together. See the lines of his drawn countenance! How his lips quiver! Or perhaps, poor fellow, he does not know what a fool he made of himself that time when he "went down the line." Charity, charity, brother; have charity in your heart for the ignorance of common humanity. Silence again becomes golden. But the baby! The baby! Now here is where your heart does break in twain. You almost look up to God and feel like asking Him, "Why did You do this? Why did You make it thus that this innocent, helpless, defenseless being should pay the price, should bear the blame of that father's ignorance and folly?" But what meets it—philosophy or reflection at this point? What you are for, Mr. Oculist, is to save this babe from the blind asylum. It is up to you. And woe be unto you if you fail—should the child come out blind. So here is where your truthfulness, bravery and skill come in, and first it is absolutely necessary to see and know whether the eyeball is perforated. If it is, that settles it. You stop and simply say: "I can not save this eye. It is gone." But if it is not perforated, then, quick, quick with your lariat of the silver salts to head off the deadly tarantula from sleeping innocence and all is well.

Set forth succinctly, Prof. Stillson's lecture means that gonorrheal infection is responsible for the blindness of many children. He presents the drama of the unsuspecting wife, the innocent babe, the nurse with sealed lips, the guilty father, the unhappy family physician confronted with a serious domestic crisis, and the oculist called in at the eleventh hour, who must glibly lie to save the situation all around. The infection is often transmitted by husband to wife shortly before the birth of the child. The infection finds its way into the eyes of the babe by contact with the maternal passages during birth. Men know where they get the infection. Before exposing themselves to the infection, men should think of the blind beggar on the street corner, who, with rolling white eyeballs, clatters a tincup and beseeches pennies from the passers-by. A gonorrhealized father was probably responsible for the beggar's sad condition.

Medical literature abounds with distressing pictures of infection, stories of weird venereal accidents not greatly varying as to the baneful climax—differing only as to detail. Occasionally there is the diseased boy in military or preparatory school who is responsible for the loss of an eye of a companion by infecting a common towel, or the father who is blinded from bathing in a bathtub infected by his son. All this is very gruesome, very sad, but, alas, very true.

PROSTITUTION.

Prostitution, which has given the venereal diseases to humanity, is as old as humanity itself, and the venereal diseases are as old as prostitution. The polygamous or "more than one wife" instinct in the male is largely responsible for prostitution. While evolution is gradually impelling the male into monogamy, he is secretly rebellious. The polygamous instinct in him is still quite strong. On the other hand, the polyandrous or "more than one husband" instinct is practically extinct in the female. Sexual desire in her is a means to an end—maternity. In the male, sex gratification is still largely the end. Biologically (science of evolution), the female is the original, much older, superior, more refined type, the male

being a later development or offshoot from the female in the order of evolution. Thus while the female embodies in a large measure the intuitions, the emotional characteristics, the moral instincts of the race, the male by reason of his more recent origin has the larger share of primitive impulses. His passions are stronger, his morals less defined, and thus he is often thoughtless, cruel, relentless, and destructive in the pursuit of gratification. While evolution has assigned to the female the supreme function of the race, that of reproduction, yet at the same time she has been made physically dependent on the male who, released from the responsibilities of race perpetuation, is enabled to concentrate his energies to secure the means of existence. Largely holding the right of existence in his hands, enjoying this coigne of vantage, the male arrogantly dominates the weaker but superior type and levies sexual tribute upon her. Thus it is the male himself who compels and largely maintains the institution of prostitution, and prostitution can never be extirpated from society until the male becomes a creature of morals and calm reasoning intellect, instead of instincts. As punitive measures to force men into the monogamous relation necessary to the reproduction of the species, it would seem that the Supreme Intelligence has authorized the venereal scourges. Considered in their final aspect, these scourges are probably benevolent, since they drive men into the quiet family relation, the path of peace and industry. As an antidote to the fighting instinct in men, it is significant the scourges will disintegrate the strongest standing army in a few years. Though the scourges be benevolent, it is supremely important that as many members as possible of the human family shall be saved from infection.

It is useless to attempt an amelioration of prostitution or the eradication of its attendant evils by the application of radical measures. The moral radical the prosecution of prostitution, the more pestilential it becomes in its social consequences.

Prostitutes unduly oppressed, seek cover and practice clandestine prostitution often in the midst of respectibility. Clandestine prostitution is much more dangerous to public health than open prostitution, for in clandestine prostitution the hygienist has no power to cope with secret foci of disease. When not regulated too severely, there is a natural tendency among prostitutes to segregate or come together in a special locality.

In early days prostitutes were burned at the stake, drowned, scourged, branded, flayed and tortured in divers ways. But as one writer has stated, if all the prostitutes in the world were to be removed today, on the morrow the ranks would be completely filled with fresh recruits. The polygamous instinct in man causes the demand and the supply follows.

HYGIENE.

It may be taken as a medical truism that all public prostitutes are in a probable condition of gonorrheal infectiousness. Efforts to control this disease in brothels by a system of medical inspection have proved failures both in this and other countries. In Paris, where the system of regiementation or inspection has state sanction and high scientific direction, it is said venereal infection continues to show increase.

The effort of Cincinnati to reduce the amount of venereal disease by a system of medical inspection is set forth in Ohio Sanitary Bulletin, published by the State Board of Health, Columbus, Ohio, Janaury-March, 1907. Dr. S. E. Allen, Cincinnati, in an address at the annual conference of the State Board of Health of Ohio, January 24, 1907, describes the results of the inspection system of Cincinnati as follows:

The examination could not be made oftener than twice a week, and between examinations a woman might be infected, and, of course, a woman infected with gonorrhea does not get well, practically; that is, she may get well, but for a long time there is always more or less infection present. Then the great trouble with the whole thing was that it gave everybody a sense of security which did not exist; they thought that they were inspected, and here was a woman bearing a certificate from the board of health showing that she was healthy and that to the male would indicate that everything was all right, whereas it was not so. It gave them a false sense of security, so that I think less care was perhaps exercised and less trouble given to avoid those things, and in that way the effect of the inspection was counterbalanced. I am just as much up in the air as to the regulation of these diseases as I am to the regulation of doing anything for the whole nefarious business.

Gonorrhea as a hygienic problem in brothels seems to be unsolvable. Observation in public and private practice does not warrant the belief that more than 25 per cent of brothel prostitutes are at any time in an infectiously syphilitic condition. At this point the hygienist can be of value to society by demanding the prompt isolation of an infected inmate as a menace to the race. The physician or hygienist knows that young prostitutes living at home with small understanding of the value of hygiene, and that careless street prostitutes living in furnished rooms, are even more dangerous as disease breeders than brothel prostitutes. He would that all young men should know these truths, and he stands ready to furnish society with many other helpful suggestions as soon as society is ready to listen to him.

In view of the present moral standard of the race, many eminent venerealists are strong advocates of circumcision as a practical prophylactic measure against the ravages of syphilis. This meritorius sanitary rite which has stood the test for more than 5,000 years is practiced today by 15,000,000 Jews, 300,000,000 Mohammedans, by countless black men in Africa, and by thousands of Christians in all parts of the world. The Jewish race, which adopted the custom from an older nation, is remarkably free from syphilis. Circumcision is not a preventive, however, of gonorrhea.

Many physicians feel that if circumcision should become general in the United States that it would have a most beneficial effect in raising the standard of public health. Dr. William T. Belfield, a medical writer of authority and secretary of the Chicago Society of Social Hygiene, states in one of his essays that probably one-sixth of the American population is now infected with syphilis but with general circumcision this dreadful scourge would be lifted largely from American social life within forty years.

When circumcision is performed at an early age, the skin of the part becomes toughened by contact with the clothing—becomes somewhat like the palm of the hand. In case of exposure the skin does not easily abrade. If the scarf of the skin should not break, the syphilitic poison does not find entrance to the circulatory system, which is necessary to the development of syphilis.

Circumcision is also recommended as a preventive of self abuse among boys. The removal of the foreskin keeps the part clean and cool, with a resultant absence of annoying irritation. Circumcision also has been found efficacious in reducing the frequency of emissions.

MARRIAGE.

It must be considered that the sex relation properly understood is chiefly psychic (that is, mind attraction or congeniality of temperaments), the physical being but an incident of harmonious concordance with or submission to nature's mandate that there be reproduction of the species. Submission on the part of the male is associated with a sense of responsibility; as the head of a household, he becomes a factor of social consequence. Again, as husband and parent, stability and dignity and qualities of love, kindness and cherishing protection over wife and offspring are developed in him. The marriage relation thus rightfully understood and exercised becomes a function of supreme value to the state in that it gives new lives to the state, and by necessitating regularity of habits and a conservation of energy, increases the value of the male as an economic unit. The marriage relation should be the consummation of psychic affinity and should carry with it a manifestation of all the nobler atributes of man, fulfilling the poet's conception:

True love! 'Tis fashioned in a cup of gold.
Kindness, forgiveness, these the measure hold.

The needful psychic conditions are rarely if ever presented in mercenary prostitution. Love, esteem, self-respect, forgiveness, courage, sense of social obligation and hope certainly do not form the psychical basis of public prostitution. On the other hand, as the conspicuous and inevitable concomitants of an atmosphere of harlotry are to be found hatred, contempt, self-loathing, quarrelsomeness, fear, criminal impulse and despair. Such an atmosphere is deeply antagonistic to the development of the higher nature of man.

MORALS.

In its last analysis, from whatever standpoint the problem may be considered, it is clearly one of morals, and it cannot be met on any other basis with a hope of accomplishing lasting results. Should the hygienist enter into the problem with the determination to surround prostitution with physical immunity, he tacitly becomes a co-partner with and protector of an infamous traffic with its sure moral degradation, even if its physical dangers could be overcome.

The opposing views of morals and science are frequently presented in the discussions of physicians as to the social evil and its disease consequences. Occasionally there is a physician who would battle with venereal disease on purely scientific lines, having no other thought than to pre-

serve the physical purity of the race. This type of physician would ignore or fails to perceive any harmonious design in the evident purpose of the Supreme Intelligence to develop the moral nature of man by demanding that he exercise will-power and restraint over his desires. Physicians recognizing that phase of the problem are prompt to antagonize the coldly physical view of evolution in which the moral is forgotten or subordinated. Such physicians, while anxious that race health be preserved, also realize that too great a price may be paid for it if the moral stature of man is to be lowered by giving prostitutional intercourse the safety of hygienic protection—even if such were possible. The majority view of physicians is that the medical profession can not afford to take such position, and those who have given the problem a more thoughtful study admit in its final aspect it must be considered purely as one of morals.

Stated briefly, the position of the physician or venereal hygienist is as follows: He knows he can eradicate neither prostitution nor its associated diseases. He knows he can often prevent the spread of venereal infction, but that even then his best efforts are only incidntal as to the entire mass of venereal disease over which he has no preventive control, and can have none, though he earnesly asks that he be permitted to do what he freely can do to minimize infection. He realizes he can do much to mitigate race deterioration as to the venereal diseases if an enlightened public sentiment will permit him and join with him to enforce a reasonable standard of physical purity before the marriage relation is contracted. Above all, while realizing that he does not come into contact with infection until the harm has been done, yet he feels that the harm should not have been done, and he knows the only way to prevent the harm from being done is by a general and persistent education of the masses in sex matters, which education he knows to be of supreme importance to the individual and the race.

EDUCATION.

The problem accepted as a moral problem, resolves itself into a problem of education, and the problem of education, from the standpoint of the male, in turn resolves itself into two propositions:

(1) It is possible so to train a young man by pointing out to him the evil physical and moral consequences of illicit intercourse as to strengthen him in determination to remain continent until he shall have arrived at the psysical and economic period when he may justly contract the marriage relation?

(2) This failing, is it possible so to impress on a young man the solemnity of marriage in its physical relation to wife and unborn, that he will refrain from contracting the relation in case of having acquired infection until he shall have been pronounced free from the probability of transmitting disease?

That the problem as presented by the first proposition is a difficult one, all will admit, but on examination, there are several encouraging features that give hope, if proper educational measures adopted, that

much may be done in the reinforcement of young men in a determination to maintain a condition of sex purity. It must be remembered that there are many young men who, either by instinct, special training or environment, reach the time of marriage unpolluted by contact with the prostitute. Even should the heavy figures as to gonorrheal contamination be accepted, their analysis shows there is still 20 per cent of young men who have escaped the contamination. But admitting that many of these in truth have not been continent, but owe their escape to "good luck" or lack of opportunity and that only 10 per cent of marriageable young men can say sincerely that they have remained away from the courtesan by sheer force of self-control, even that small percentage would seem to indicate that there is a saving grace among the young men of America that could be rapidly developed into a rallying point for a wide national movement pledged to physical purity. Goethe, dying, called for "more light!" Such has been the cry of the ages, but has been persistently fought by trembling fear and foolish prejudice. Freed from the stumbling block of ignorance and darkness, humanity will find its way. It is not a morbid but a natural and entirely justifiable curiosity on the part of young men to desire an intelligent knowledge of the mysteries of life. Youth is the psychologic time for right suggestion, the plastic period of mental development for the making of lasting impressions which, when crystalized into definite conviction, constitute the attitude of mind, conduct or character. Here lies the crux of the whole matter. Education marks the chief distinction between the conduct of the savage and civilized man—spelling the difference between the exercise of reason and blind following of instinct. While the sexual impulse may be "uncontrollable," or "without conscience," given certain conditions, yet if the soil of the mind has been well prepared, if the reason has been strengthened by the stern truths governing sex well-being, then men eventually will learn instinctively to avoid those conditions which lead to their undoing. A steadily increasing number will not so deliberately or persistently seek such conditions, and thus a vast amount of needless social injury will be prevented.

Education is certain to work for greater self-control and eventually to develop a profound change for the better in the general view entertained by young men as to sex-responsibility.

The sexual life will become vested with a serious meaning taking the place of the prevailing atmosphere of cheap levity and assumed bravado. Sense will be substituted for folly—often safety for ruin. Gross errors and wrongful conceptions will be uprooted and destroyed. Some young men are so uninformed or indifferent at present as to sexual responsibility that it is not uncommon to hear one of them say: "That girl gave me a disease and I propose to get even by giving it to as many girls as I can." Such a youth does not realize the atrocity of his view or conduct. He feels the physical pain and mental anguish of the disease and seeks to avenge himself on society for the supposed wrong done him by scattering his misery as widely as possible. He does not realize that

the female from whom he acquired the infection, did not contract it as an intentional part of her misstep. No one likes to suffer. The unfortunate female probably did contract the infection from some male who perhaps held precisely the same view as the aggrieved youth who announces his intention to do as much harm as possible.

Young men should understand the right of this matter. The venereal diseases do not originate spontaneously. The germs of the diseases are persistent types of perverted cell life. They are passed from one person to another. When the female becomes infected, almost without exception, she contracted the infection from a sexual relationship with an infected male. The female no more desires maliciously to cause pain to the male than she wilfully desired to contract the infection. The female is largely above the desire to cause sexual misery. The young female is often weak and ignorant, sometimes in need; she does not understand her physical condition and often does not realize it until brought to the hospital operating table where nature demands payment for her "good times" to the last farthing. As long as the male holds his cruel view that he has the right to spread sexual contamination *ad infinitum*, keep disease going as a sort of endless chain, simply because some female infected him, there can be little betterment in conditions. When the male is brought to know that he who wilfully infects a female is a social criminal of the most depraved type, then there will be hope for improvement.

What a great gain if coming generations of young men could be made to believe that true manhood consists in not acquiring infection instead of the false view now often held that infection is a sign of manhood. Certainly it requires more strength of character to fight the battle for self-control than to yield weakly to a passion largely capable of sensible direction. The young man who keeps himself well in hand sexually, has certainly built up a reserve of will power which will serve him well in later life.

It is admitted that home education would be the ideal method of the instruction of youth in the mysteries of life but how many fathers are equipped with the scientific knowledge or parental courage to enter into intimate discussion with a son on such matters. Many fathers do nerve themselves to the point of briefly warning a son as to the "dangers" of masturbation, hinting at the possibility of the madhouse, etc. That such warnings have not been of great hygienic value to the race in the past is evidenced by the enormous amount of venereal disease existent and the wreckage of youth on every side. While the admonishment as to masturbation undoubtedly has been well meant, yet it often has had exactly the opposite result from that intended. Standing at the crossroads between masturbation and prostitutional exposure, thousands of youths have accepted the latter as the only course left open to them to escape the terrors of self-abuse as depicted by father. Some fathers again go so far as to say to a son: "if you have to do a thing of that kind, go to some first class house. If you get a disease, go to a good physician and send me the bill." Such advice simply means that the father is advising the son to expose himself to the danger of syphilis. Fathers in the

past have made these mistakes and are still making them because of their erroneous belief that sex nature is impossible of control. Science now knows better and asks that the old way make way for a new and better way.

The evils of masturbation have been grossly exaggerated. It is wrong to terrify the mind of youth with the formidable insanity specter. While the practice is admitted to be weakening and debasing and while physicians understand that the youth who wisely refrains or keeps the practice under control makes the better balanced man in maturity, yet exact knowledge asserts that masturbation is rarely the specific cause of insanity. The popular impression that the practice is the frequent cause of mental overthrow, is based on the observation that many insane people practice the vice. Those who make a scientific study of the insane have now learned that perhaps the larger percentage of demented persons owe their condition to delinquency at birth. Frequently they are the offspring of underfed, overworked or alcoholized and often venereal-ized parents. Lacking in physical and mental stamina at birth, the delinquent has not sufficient moral strength to resist the temptation to self-abuse, which may hasten but is not the primary cause of insanity.

Admonition as to the evils of masturbation is not the most important thing in sex-education. The important thing is to teach young men the physiologic truths of their ow nnatures. The question of self-abuse is quickly disposed of under such instruction, since science teaches the practice is not necessary, can largely be restrained and gives the reasons why. Science presents the possibility of a sensible, well regulated young manhood that constitutes an infinitely more invigorating and noble animus for the right conduct than the detestable threat of the madhouse with its hateful and unnecessary mental anguish.

Whenever a suggestion is made to educate boys and young men as to the truths of the sexual life someone generally appears quickly with the old fashioned argument that there might be "some boy" in ignorance of the meaning of sex nature "whose curiosity might be aroused and who might be led into bad things" by such moral and scientific instruction. Those who advocate such education are not giving much thought to this sort of saintly youth who exists largely as a figment of the imagination. Advocates of sex instruction have their eyes fixed firmly on the ninety and nine shrewd, sharp boys, who have reached or are nearing puberty, who have observed the creative process in plant life and who have seen the generative function in performance in animal life. These boys will gladly receive intelligent moral instruction and will profit by it, for a moral high toned atmosphere can be built up about the sexual life by proper education to take the place of the present immoral atmosphere which comes from street education with its filth and ignorance. It is a crass delusion to believe that any boy can reach the age of 14 or 15, unless imbecilic, who has not acquired a pretty fair idea of the reproductive process, so the suppositious "saintly youth" should be sent to the scrap heap of pitiful bogies. Even admitting the existence of such a youth, common sense demands that a strong effort be made to educate and prop-

erly guide the majority. As president-emeritus Dr. Charles Eliot of Harvard expresses it: "Innocence among the young is not essential. What we should strive for and which is vitally necessary to preserve the race, is virtue. Education of the young is a chief incentive to virtue."

Not the least value of such an education will be the development of a healthy and powerful public opinion that will place the stamp of stern disapproval on the man who does sexual wrong to the innocent. Employers also will begin to learn that sexual morality lies at the basis of all morality and that a venerealized employe often is even more inefficient as an economic unit than the victim of drink. Railway managers will learn that the man suffering venereal torment is an unsafe man to have charge of the lives of other people, because of pathologic disturbances affecting mind concentration.

Whatever may be one's views as to the ultimate of humanity, one truth stands out clear and strong, the race always must be largely a failure as long as it clings to promiscuity and will advance just as it gets sexual intelligence and makes an effort toward the monogamic standard.

What a mass of misery is swept out of the life of the man when monogamy is accepted as a matter of vital belief and conscientiously lived up to. If the race could ever reach the monogamic altitude, many of the most grievous problems that afflict the world would be solved. But this can never be until there is regeneration of the individual and there can be no such regeneration without slow, painful effort and the broadest enlightenment. Most all the lower animals have learned the monogamic law and subscribe to it. Those that do not are fearfully punished by epidemics, e. g., the rabbit, which is swept by disease and killed by the thousands, the rabbit being a "variet-est" not even observing "respectable" animal polygamy. Humanity has been endeavoring for thousands of years to defeat the monogamic law, has been relentlessly beaten back and hurt persistently—thousands have died—and yet society has declined to grapple resolutely with the problem. But this is the twentieth century. The race has been fed on sex lies and abominations so long and with such disaster, it would seem the time has come to apply an antidote of truth and science, and however toilsome the way, to crawl to the heights of better things.

As for the second proposition advanced as to the educational problem, all certainly will concede that the average young man would halt before embarking upon matrimony should he think there might be the least probability of infecting the woman chosen as a life companion. As has been stated, the gonorrheal infection is responsible for 20 to 30 per cent of blindness in the new-born and for a large percentage of the surgical operations on women; that syphilis is responsible for a menacing percentage of insanity. It is also known to be responsible for a large number of premature breakdowns of men and consequently for a vast amount of public indigence and criminal tendency. Education would bring about astonishing benefits for both individual and state should it be successful in eliminating even part of the venereal tragedies.

The question that offers itself: In what way should an education be extended to a young man to give him a proper view of sex nature and responsibility? Students of the problem agree that the first work to be done is to kill a number of popular lies as to sex matters, which lies are in strong variance from the truth. These lies are very harmful, obnoxious and dangerous, and widespread education alone can remove them.

SEX NECESSITY LIE.

The father of these lies is called the sex necessity lie. This lie is founded on the doctrine that cohabitation is essential to health. This lie is a prostitute in itself in that it beckons to the young man and professedly gives him the sanction of nature to cohabit with the prostitute. That this is a malignant lie, one that nature bitterly opposes, is demonstrated by the fact that nature punishes those who believe it with disease. It is the popular acceptance of this lie that seems to extend a sort of apologetic social pardon to a young man who grievously sells his physical birthright for a mess of verereal pottage; it is this lie that keeps alive the "wild oats" delusion with its wreckage of human hope and happiness; it is this lie that defends downright wickedness.

Dr. Wm. T. Belfield of the Rush Medical College, Chicago, says in connection with the sex necessity lie:

> That cohabitation is necessary to physical health, that continence and health are incompatible, is the comfortable creed of men addicted to promiscuous sexual intercourse though such a man flies into a virtuous rage if an unmarried sister or daughter adopts his creed and conserves the health of her male friends by administering to sexual necessity. It is only the other fellow's sister whose philanthropic interest in masculine health should be encouraged.

The American Society of Sanitary and Moral Prophylaxis unanimously resolved that: "Continence is compatible with health and reprobates the contrary doctrine as a menace to the physical and moral welfare of the individual and society." Fournier, a distinguished French specialist, says: "Referring to the so-called dangers of continence, I do not know them, and I have never observed them." Prize fighters, athletes and men engaged in high effort, physical or mental, frequently are continent for long periods. They practice continency because it conserves their health and strength.

The sexual capacity has been likened to the tear duct. The eye is always ready to shed tears copiously, but because the tear duct does not continually shed copious tears is no indication that the duct has been injured or has lost its capacity for shedding tears. If there is such a thing as sex necessity in the same meaning that it is necessary to eat, sleep and drink, then men who have been held in prisons for extended periods constitute a paradox, since many men come from prison, after long terms, greatly benefited in health. They have been compelled to live regularly, they have not been able to gratify "sex necessity" and are stronger and better men physically.

It should be thoroughly understood that the sexual organs differ essentially from other organs of the body. It is a great mistake to

think that they can be developed or strengthened by exercise like the arm or chest. The sexual organs of the male are generally much stronger when not used and never suffer from non-use.

Young men should also understand from a biologic (science of life) standpoint that from the ages of twelve to twenty-one the body of a boy is being made over into that of a man. Nature has no large amount of vital energy that may be wasted safely in excesses of any kind during the adolescent period, for all the forces of the body are needed for rebuilding. Sexual excesses during that period are certain to be punished with a dwarfing or stunting effect on mental and physical development. Self-control is the thing.

Remember the words of "Old Adam" in "As You Like It," as he talks to young Orlando, who is in trouble. Thus saith Old Adam as he offers to Orlando his savings for old age, signifying he was ready to go back to work:

> Though I look old, yet I am strong and lusty,
> For in my youth I never did apply
> Hot and rebellious liquors in my blood,
> Nor did not with unbashful forehead woo
> The means of weakness and debility.
> Therefore my age is as a lusty winter,
> Frosty but kindly.

The sex necessity lie is without justification in either the physical or psychic nature of man. It should be slain without compunction and an enlightened people will eventually do it.

DOUBLE STANDARD OF MORALITY LIE.

The double standard of morality lie is the twin brother of the sex necessity lie. The lie simply means that the young man has the right to debauch himself sexually, but that the young woman may not do so. This lie has one benevolent feature, in that it largely confines the mass of distinctly venereal punishment and pain to the male members of the race, but just the same it is a disgraceful lie and should be ruthlessly destroyed. Nature plainly points out to a young man that he must exercise self-restraint and thus assist her in bringing the race to the point of evolution where reason shall be persistently triumphant over instinct or desire.

Dr. Edward L. Keyes, Jr., Secretary of the American Society of Sanitary and Moral Prophylaxis, in an address before that society at the time of its organization, said, in discussing the double standard of morality:

> This spirit of recognizing a certain sexual right on the part of the male, therefore exists, and is accepted and tolerated by the community as a whole—not by the church, not by the law, not theoretically by the community—but practically it is a fact that it is so tolerated. How, then, is this sentiment, this tradition, this unwritten law, to be overcome? Only by educating the young male, teaching him to develop his character, teaching him that his sexual yearnings are to be restrained like his propensity to overeat, to overdrink, to overexercise; teaching him that because he wants a thing it is not, therefore, necessarily good for him that he should have it, but often harmful; by assuring him that not only will he not perfect or retain his sexual potency by indulging in illicit intercourse, but that he is more likely by excess and irregularity to impair it.

The "Double Standard of Morality" lie is the lie that protects the libertine and gives to him social standing, while it outlaws his sister, the prostitute. The lie also gives the syphilitic the right to enter a home of respectability and to marry a pure woman. The wife often finds out too late she has been married to a walking pest, a being who properly should be in a sanitarium or hospital or in isolation upon some island where he could not injure the innocent or assist in social disintegration. It is to be hoped under a system of sane education that the parents and young woman of America will realize that a syphilitic husband makes a mighty poor parent, whether he be foreign duke or American millionaire. There is nothing quite so fine as good, red blood free from disease. It maintains the home and sustains the state.

EMISSION LIE.

The Emission lie is a cheap medical faker lie. It is used as a bogy man to scare a young man into fits and make him believe that an automatic function of nature for the relief of overcharged seminal vesicles, is an indication he is suffering from sexual weakness and is on the road to the mad house. This lie has brought a good deal of money to the medical fakers, and is still bringing them substantial returns. It has been exploded long ago, but because of the lack of proper knowledge, there is still plenty of ignorance to be preyed upon. Education would kill the "emission lie" almost at once, saving many young men from unnecessary mental anguish and at the same time depriving the fakers of a field for harmful exploitation. Circular No. 2 issued by the Chicago Society of Social Hygiene, says in connection with emission.

> These occur during sleep in perfectly healthy young men; they do not indicate an unhealthy condition of the sexual organs unless they take place oftener than once in ten or fourteen days. The scarecrow newspaper advertisements of "quacks" are designated to frighten ignorant boys and young men into paying heavily for unnecessary treatment.
>
> When emissions occur too frequently, the cause is often sexual excitement in thought or deed, lack of physical exercise, overeating or drinking of alcoholic beverages—all of these habits are injurious to the body in general and to the sexual organs in particular. A young man who will take plenty of muscular exercise, eat moderately, avoid constipation and alcoholic drinks, and keep his attention diverted from lewd subjects, will seldom need medical treatment for seminal emissions.

Moreover the prostatic vesicles are engaged in a continuous work of secreting an excess of seminal and prostatic fluids into the urethra where they are carried from the system in a natural way. At times the young man may feel the sexual call to be pressing but if he will take a five mile walk or engage in a half hour "stunt" in the gymnasium he will be surprised at the rapid disappearance of the desire. The explanation of this is perfectly clear. Exercise causes activity of the glands and the excess of fluids that awaken the sexual desire are eliminated. It is much better to accept the exercise cure for sex desire during youth than to risk

prostitutional exposure with its strong probability of suffering and injury. So-called sex necessity in the young man is largely imaginary and the desire is the easist of all to be controlled when properly understood. The best investment that can be made in this life is to get an understanding of the physiology of sex nature and rigorously adapt one's life to such understanding.

BAD COLD LIE.

Then there is the "Bad Cold" lie, "I would just as leave have the clap as a bad cold." This is one of the most dangerous lies as to sex matters in existence. It is a lie uttered by thousands of men who, whether they really believe it when they give it expression, find out sooner or later they have been the victims of a vast delusion. This lie should be promptly garroted and embalmed in prussic acid, to make sure there shall never be a possibility of its popular resurrection. The killing of this lie would go far to save many wives from the operating table, to save many men and women from sterility and many babes from blindness. The killing of the lie would also have the result of the male learning that gonorrhea is a dangerous disease, and that he should lose no time in placing himslf in the hands of an honest and competent physician in case of contracting infection, since the successful treatment of gonorrhea is often dependent on its immediate treatment. When the disease finds its way into the deeper tissues of the body it is then sometimes a grave question as to its eradication. Young men will learn to keep away from uncertain and perhaps dangerous drug store remedies, and will also learn to keep out of the clutches of quack advertising doctors, whose first thought is money, the welfare of the patient being a minor consideration. Again quacks are often black-mailers, who, after learning the secret of their patient, bleed him for excessive fees under the threat of exposure by bringing suit. A young man also will learn that he must not marry with any of the germs of this disease in his body. A latent gonorrhea or gleet is scarcely less capable of infecting than is active gonorrhea. A young man who contracts the marriage relation in such a condition, commits a physical and moral crime. It is also a statutory offense in the state of Indiana, which state has passed a law demanding that the applicant for a marriage license shall make a statement he is free from the venereal diseases. Would that all states might pass similar laws, and that an enlightened public sentiment should demand their enforcement to the letter!

WAY FOR EDUCATION OPENED.

There are a number of other sex lies, some of them of such a wretched character that they have no place outside of the medical lecture or treatise. But with the killing of the principal lies the subject of social hygiene can be opened up within proper limits to young men in all institutions of public or private learning. The presentation of the necessary truths is a work of the highest moral character, for such knowledge will equip young men with stamina to resist coercive invitations

to visit the prostitute. Today a young man who is reluctant to "go down the line" is liable to be derided by his fellows as a "mamma's boy," "baby," "molly-coddle," "sissy," and in spite of an instinctive feeling that he should remain away from danger, he often has no effective argument to advance against the invitation. His will thus is overcome and he is brought into contact with the prostitute, whose wiles may be depended upon to do the rest. Thus many a young man is compelled to pay the penalty of disease and suffering as the result of a short-sighted social policy that will not arm him with a cuirass of knowledge sufficient to resist the gibes and sneers of reckless companions. It is certainly to be expected when there shall be widespread knowledge of the profound danger of the prostitute the visit to her will become a distinctly unfashionable and unsociable thing on the part of the male. A system of persistent, intelligent education cannot fail to do immense good. To longer withhold such education from young men is little else than a national crime.

BEST OF ALL INVESTMENTS.

Parents and taxpayers should bear this in mind: Instruction in social hygiene is the cheapest yet best paying investment that can be made by any community. An ounce of disease prevention in the way of education is worth a pound of heavy taxation cure to take care of disease consequences. One or two lectures during the term in the high schools will go far to post young men as to fundamental truths. It is desirable, though not strictly essential, that the instructor be a physician. One thing is advisable, however—he personally should be a man of high moral character who by open life and manifestation of physical health, constitutes an example of the value of moral and physical restraint, thus arousing a spirit of emulation in young men. Boys do not want to be preached at. They simply want to be told how to live, in order that they may become successful and respected men. There is no subject they are more deeply interested in than sex nature; they instinctively realize it to be the supreme thing in manhood. What a great wrong society does to them by denying them proper knowledge.

RESUME.

Whichever way we look we see disease, sorrow and disaster, as the result of sexual error. It fills the streets with unambitious, venerealized men, the penitentiaries with hopeless, syphilized criminals, fills our insane asylums, our institutions for the blind, homes for imbeciles and other delinquents, hospitals and divorce courts. It is probable with the venereal scourges gone there would be little need of the physician, as we know him today, for many human ills would likely vanish as if by magic with the social diseases eliminated. But whether or not, there would be such a reinforcement of resisting power to the human body, freed from the venereal taints, that future generations would be largely immune to the diseases that now prey on and destroy the members of the human family.

At the door of improper sex education must be laid the blame of much of this social misery. Therefore proper education is the great, the deep, the vital question. It is the axe that will attack moral and physical sickness of the human kind at the root. Such education must no longer be ignored in this country. We are not building this American civilization that it shall be weakened or destroyed by the foul venereal scourges. With our fine free school system and general national shrewdness we are in unexampled position to try the experiment of broad education in social hygiene. In some parts of Europe, whole villages are swept by the venereal plagues. Densely ignorant, the unfortunate inhabitants are incapable of grasping even the rudimentary principles of hygiene or morals in their relation to the sexual plagues—and therefore must die. But such conditions do not exist in the United States. They never must be permitted to exist.

Who is so low, so forlorn, as would wish to be marred or slain by the venereal poisons? Who would have offspring fall victim? Is there any other heart-anguish quite so bitter as to bring a child into the world, the child of disease, and then to look on it and say: "What have I done! What have I done!"

There is still time in the United States to build a bulwark of popular knowledge against the advance of these scourges. Should we not bend our every energy to protect the young people of today and those who may come after! Verily, sex education is almost synonymous with national health.

Is it not the supreme duty of every conscientious American to use his influence and insist that sex education may be made a functional part of the public school system in order that no young man in the future shall have the right to say:

"If I had only known."

EXPERT OPINION.

I think it is our duty to give young men such knowledge as will protect them against the physical evils of venereal diseases.—James J. Walsh, M. D., New York.

Before the boy reaches the age of puberty, I think he should be taught the sacredness and naturalness of the sexual instinct, and this can be done in a quiet way.—E. L. Stephens, M. D., Des Moines, Iowa.

The subject should engage the attention of the parent, the teacher and the physician; in fact, on the proper solution of the subject depends the future welfare of the nation.—M. M. Smith, M. D., Austin, Texas.

I believe it an injustice to allow these boys to go without this precious knowledge. I think it is not so much the knowledge as the mental impression which keeps these boys moral.—F. W. Robins, M. D., Detroit.

If I were obliged to answer the question, "What do our boys and girls most need to have added to their education?" I think I should have to reply: "More intelligent training in the mysteries of physical life and sexual functions."—Herbert W. Gates, Department Secretary, Y. M. C. A., Chicago.

I do believe, however, that public education will accomplish a great deal. It is no use to point out simply the danger of venereal diseases without telling a young man how to lead a consistent life. We should, therefore, make a strong plea in favor of continence.—Geo. M. Kober, M. D., Washington, D. C.

I think that if anything is to be accomplished toward protecting the young of this country it should be done at a time when it would be effective. I really believe that physicians should teach physiology in the public schools, and at the same time, they should teach regarding the sexual functions and the dangers which its abuse entail.—Walter Shropshire, M. D., Yoakum, Texas.

The whole subject of physiology should be taught and not, as at present—only in part, and that imperfectly. The truth should be taught, and that is that there are two great functions of the organism, namely, the preservation of the individual and perpetuity of the race; that the functions of the various organs of the body are subsidiary to one or other of these great functions.—DeLancey Rochester, M. D., Buffalo, N. Y.

This is the point: The young man goes free for the first time when he enters college and since human nature is imperfect, when he reaches the time of freedom something goes wrong, and it is largely through lack of proper instruction. It has been my habit to talk to boys at home and at my house. I know that my efforts have been crowned with success so far as instructing them is concerned.—Theodore Potter, M. D., Indianapolis, Ind.

The parasites known as gonorrhea, chanchroid and syphilis are as destructive to the human body as the dodder vine is to the alfalfa plant, and our axiom is that "The proper way to avoid dodder is not to plant the seed." Let us, therefore, prepare the soil of the mind by well chosen education begun very early and continued into adult life, because in that way we may best avoid venereal diseases by teaching the youth or maiden not to plant the seed, and also by giving it no encouragement to grow.—George Whiteside, M. D., Portland, Ore.

Every year of my life I am struck more and more by the ignorance that permeates the general laity. My experience makes me believe that education lies at the bottom of the whole thing, and we shall never gain much headway until every young man and every young woman even before she falls in love and becomes engaged knows what these diseases are and what it will mean if she marries a man that has contracted them. I believe that many young men—perhaps most of them—can be impressed with a sense of honor and of the moral features of the problem. I also believe that many a woman becomes a prostitute without heredity being an influence. I believe that many fall through ignorance.—Seneca Egbert, M. D., Philadelphia, Pa.

A young man said to me: "If my father had given me ten minutes of sound advice and warning, I should have been saved years of sickness. As it was, I knew nothing; it was a question of guessing. I kept on guessing until I found out by bitter experience." What can be reasonably expected from this hygienic education? It will constitute a safeguard and a valuable safeguard against venereal exposure. Fournier says: "Many young men thus instructed will expose themselves, but they will expose themselves less often, less readily, less recklessly, less foolishly, and thus a greater number of contaminations will be prevented."—Prince A. Morrow, M. D., New York City.

This committee has confined its studies to the enormous spread of venereal diseases without deciding on the merits or the demerits of a "Regulation of the Social Evil." It has come to a conclusion that systematized action emanating from the medical profession—a dissemination of knowledge to teach the populace the hygiene of sexual life—is the first step to diminish the consequences of venereal disease. * * * A propaganda of action having as its aim to interest the profession and especially to enlighten the broad masses of the importance and dangers of venereal diseases is the next step in the crusade to attack the hydra which endangers humanity in the present and threatens it in the future.—Second Annual Report of the Committee on Prophylaxis of Venereal Diseases. Ludwig Weiss, M. D., Secretary, New York City.

There are sad things in this world, and they go on year after year just the same, even if we close our eyes and say we do not see them. I conceive of no possible improvement worthy of the name unless the truth is made manifest and a spirit of humanitarism prevails. A liberal education is incomplete if it does not include a knowledge of the most important function of the body, its proper performance under suitable conditions, its disastrous results when misdirected. * * * There must be an awakening on the part of the profession and our philanthropists to the paramount importance of venereal diseases. * * * The limitation of venereal diseases must be effected by educational methods and by affording adequate provision for systematic and thorough treatment.—Denslow Lewis, M. D., Chicago, Ill., in "The Limitation of Venereal Diseases."

You cannot readily suppress anything of the kind, but you can control it, and after a time through education of the people you may perhaps be able to suppress it. Our school teachers must be educated properly. Let them consider that the moral character of their pupils is placed under their charge and rests largely upon them. Instruct them and let them know what they should teach and how to teach it; let them learn how to guide these children along. I want to tell you that you will never have a moral body of people, I don't care how much you legislate, until you train them in morals. You have got to make a boy or girl understand that they will derive pleasure from being moral. Do what we may, the fact remains that the bulk of the reproduction of the race will come from the sexually clean.—L. S. Tuckerman, M. D., Cleveland, Ohio.

Young men greatly underestimate the disease gonorrhea. Besides producing a long train of other physical ailments, the gonococcus frequently finds its way into the deep urethra, where, by setting up inflammation, causes a damming or occlusion of the seminal vesicles, which serve as the receptacles of the spermatozoa or reproductive principal. Because of this occlusion, the spermatozoa are unable to meet with the prostatic fluid constituting the major portion of the emission. Thus many a husband blames his wife for barrenness when he in fact has become sterilized by the gonococcus. General public ignorance is responsible for much of this mischief. The crying need of the youth of the American nation is thorough education in sexology. Education alone will stop the terrible injury that is being done to national health.—R. F. Sloan, M. D., Wilmington, Del.

It is time for all those who value the national health and morality to unite in a reasonable, earnest and patient campaign for sexual purity. For apathy and neglect there is no longer excuse. * * * As parents and teachers we are called upon to protect children and youth from the physical and moral ruin which follows the perversion of the sexual life largely due to ignorance and misinformation. We may reasonably hope that, some day, perhaps not soon, the state will require a certificate of freedom from "Social Diseases" in the interest of innocent wives and children. * * * Venereal diseases are most of all the effect of human volition and habit; with a higher moral control they would disappear. It is to this crusade we address ourselves and summon to our ranks every chivalrous man who would protect the innocent from the effects of a vice for which there is no excuse, and every good woman whose sympathy arises from her pity and her purity, her love for children and her patriotism and religion.—Prof. Charles R. Henderson, University of Chicago, President Chicago Society of Social Hygiene.

What, then, is the hope in social prevention of syphilis? It is this: That we train our young men to higher ideals of women and marriage; that we remove the ideas of false modesty and prudery in regard to matters sexual existing among our young women; that we protect the innocent; that we guard the unwary; that we expose the infamous; that we have charity for the unfortunate, and alms and pity for the diseased and suffering. That we educate instead of legislate; that we cure instead of scold; that we pray instead of scoff. And when the moment shall be generally conceded that our Anglo-Saxon prudery and civilization shall not inhibit or prevent general discussion on these matters; when papers similar to this may be given without question, without exciting the jealousy and envy of other professional men, and when general knowledge of the far-reaching disasters of venereal disease can be inculcated into the minds of the laity; then, and not until then, in my judgment, will there be any relief, any suppression, any let up in the category of venereal tragedies. In a word, the only hope is education. Let this, then, be our creed—let education be our watchword. For it is the hope, the main hope, the greatest hope in the social prevention of syphilis—the disease ever in our midst. Education on broad and open lines alone can lead us in the path of safety. Science—nature learned through the language of experience—alone can touch our reason, can ennoble our sentiment, can modify our emotions, can quell our passion, can remove us from the blight and bane of this social tragedy and make us noble, make us good, and make us free.—Nelson D. Brayton, A. B., M. D., Government Physician to the Isthmian Canal Commission, Panama, in "Syphilis, Past and Present."

TWO VIEWS—Quo vadis Domine?

OLD MORALIST VIEW—1869.

Wm. Lecky, "History of European Morals."

"The essentially exclusive nature of marital affection, and the natural desire of every man to be certain of the paternity of the child he supports, renders the incursions of irregular passions within the domestic circle a cause of supreme suffering. Yet it would appear as if the excessive force of these passions would render such incursions both frequent and inevitable. Under the circumstances there has risen in society a figure which is certainly the most mournful and in some respects the most awful upon which the eye of the moralist can dwell. The unhappy being whose very name is a shame to speak, who counterfeits with a cold heart the transports of affection and submits herself as a passive instrument of lust, who is scorned and insulted as the vilest of her sex and doomed for the most part to diseases and an early death, appears in every age as the perpetual symbol of the degradation and sinfulness of man. Herself the supreme type of vice, she is ultimately the most efficient guardian of virtue. But for her the unchallenged purity of the countless homes would be polluted and not a few, who in the pride of their untempted chastity think of her with an indignant shudder, would have known the agony of remorse and despair. On that degraded and ignoble form are concentrated the passions that might have filled the world with shame. She remains while creeds and civilization rise and fall, the eternal priestess of humanity, blasted for the sins of the people."

NEW SCIENTIFIC VIEW—1910.

Modern science holds there is absolutely nothing in the physical structure of the normal male that immutably demands that any female be immolated on the altar of prostitution and strongly protests against the view that the mournful figure is the "guardian of virtue." Science disposes of this ancient and gross error simply by asserting with a confidence born of exact knowledge that in the adolescent period when much of the injury to the race is done through venereal contamination, that the sex relationship is not necessary and that youth is much better and stronger without such relationship.

The scientific view does admit, however, that the race is largely ignorant of the physiology of sex-nature and its proper direction. Science further accepts the biologic origin of man as opposed to the strictly scriptural view and consequently concedes the natural existence in the human breast of primitive instincts and savage longings. Science also

realizes the presence of an atavistic or inherited but erroneous social attitude as to sex-responsibility with its poor encouragement for increased morality. Science is compelled therefore to confess the sad and humiliating social condition that even in this enlightened age, thousands of females are condemned to suffering and death in order that an imaginary sex necessity and the polygamous sexual pride of the male be gratified.

The scientific view demands that the "instinct" conception of sex-nature be corrected; that there be enlightenment and a serious and courageous effort on the part of the male for his own sake and in behalf of the welfare of the race to strive for a modification of the savagery of the sex instinct in order that it may be directed along channels of safety demanded by his modern environment. Science makes an appeal to him in order that the venereal scourges, which are the result of promiscuity, be eliminated as largely as possible. The individual owes this effort to the sanitarians and hygienists of the world who are working heroically to rid humanity of disease. Their work must always fall far short of success unless the individual loyally co-operates in an effort to keep himself free from the venereal infections. Medical discovery holds out faint hope at present of the immunization of the race against the sex scourges and therefore the the battle must be largely fought out on the moral and self-control lines.

Having before it an ideal of a race free of disease, science indignantly denies that the mournful figure conserves the "purity of the home;" in fact, holding an exactly opposite view, indicating the mournful figure as an arch-polluter and destroyer of the race, since the seeds of her vice are carried from her by the male to the marriage bed, mutilating and destroying the chaste female and afflicting the innocent even unto the third and fourth generation. Mournful figure she is, but more mournful is that blinded and indifferent social state that will not accept the supreme necessity of proper education and guidance of the young in matters sexual, that will not endeavor slowly but surely to teach men that the sex-capacity is primarily for reproduction and not for pleasure and that the noblest right given to man is the right of reproduction; that will not strive to impress on men that in its last analysis the human organism has but two chief functions, the preservation of itself and the perpetuation of the species, and that the species cannot be perpetuated healthfully if the diseases of the mournful figure are to continue to pollute humanity. When the male through persistent education admits finally he has no physical, moral or social right by an act of deliberate volition to drag a female into the slough of degradation for selfish gratification; that he has no right to do a thing that may entail great suffering on himself and posterity; that if he is stronger than the female physically that he is still the weaker entity, if morally he is not the stronger; that his claim of manhood is indeed a sham if his manhood holds no higher strength or aspiration than the pursuit and persistent effort to overthrow the female sexually; that the sex-relation in its true and finest significance means protecting, parental responsibility; then indeed when men have learned these truths

and endeavor to apply them, they will have grasped the ultimate law of homo genus. Just as men observe the ultimate law so will crime, divorce, harmful industrial pressure on women and children degradation and general inefficiency begin to show diminution. With a more intelligent knowledge of the meaning of life, there will be released a vast stream of human kindness and helpfulness that will radiate altruism into every avenue of the social body. When the race shall endeavor even approximately to achieve the moral ideals contained in the ultimate law then will it have perceived its high evolutionary goal and will have taken the road leading to an ideal social condition which ever must be dreamed of and vigorously striven for, even though its attainment be Utopian or in the far distant future.

SOME SEX TRUTHS AND BELIEFS.

Man cannot play "sneak" with nature.

The man who "keeps it up" will get hurt.

Whose sister? Whose blind child? Whose maimed wife?

Gonorrhea and leucorrhea are often one and the same thing.

Clean out the sewers of humanity and the flowers will bloom above.

Children should be taught to avoid the venereal infection as they would a snake.

"Hygiene can do more for the supression of crime than any law."—Hugo Munsterberg.

Dirt must be swept out of the human soul as it is out of the house if one would be healthy.

"What man needs is not reform but regeneration."—Thomas R. Marshall, Governor of Indiana.

The man who pulls down another man's daughter may expect to have his own daughter pulled down. That's the law.

Syphilis and gonorrhea are traps for the ignorant and foolish. Nature has no mercy on ignorance or folly.

There are 50,000 blind children in the United States. It is asserted that gonorrhea is responsible for 12,000 of them.

The man who does not believe in educating young men in the sexual life invites the destruction of his daughter. Is it not true?

"Science is bound by every law of honor to face fearlessly every problem that can be fairly presented to it."—Sir William Thompson.

Don't be too quick to blame your wife for sterility if you have been infected. Try the physician's microscope as to your own condition.

Races that practice polygamy are the backward races of the earth; those who practice monogamy are the strong and progressive races.

In cheaper houses of prostitution many of the inmates are infected with both gonorrhea and syphilis. It is often a case of both "money and your life."

Don't marry your cousin. It is contrary to Indiana law, and invalid. Family intermarriages have a tendency to produce the deaf, imbeciles and crippled children.

Women and children are the innocent and helpless victims of the venereal diseases. There can be no higher honor in man than to protect them from such infection.

"Pollute not thy lips with dirty stories."—Joaquin Miller. The dirty sex story teller should be suppressed. Let him tell the story to his own son and daughter.

No female should use a syringe, douche or any other instrument that has been used by another female. Many sad cases of innocent infection have resulted from such errors.

A young man may be sterile and not impotent. There is an important truth concealed in this statement. Look up the meaning of the two words and then talk to your physician.

Woman is the moral thermometer of humanity. She rises with the moral standard of the male and falls as his standard falls. Wherever prostitution is rife, the moral tone of men is low.

Don't use a public common towel if you can avoid it. Be specially careful of contact with eyes and mouth. Use every precaution in public toilets, protecting exposed parts by use of clean paper.

Stop the indiscriminate kissing habit. There are thousands of syphilitic mouths. Don't let strangers kiss your children in the mouth under any circumstances. The less mouth kissing, all around, the better.

Every young man should make a confidant of some reputable physician. Your troubles are nothing to what the average physician has met with. Have no "false modesty" about it. Be brave and sensible. Conceal nothing.

There is no more reason why the average healthy young woman should be hauled off to a hospital a few weeks after marriage than there is a necessity of a dispensary for cats. Man's ignorance and wickedness is largely the cause.

"Syphilis" was the name of a shepherd in an old Latin play. He was cursed with an ugly disease for offending the gods. The word means "dear hog." Certainly the disease has proved a "dear hog" to an unfortunate humanity.

George Francis Train who originated and promoted the Union Pacific railroad, finally became so "eccentric" he would not shake hands with a man. Why? Most men wash their hands after visiting a toilet room. Some do not. A gentleman always does.

Man here below is in prison to nature. If the prisoner learns and obeys the prison rules the earth sentence becomes bearable and often enjoyable. Confinement in solitary cell of disease, pain and remorse, is the consequence of disobedience of the prison rules.

Morally, it is assault and battery with intent to kill to infect a female with gonorrhea. An enlightened public sentiment some day may make it a statutory offense. A male has no more right to pass a venereal disease to a female than he has to infect her with hydrophobia or smallpox.

Enlightenment for both young men and women means that in a few years America will give to the world the finest physical and noblest intellectual specimens of manhood and womanhood in the history of the race.

Men say: "Don't put all the blame on us. The women are just as bad as we are." Adam again. But who generally takes the initiative in immorality, who pays out cold cash for immorality, who supports the brothel? Looks very much as if Adam cannot make out a very good case against Eve.

The man who marries a pure woman and risks prostitutional exposure may be proud of one distinction should he infect his wife—he has committed a wrong that would be scorned by the beasts of the field. An animal when sick seeks to hide. Man alone deliberately destroys those nearest and dearest to him.

The man who places his sex function on a pedestal and secretly worships it—who makes sex gratification the chief object of existence—totally misunderstands the purpose of his life. Social failure and the gloomy misery of premature decay often bring home to him the bitterness of his sad misconception.

"He goeth after her straightway as an ox goeth to the slaughter or as a fool to the correction of the stocks." Read that wonderful chapter VII of Proverbs. The great hospitals of today are necessary and humane *slaughter* houses largely built for and sustained by the male and female victims of venereal disease.

The child conceived at a moment when either parent is drunk is likely to be an epileptic, imbecile or non-resistent victim of tuberculosis. A woman who conceives while recovering from severe illness is liable to have a degenerate offspring. How important it is that parents should carefully guard themselves in the reproduction of life.

A young girl should remember that there is just as much danger from contamination as there is from maternity. The comparatively strange young man met at the dance or in the park may carry the possibility of physical destruction with him. The straight and narrow path is much the better from the standpoint of health, morals and happiness.

Two young men may expose themselves with the same woman. One may acquire gonorhhea and the other not. The reason advanced for this is, that in the case where the male becomes infected, the gonorrheal germ is thrown out by the female from the pus-filled ovary during the orgasm. In the case where the male escapes infection no orgasm occurred.

The sexual diseases differ from all other diseases in that they are acquired generally by the male by an act of volition, that is, by deliberately exercising the right of choice, the choosing to risk exposure. Correct education as to sex nature means a more intelligent control of the will and the consequent gradual elimination of the sex scourges.

A woman may have syphilis and look as fair as a rose. The same woman may infect a man who may die in two or three years. This same woman again, may live for years as a trap for the unwary males. Medical scientists are not clear as to why the syphilitic germ has a different pathological effect on woman from man—but it does act differently.

"Clean up inside and outside" is the new manhood slogan. One can't be clean and touch the prostitute, street or brothel. They are living incubators of poisonous germ life. The day will come when a young man with syphilis or gonorrhea will be ordered out of a business office or well-ordered home as a walking pest, in danger himself and dangerous to others.

Life is a game. To assure success, no point in the game can be overlooked. Health is the first point in the game. The youth whose vitality is drained for a number of years by a gonorrheal gleet "cashes in" early, for a drained vitality is no good in man fighting. Such a youth accepts as his a portion of venereal slop in lieu of the really good things of later life.

So-called health certificates in a house of prostitution are a delusion and a snare. No public prostitute can long escape infection. A microscopic examination might fail to reveal the germ, but it may be there just the same. Antiseptics cannot reach it. The gonococcus burrows deep, but is thrown out in sexual excitement. In prostitutes it is usually there to inflict damage.

Who would hunt lions and be a boy at fifty like Roosevelt? Who would die past the age of ninety, a marvel of physical perfection, like Pope Leo XII? It isn't on the map of venery to produce such men—the whole category of sexual indulgence never produced a Roosevelt or Leo. Does it pay to stay away from the prostitute and her foul diseases? What's the use of asking such a question.

They are teaching the pathology of venereal diseases in open classes of male and female students in the Leland Stanford University. Social hygiene is taught in Vassar. No student has as yet withdrawn because of shocked sensibilities. The instruction is being given in the schools of Germany with hopeful results. Why not teach this vital matter in all American schools at the proper age?

The sexual hog, the man who boasts of his sexual prowess, of his fictitious capacity to have sexual relations numerously and repeatedly, should remember that he has a prostate gland at the neck of his bladder. When that gland is abused by overwork, it not infrequently enlarges, shutting off the proper passage of the urine. Decayed urine in the bladder means slow, torturing poison and eventually death. Sometimes there is a dreadful surgical operation.

The sensations of hunger and sex desire are almost identical, showing there to be a close sympathy between the stomach and sex-organ nerve centers. Physicians say this identity of sensation accounts for many cases of sexual perversion, and sexual perversion often comes when the male sex organs have been injured and weakened by gonorrhea, the disease switching or cross-currenting the hunger and sex-desire nerve centers. Think over the proposition!

The finest compliment that any young man can pay to his bride-to-be is to place in the hand of her father or best friend a certificate of "freedom from communicable disease," given by a reputable physician. It shows that the young man is "on the square." This should become a national custom. No young man who has been infected should risk marriage without the advice of a physician. A timely consultation of this kind may save much future unhappiness.

If young men could see the diseased vagina as the physician sees it, by electric light and microscope, they would not be so quick to throw away the priceless heritage of good health for the privilege of contact with the pus-poisoned genitals of the prostitute. No one has such a profound respect for venereal disease as the physician who daily may come in contact with infection. Observe him hasten for antiseptics after coming into contact with infection. None of it for the wise physician!

Think of the millions that would be released for helpful things if men were to surrender polygamous pursuit. Think of the millions that are spent in the chase after the sexual joys that turn to gall and wormwood, the millions that are apparently largely wasted as far as benefiting the world is concerned. The courtesan will consume as much wealth in a year as would aid many to a happier life. Then after it is all over, and the man has had his "fun," it is universal experience that his reflection must be "I was an ass!"—and there is none to dispute the admission.

It will soon be impossible for any man to deceive his wife as to the venereal infections. The Ladies' Home Journal, with a million circulation, has placed before the women of the country definite information on the subject. Other magazines treat the subject openly in their columns. The future generation of intelligent young women will be fully conversant as to the results of infection. The poisoning of women and children must come to an end. Soon society will not accept any excuse for a gonorrheally blinded child or for the venereal debauchment of the wife.

Young men ask: "Why is circumcision advisable now and was not necessary at an earlier period?" Biology answers that at one time the human species was much lower in the animal scale than at present—perhaps man crawled on his "hands and knees" or his four legs. He roamed through forest and field, lived a wild rough life and the portion now excised was necessary then to protect the part from injury. Now that man has risen to his "hind feet," with his head toward the stars and his body protected by proper clothing, circumcision often becomes an hygienic aid and physical comfort.

Much of the bibliography used in the preparation of this pamphlet was furnished by Dr. Homer G. Hamer, Indianapolis, Ind., secretary of the Indiana Society of Social Hygiene. Many of the pamphlets consulted are now out of print. Those who desire the latest writings in connection with the popular education of the people in sex matters should address Dr. William T. Belfield, secretary Chicago Society Social Hygiene, 100 State St., Chicago, Ill.; Dr. Prince A. Morrow, president American Society of Sanitary and Moral Prophylaxis, New York City, or Journal American Medical Association, Chicago, Ill.

The burden of taxation to take care of social delinquents is steadily growing. With the progress of civilization and the further acceptance of the principle that the weak must be looked after, this tax burden bids fair to become crushing. A farmer gladly favors state appropriations for scientific knowledge which will save his live stock, yet the profits earned by such knowledge are wrested from the farmer in the way of taxation to support human misfits. Has the time not come for an entire reversal of state policy—to prevent disease instead of trying to cure it? It costs money to issue printed matter but the returns are of enormous social and economic value.

A minor sexual erratum may be responsible for a boy's deficiency in school. Mothers all over the nation should insist on medical examination of school children. The physician must co-operate with the teacher and parents in the future for the proper guidance of children. A medical examiner attached to each school is a sort of child advisor for the neighborhood. He is worth his weight in gold to any community. If he were to save one blind child in a year, he would more than make his cost back to the state, for it costs from $300 to $500 a year to maintain and educate a blind child. Mothers must take more public interest in the future in matters relating to the physical welfare of their children. They can bring about astonishing reforms if they will co-operate, agitate and educate.

A young man has a deep-seated posterior gonorrheal gleet—hardly noticeable, perhaps. He gets married. The germ, half-starved and attenuated from trying to live in worn-out, non-responsive tissue, is thrown out from the husband. The bride becomes infected. She develops an acute gonorrhea, since the germ transplanted to a fresh soil, gratefully welcomes the change and comes to life with renewed and malignant vitality. To his amazement, the young husband may acquire an anterior infection or a "new dose" of gonorrhea. The husband becomes suspicious and angry and accuses his wife of having infected him. Results: tearful denial, separation, divorce, perhaps hospital operation for wife, husband seeks another bride to infect. Is humanity any better off for such ignorance?

It is considered quite the proper thing to inform a young girl as to the truths of her nature when she approaches the menstrual period. Intelligent persons are convinced that such knowledge affords a valuable safeguard for the maiden in every way. But when a boy is approaching a parallel critical period in his life—the period of emissions

and erotic (love) fancies—it is considered very bad form and "dangerous" to give him the slightest information. The lad is expected to stumble his way into knowledge, to suffer and to die, perhaps, from the venereal poisons. If moral and physiological instruction is good for the maid, why should it not be good for the youth? No wonder President David Starr Jordan of Leland Stanford university should remark sadly that probably one-third of the young men of today are maimed for life before they get a good start.

Many ask: "How did the venereal diseases originate?" They are supposed to have originated from long violation of the laws governing sexual purity. The cells of the venereal diseases are supposed to be perverted cells—that is, they were good cells originally but constant abuse, filth and ignorance of or indifference to hygienic law, slowly changed the types of the originally good cells to debased cells until finally the cells reached a type of permanent malignity, this transformation perhaps requiring many, many years. This transformation is on the same principle of making a bad child out of a naturally good child by constant abuse and poor environment. Social workers have records of certain families so debased, that they produce criminals and perverts for generations, not a single member of such families for perhaps a hundred years showing normality.

This professional, dyed-in-the-wool polygamist with his overheated brain, is continually on the search for excessive amativeness in the female and mournfully deplores the fact that the "majority" of females are not up to "expectation." This is a favorite excuse for divorce. The polygamist does not understand that nature has wisely ordained a certain degree of passivity in the great majority of females for both physiological and moral reasons. Physiologically, if the normal female were to be filled with the persistent and excessive sexual desire demanded by the polygamist, the sexual tract of the average male would soon be destroyed by overwork; morally, if the female should be in a continual state of sexual excitation, there would be a few virtuous women in the world and the race would die out. Nature is much wiser in such things than most of us suspect.

Isn't it time America looks itself squarely in the eye in connection with this sex problem? Isn't it time there should be a little common sense clear along the line? Isn't it time that some remedial measures be attempted—the elimination of the pander play, for instance? Think of theatrical managers making money out of teaching men to be vile, by presenting a drama apologetic for sex error or the drama that encourages sexual wrong doing by sly indirection. Yet there are men who put cocaine in catarrh snuffs to cure catarrh victims; put morphine in medicine to cure morphine victims; put aphrodisiacs in gin to drive negroes to sexual frenzy so that they will attack white women. The theatrical manager who caters to sexual bestiality belongs to the same class, only he is worse, for he strikes directly at national health by breaking down moral sentiment. Where the commercial fiend can ruin one, bad teaching will ruin many.

Young women ponder: "Why does a young man often get tired of his bride so quickly?" Biology answers: The polygamous instinct in the male is largely responsible, for it must be known that the male once roamed the hillside free and captured any female subject to his prowess. The male has not quite gotten over the habit yet, though the venereal diseases have risen to cut short his career. The male often does not understand his own nature or that of a female. His chief point is his vanity, and his pride in his sexual power constitutes not the least part of this vanity. Possession breeds dissatisfaction—the other girl unpossessed is perhaps just a little more desirable than his wife—so he thinks. He aspires to be loved, and coddled by a bevy of females. He gives little thought to the dignity or responsibility of the marriage relation. He may admit its social and conventional necessity but maintains secret reservations. When a man forswears the social, moral and physical right to practice promiscuity, there is small danger of that man having much domestic trouble, for the average woman will stay "good and true" if given half-encouragement. It's a great big subject but the uneradicated polygamous instinct lies at the bottom of the divorce evil and divorce can never be eliminated by law. Education of the sexes as to their own natures will alone serve to modify the evil.

If it were possible to designate any one gland of the male body as more important than another, it is possible the prostate gland might be entitled to that physiological distinction. Specialized study of the prostate is comparatively recent but enough has been found out about the gland to know that it is of extreme importance in connection with the physical and mental stability of the male organism. Pathologic (disease) disturbance of the gland is often accomplished by the most pronounced disturbance of other functions. Nature has shown her great solicitude for the gland by so placing it in the anatomy that its traumatic (blow) injury is very rare. When the male is in an erect position the gland is "directly between the legs" so to speak, where, for instance, a kick neither from the rear nor the front, can reach it. Nature evidently places much higher store on the gland than on the testes, which are so exposed as to be susceptible of injury. That nature has a deep design in so hiding and shielding the gland is now beginning to be perceived by venereal specialists, for they note the evil results of its disturbance. There are two things however that can reach the prostate gland—excessive intercourse and the gonorrheal inflammation. Excessive intercourse is silly, vulgar, brutal and destructive. Kept up persistently, injury is sure to result to the gland from overwork and many men suffer from an enlarged prostrate with its inconvenience and danger as the result of their folly. But gonorrhea—the gonococcus—is the deadly enemy of the prostrate. The inflammation gradually extending to the deep urethra involves the organ. Nature seems to resent this intrusion with the deepest indignation. Her carefully laid plans have been defeated—she flares up angrily and woe to the victim! Dame Nature lays on the strap unmercifuly.

Young men often ponder: "Why is it the race should be punished by venereal diseases when such a strong passion awakens at a period when

it is not feasible to contract the marriage relation from an economic standpoint and when the body of neither the male nor the female is prepared for reproduction?" Biology answers: Humanity was cradled in a warm climate. It lived in such a clime perhaps for thousands of years before venturing to colder lands. Life of all kinds matures more rapidly in a warm than in a cold climate. In the evolution of the race it is quite likely that thousands of years ago, nature placed no bar against puberty mariages. Again, the conditions of life during the early period were probably much more hazardous to the individual notwithstanding the softer climate than they are today. It is speculatively probable that the average life of the male was much shorter then than at present that the male began to make his own living at the age of twelve,—perhaps thirty years was an average long life then. In order to secure the perpetuation of the species, it is probable nature found it necessary to awaken the sexual instinct at an early age. This early awakening has been retained, though a large portion of the race now lives in the temperate zone where life matures more slowly than in the tropical zone. It might be that if the race were to live continuously in a cold climate for thousands of years, perhaps sex awakening would be delayed until eighteen or twenty years of age. However the awakening does come now at an awkward time, but it serves no useful end to lament over the conditions that bar the possibility of safe sexual exposure. Nature is determined to perpetuate the race and she has authorized the venereal scourges to force the race into the reproductive relationship, which is marriage or monogamy. Nature apparently cares little for the individual, though he cares for himself and if he wants to live long in the land the Lord his God has given him, he must accept the conditions as he finds them and live up to nature's laws even if they are heartless or "brutal."

Let us then hear the conclusion of the whole matter. Fear God and keep his commandments, for this is the whole duty of man.

For God shall bring every work into judgment with every secret thing whether it be good or whether it be evil.—Ecclesiastes, ch. 12, verses 13-14.

And so he does.

PRACTICE OF OPTOMETRY.

(Chapter 167, Acts of the Thirty-third General Assembly and as amended by the Thirty-fourth General Assembly.)

Section 1. **Practice of optometry defined.** The practice of optometry is defined to be the employment of any means other than the use of drugs for the measurement of the powers of vision and the adaptation of lenses for the aid thereof.

Sec. 2. **Board of optometry examiners—term—vacancies.** The board of optometry examiners shall be appointed by the governor and consist of three optometrists who have been engaged in the practice of optometry not less than five years in the state of Iowa, and are recommended by the Iowa state association of optometrists, one physician member of the state board of health, and the secretary of the state board of health. They shall be appointed on or before July 1, 1909, and each year thereafter and their terms of office shall be one year from July 1st of each year. Vacancies shall be filled by the governor, but the number of optometrists shall neither be increased nor diminished by any appointment to fill vacancy.

Sec. 3. **Organization—meetings—quorum—regulations.** The board shall organize by selecting one of its members as president and the secretary of the state board of health shall serve as the secretary for the board. They shall meet at least once each year the second Tuesday in July and at such other times as they may deem necessary in the office of the state board of health. A majority of the board shall constitute a quorum and its meetings shall at all reasonable times be open to the public. This board shall have power to make all needed regulations for its government and proper discharge of its duties in accordance with this act.

Sec. 4. **Who not eligible to appointment.** No members of the faculty of any optical school or college, or members of any wholesale or jobbing optical house shall be eligible to an appointment upon the state board of examiners in optometry.

Sec. 5. **Examination—license or certificate—record kept.** The board shall, at any regular meeting, and may at any special meeting, examine applicants for a license to practice optometry. Such examintion shall be confined to such knowledge and requirements as are essential to the practice of optometry. Said board shall issue a license or certificate duly authorizing such as are found to be qualified to practice optometry. Such certificate shall be conclusive as to the rights of the lawful holders of same to practice optometry in the state of Iowa. The name, age, nativity, location, number of years of practice of the person to whom a

license is given, the number of the license and the date of registration thereof shall be entered in a book kept in the office of the secretary of the board, which shall be open to the inspection of the public, and the number of the book and page containing such entries shall be noted on the face of the license.

Sec. 6. **Qualifications—examination—license—certificate for practitioners from other states—fee.** On and after October 1, 1909, every person desiring to begin or continue the practice of optometry in this state must furnish satisfactory evidence that he is twenty-one years of age, and of good moral character; that he has a preliminary education equivalent to at least two years' study in an accredited high school; that he has studied three years in the office of a registered optometrist, or is a graduate from a standard school of optometry before he shall be eligible to examination by the board. The standard school of optometry shall include a course of instruction of not less than two years' duration, and the terms of school shall not be less than three months' actual attendance each year. The requirements of a standard school of optometry shall be that each student shall devote seventy-eight hours to each subject named in this section during each three months' course. He shall not be entitled to be registered or to receive a license from the board unless he shall show proficiency in the following subjects: physiology of the eye, optical physics, anatomy of the eye, opthalmology, and practical optometry. Any person successfully passing such examination, and meeting all of the requirements in this section shall be registered by the board, and receive a license. The board of examiners may issue a certificate to any person taking up a permanent residence in the state of Iowa, and desiring to practice optometry, providing satisfactory evidence is furnished, of his qualifications, including credentials from the state board of examiners in optometry of the state in which he formerly resided, and upon payment of a fee of fifteen dollars.

Sec. 7. **Certificate of exemption—revocation of license or certificate—public hearing.** Every person entitled to a certificate of exemption from examination as herein provided must make application therefor and present the evidence to entitle him thereto on or before six months after the passage of this act or he shall be deemed to have waived his right to such certificate. Any license issued by said board of examiners may be revoked by said board for violation of the law, incompetency, immorality or inebriety. Provided that before any certificate or license shall be revoked, the holder thereof shall have notice in writing of the charge or charges against him, and at a day specified in said notice, and at least five (5) days after the service thereof, be given a public hearing and have ample opportunity to produce testimony in his behalf and confront the witnesses against him. Any person whose certificate has been revoked may, after the expiration of ninety (90) days, apply to have same regranted upon a satisfactory showing that the disqualification has ceased.

Sec. 8. **Fees.** The fee for said examination shall be fifteen ($15.00) dollars, for which a license shall be issued, to practice optometry in this state. Fee payable in advance to secretary of the board. Should

the applicant fail in his first examination he shall have the right to apppear at the next meeting of the board for another examination free of charge. For a certificate of exemption a fee of ten dollars ($10.00) shall be paid to the secretary of the board of examiners, for which a license shall be issued to practice optometry in this state; said fees constitute a fund for expenses made necessary by this act. From this fund the board shall cause to be paid all necessary expenses incurred in the administration of this act.

Sec. 9. **License filed with clerk of district court—fee.** Every person to whom a license is issued under this act shall file the same for record with the clerk of the district court in the county or counties in which he desires to practice optometry and the clerk of the district court shall be entitled to a fee of fifty cents (50c) for recording such license.

Sec. 10. **Compensation—expenses** Each member of the board of examiners (except the secretary) shall be paid five dollars ($5.00) for each day actually engaged in the duties of his office with actual expenses incurred by him in the discharge of such duties, from the fund created by the payment of fees by applicants for examination. Secretary shall receive his necessary expenses incurred for services which cannot be performed at the capitol. All printing, postage and other contingent expenses necessarily incurred under the provisions of this act shall be paid from said fund. All expenses incurred under the provisions of this act shall be itemized thereupon and audited and a warrant drawn therefor on the optometrists' fund in the same manner as other expenses of the state board of health.

Sec. 11. **Not applicable to merchants or dealers—unlawful practice.** This act shall not be construed to apply to merchants or dealers who sell glasses as merchandise and who do not profess to be optometrists or practice optometry as herein defined. Any person practicing optometry shall be prohibited from using the prefix doctor to his name unless he is a duly registered and licensed physician and surgeon and his rights to such being allowed by the state board of medical examiners, nor shall he advertise himself in such a manner as to lead the public to believe him to be different than an optometrist as defined in this section.

Sec. 12. **Penalty.** Any person who shall practice optometry in this state in violation of the provisions of this act, shall be guilty of a misdemeanor and upon conviction thereof shall be punished by a fine not exceeding one hundred dollars ($100.00) or imprisonment in the county jail not more than thirty (30) days.

Sec. 13. **Disposition of unappropriated funds.** All unappropriated funds arising under this act, shall be accounted for and turned into the state treasury on June 13th of each year, except the sum of five hundred dollars ($500.00), which shall be placed to the credit of the optometry fund, by the state treasurer, to defray current expenses of the board of optometry examiners.

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REPORT

BY THE

GOVERNOR OF IOWA

OF

Pardons
Suspensions and Conmutations
of Sentence

AND

Remissions of Fines

From January 1, 1911, to December 31, 1912

DES MOINES
ROBERT HENDERSON, STATE PRINTER
1913