N. B. LOGSDON.

On January 9, 1903, at 5:40 P. M., N. B. Logsdon, a miner in the employ of the Saylor Coal company at Saylor, in Polk county, fell from the ground landing to the bottom of the shaft. He breathed but a few times after striking the bottom.

Mr. Logsdon and his partner, Mr. Thomas, were letting down props. Before the first cage was sent down they sent the cager down and the cage was not returned, although they did not know it. They neglected to put the bar across the shaft. They then loaded a car of props and did not ascertain whether the cage had been returned to the ground landing. The car was pushed into the empty shaft and Mr. Longsdon followed it down. Mr. Thomas caught the center post and thus saved his life.

RICHARD D. GUTHERIE.

Richard D. Gutherie, a miner in the employ of the Midway Coal company, located three miles southwest of Des Moines, was instantly killed by slate falling on him in his room, between 9 and 10 o'clock in the morning, on February 19, 1903.

Mr. Gutherie's attention had been called to the unsafe condition of the root in his room, but thinking it was safe he failed to put any props up. While he was at work under this loose slate and rock it fell and completely buried him under it.

TWELFTH

BIENNIAL REPORT

OF THE

BOARD OF HEALTH

OF THE

STATE OF IOWA

FOR THE

PERIOD ENDING JUNE 30, 1903



DES MOINES: B. MURPHY, STATE PRINTER, 1903.

LETTER OF TRANSMITTAL

STATE OF IOWA, Office of Secretary State Board of Health, Des Moines, July 1, 1903

To Albert B. Cummins, Governor of Iowa:

2

SIR,—In accordance with the provisions of section 2565 of the Code, the Twelfth Biennial Report of the State Board of Health for the period ending June 30, 1903, is herewith presented. J. F. KENNEDY, Secretary.

MEMBERS OF THE BOARD

CHARLES W. MULLAN, Attorney-General, Des Moines, *ex officio*. PAUL O. KOTO, State Veterinary Surgeon, Forest City, *ex officio*. CHARLES FRANCIS, Civil Engineer, Davenport.

Appointed by Governor.	Health Districts.	Term Expires.
C. B. Adams, Sac City (H)	Fifth	January 81, 1904
J. A. McKlveen, Chariton (E)	Eighth	January 81, 1905
Henry Matthey, Davenport (R)	Second	January 81, 1906
R. E. Conniff, Sloux City (R)	Fifth	January 31, 1907
F. W. Powers, Waterloo (R)	First	January 31, 1908
J. H. Sams, Clarion (R).	Fourth	January 81, 1900
A. M. Linn, Des Moines (H)	Seventh	January 31, 1910

The Third and Sixth districts are not represented. The Third district lost its representation May, 1901, by the resignation of W. Bancroft, of Keokuk; and the Sixth by the resignation of Senator J. H. Emmert, of Atlantic, December, 1897.

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PREFACE

In the preparation of this report I have endeavored to follow the requirement of section 2565 of the Code, which makes it the duty of the Secretary of the State Board of Health, in his biennial report to the Governor, to "include so much of its proceedings, such information concerning vital statistics, such knowledge respecting diseases, and such instruction on 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."

It will be noticed in comparing this report with former ones from this office, that no previous one contained so many and such important and instructive papers from the members of the State Board of Health.

A large amount of space is given to Sewage Disposal; Tuberculosis and its Care and Treatment in Sanatoria; Smallpox; Milk and matters of practical sanitary interest, as well as a report of the meetings of the Board.

A glance at the table of contents will indicate the wide range of topics presented, in many respects by eminent specialists in the subjects considered.

J. F. KENNEDY.

BOARD MEETINGS

I

SECOND QUARTERLY MEETING, AUGUST, 1901

By order of the President the Iowa State Board of Health, met in second quarterly session at the office of the State Board of Health, Des Moines, August 14th, and was called to order by the secretary in the absence of President Shrader, in Europe, and Dr. R. E. Conniff was elected president *pro tempore*.

There were present Conniff, Adams, Gibson, Linn, Powers and Matthey.

The quarterly report of the secretary was read and referred to the appropriate committees.

The secretary reported the following respecting infectious diseases:

There has been a great falling off in the number of outbreaks of smallpox as compared with the last three or four quarters. Scarlet fever reports, however, were rather in excess during the month of July. There has been also a notable decline in dipththeria outbreaks. There is no occasion, however, for further detail on this point as the card reports from time to time and the *Bulletin* have kept you promptly and fully informed as to these casualties. It may be proper to say that the state is comparatively free from these diseases at the present time.

TUBERCULOSIS

The following statement was made by the secretary in regard to tuberculosis:

It was doubtless a great surprise in the late Tuberculosis Congress in London to have Prof. Koch declare that tuberculosis in cattle and in human families were not identical, and that the disease could not be communicated to the human family by the use of the meat and milk of tuberculous cows. The *Bulletin* now in press, gives the concensus of opinion of some leading observers upon his statement. The venerable and eminent Lord Lister of London, and Brouardel of Paris, besides noted authors in this country are not in sympathy with the views expressed by Prof. Koch. If his statement is true all our text-books and circulars on tuberculosis will have to be revised, and future scientific conclusions on this disease will be received with doubts, since it was thought that the views ordinarily held and promulgated heretofore were based upon indisputable scientific demonstrations.

FINANCIAL

The following exhibit shows the expenditures of the Board for the quarter ending July 31, 1901. The items of expenditures were as follows: Board meeting, May 22, 1901.

MEMBERS' EXPENSE ACCOUNT

C. B. Adams			 à						 •		 •	•	• •	. ,		•		 		 .:	\$25.46
J. C. Shrader						• •				•	 			8	•			 			21.28
R. E. Conniff			 4								 					•		 			34.40
H. Matthey		 	 				 				 						 ,	 		 ÷	29.00
J. A. McKlvee	en		 															 			17.30
A. M. Linn .		 	 				 		 												8.50
F. W. Powers		 	 				 											 			24.20
J. I. Gibson							 											 			27.08

Total

\$ 187.22

Paid by State Warrant No. 8117.

SPECIAL EXPENSE ACCOUNT

J. I. Gibson, Tuberculosis Congress, New York City, 138.00 Paid by State Warrant No. 8116.

CURRENT EXPENSE ACCOUNT, MAY, 1901

J. F. Kennedy, Secretary	100.00
Margaret S. Schoonover, Stenographer	65.00
Meyers & Tucker, Bulletin mailing list	73.81
Meyers & Tucker, printing May Bulletin	56.30
J. C. Shrader, investigating smallpox	11.05
Lewis Schooler, postal cards	10.00
A. M. Linn, investigating smallpox	9.85
R. E. Conniff, telegrams, livery, etc	5.67
F. W. Powers, investigating smallpox	3.98
Puck Manufacturing Co., disinterment permits	4.50
Iowa Litho Co., letterheads	3.00
Langan Bros., bond paper	1.20

1903] SECOND QUARTERLY MEETING-AUGUST, 1901. 13

Bausch & Lom	b, Journal, 1901	***************	1.00
U. S. Express	Co		.52
Total			\$ 345.88

Paid by State Warrant No. 8362.

CURRENT EXPENSE ACCOUNT. JUNE, 1901

J. F. Kennedy, Secretary,	\$100.00
Margaret S. Schoonover, Stenographer,	65 00
Meyers & Tucker:	0.010.0
Printing June Bulletin\$50.00	
Mailing June Bulletin 6.30	
Postage for April	
Postage for May 2.90	
	\$62.02
Iowa Litho Co., 9,000 letter heads:	
3.500 Office of Secretary.	
2,500 Office of President.	
3.000 Members.	
700 envelopes (200 stamped) for President.	
Geo A Millor Printing G	48.50
1500 postola	
1,500 postais\$15.00	
4.75 a 700	
2.500 circulars 4.75	
2,500 1c envelopes 27.50	
Printing 2,500 envelopes 2.25	
	54.95
C. B. Adams, investigating smallpox	17 99
J. C. Shrader investigating smallpox	11.33
Adams Express Co	10.04
American Express (o	1.26
I. S. Express Co	1.46
angroup (discourse)	.76
Total\$	367.12
Daid by State Wesser in anna	

Paid by State Warrant No. 8779.

CURRENT EXPENSE ACCOUNT, JULY, 1901

J. F. Kennedy, Secretary	100.00
Margaret S. Schoonover, Stenographer	65.00
Meyers & Tuvker, printing and binding Bulletin	56.30
ewis Schooler, stamped envelopes	42.00
C. B. Adams, investigating smallpox	28.62
F. W. Powers, investigating smallpox	25.75
Langan Bros., stationary	11.33

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[No. 21

Star Engraving Co	5.85		
Iowa Litho Co., letterheads (Powers)	5.00		
Southern Printers' Supply Co., electros	3.25		
Puck Mfg. Co	1.75		
Southern Printers' Supply Co., electros	1.00		
Adams Express Co	1.40		
U. S. Express Co	2.15		
R. E. Conniff, investigating smallpox	9.87		
Total		\$	359.26
Paid by State Warrant No. 9747.			
Recapitulation:			
Members' expense account	\$187.22		
Special expense account	138.00		
Current expense account, May	345.88		
Current expense account, June	.367.12		
Current expense account. July	359.26		
Total		\$	1.397.48
Previously expended			2.714.77
		40	4,112.25

Balance on hand\$887.75

REPORT OF AUDITING COMMITTEE

Your auditing committee, to whom was referred the financial report of the Secretary for the quarter ending July 31, beg leave to report that the same has been carefully audited and found correct.

H. MATTHEY, Committee.

The report was received and adopted.

The report was received and adopted.

DISINTERMENT PERMITS

Secretary reported that for the quarter he has issued from the office 235 ordinary permits in addition to the fifteen special permits granted by the Board at its last meeting. He presented the following applications for special permits, which were referred to the committee on corpses, who subsequently reported in favor of the granting of them all. The report was adopted and the secretary directed to issue the permits accordingly.

FRANK BROWNFIELD GASS, 1890, *diphtheria*, by private conveyance from St. Ambrose cemetery, Des Moines, to Youngstown cemetery, Polk county,

ALVIN T. HARDEN, 1863, *diphtheria*, by private conveyance from Queen City cemetery, Quincy township, Adams county, to Walnut Grove cemetery, Corning, Iowa. EMMA KLEMA, 1900. scarlet fever, by private conveyance from private burying ground, Silver township, Cherokee county, to Highland cemetery, Highland township, O'Brien county.

CHARLES HOSS KNAPP, 1895, scarlet fever, by private conveyance from Exira cemetery to another lot in same cemetery.

ANNA M. KRAUSE, 1863, membranous croup, by private conveyance from Johnson cemetery. Scotch Grove township, Jones county, to Wyoming cemetery in Wyoming, Iowa.

GEORGE W. KRAUSE, 1870. scarlet fever, by privite conveyance from Johnson cemetery. Scotch Grove township, Jones county, to Wyoming cemetery in Wyoming, Iowa.

HOWARD ROBERTS, 1886. eroup, by private conveyance from Hewitt cemetery. Grant township. Montgomery county. to another lot in same cemetery.

BERTHA N. SWANSON, 1891, *diphtheria*, by railroad from Irvington cemetery, Kossuth. to Gilbert cemetery, Gilbert, Iowa.

LENA N. SWANSON, 1891, *d phtheria*, by railroad from Irvington cemetery, Kossuth county, to Gilbert cemetery, in Gilbert, Iowa.

HITTE WHITE, 1863. diphtheria, by railroad from Woodland cemetery. Des Moines, to Greenwood cemetery, Broklyn, N. Y.

GASOLINE LAMPS

The following gasoline lamps were approved by the Board:

"Turner Arc Pressure Lamp No. 10," "Little Wonder No. 20," "Delmar Vapor Lamp," "Improved Welsbach-Students Lamp."

At previous meetings of the Board the following additional lamps were approved:

"Nulite Arc." "Bystrom Gas Lamp," "Corona," "Columbia," "Morey's No Mantle," "Grinnell Lamp," "Sterling Arc," "Sterling Gravity," "White Star," and "One Gallon Doran."

"The American Arc No. 2," "The Magic Arc," "The Magic Gravity," "The Solar Arc."

"The Simplicity style B," "The Efficient No. 6," "Pressure Arc Lamp No. 5 E." "New Century Lamp No. 50," "The Rockford X-Ray," "Omaha Automatic Gas Lamp," "Standard Gas Lamp," "The Columbian," and "The Imperial Lamp." "The M. & M. Arc," two styles, one for store and one for street, and the "No. 5 Special."

It is to be understood that the Board does not issue guarrantees of safety for any of these lamps and does not specially commend any one as more than reasonably safe under proper care.

No gasoline lamp not having the approval of the Board, after due test and consideration, can be used in Iowa without violating the law and subjecting those using them to severe penalties.

EMBALMERS

The Board directed the Secretary to issue Embalmers permits to sixlythree applicants, all of whom passed a satisfactory examination before the Board in May, except one who was granted a permit by reciprocity as the holder of a permit from the Illinois State Board of Health. [Applicants from other Boards requiring examinations, who have permits from such Boards, are admitted to certificates in Iowa upon the presentation of said certificates and the payment of the prescribed fee, without examination, *provided* the other Board issuing the certificate extends the same courtesy to those holding permits from the Iowa Board.—Sec'y.]

AMERICAN PUBLIC HEALTH ASSOCIATION

Drs. Gibson, Adams and Powers were elected delegates to attend the meeting of the American Public Health Association to be held at Buffalo, N. Y., September 16th-20th, proximo.

CONTAGIOUS DISEASES

The committee on contagious diseases, Drs. Matthey and Adams, were instructed to report at next meeting, what, if any, changes should be made in the rules and regulations relating to quarantine.

In reply to a communication from Dr. C. H. Preston of Davenport, relative to shortening the quarantine period in cases of diphtheria where anti-toxin has been used, Dr. Powers to whom the communication was referred reported as follows:

"Your committee would recommend that until more reliable data are at hand from skilled bacteriologists demonstrating that the Klebs-Loeffler bacillus loses its element of contagion or ceases to exist in the nasopharynx, or else where in the animal economy prior to the seventeen days after apparent full recovery that the quarantine period for diphtheria remain as now approved by our Board according to rules 8, 9, and 10."

VISITING INFECTED LOCALITIES

The Board directed the Secretary to inform the local health boards of the state whether rural or urban that calls for visits by members of the Board to assist in quarantine or for any official purpose must be made by the proper official authority, whether mayor or township clerk, and the expenses of such visits must be met by the locality desiring the visit, as the state makes no provision for such expenses.

Board adjourned to meet the first Wednesday in November unless otherwise ordered by the President.

THIRD QUARTERLY MEETING-NOVEMBER, 1901

The State Board of Health met in third quarterly session, November 19th, and was called to order by President Dr. J. C. Shrader at 10 A.M.

There were present Drs. Shrader, Powers, Linn, McKlveen, Coniff, Adams, and Mathey; State Veterinary Surgeon, Dr. Gibson, and Civil Engineer, Charles Francis.

The minutes of the last meeting were read and approved.

The report of the secretary for the quarter ending October 31st was read, received and referred to appropriate committees.

The following legislative committee was appointed:

McKlveen, Shrader, Linn, Attorney-General Mullan and Powers.

Charles Francis was appointed on the committee on Gasoline Lamps and also Chairman of the Committee on Plumbing and Ventilation.

President Shrader delivered the following introductory address.

GENTLEMEN AND MEMBERS OF THE STATE BOARD OF HEALTH:

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As members of the State Board of Health, it becomes us to be on the alert, in order to protect the people against infectious and contagious diseases. The Board was created for that express purpose and, after serving as a member for the past fifteen years, I feel that we can report progress. But there still remains much to be done; the people should be educated in the principles of hygiene—it is by its study, and the practice of the principles taught in sanitary science, that we can say to them (the people) that disease in nearly all of their multifarious forms should not exist. They are preventable, and, in the language of the learned men of the world, are "curable."

What diseases are proving the messengers of death in this, our day? Tuberculosis. diphtheria, the exenthemata—or diseases accompanied by a rash or an eruption on the skin—then bubonic plague, typhoid fever, yellow fever, cholera. Now all these are preventable. They are known, or nearly all, to be germ diseases—due to living parasites; and parasites, like other living things, can be exterminated. At the present time the people of the state are suffering from an epidemic of smallpox. That it has existed in the state for the past three years; there has been no time since its first invasion when we could say that it had been entirely eradicated. It is true, there have been times that it had almost ceased to exist. but from various causes it soon broke out again, until now a large number of places are infected; and as far as my observation extends it is easier prevented—stamped out. When existing in its true and unmasked form—when it was of such a loathsome character, and of so virulent a form, and produced such terrible ravages—then the people fied from the pestilence, then they were ready to submit to vaccination and to assist the authorities in every way they could to obtain relief.

The present epidemic has been of a very different character and has added very much to the difficulties in controlling the disease. Its very mildness has of itself given rise to much discussion as to its real nature and character. In many cases it differed so much from the original prototype, that in some instances physicians, that were honest in their belief and intentions, were led for a while to believe that it must be some other. or a different kind of disease; but these men, those that were honest. and seeking light and truth, became convinced of its true nature, and so manfully stated, and then did all they could to correct the error thew had committed, and were ready and willing to obey the rules and regulations of the State Board of Health in the way of vaccination, disinfection, quarantine, etc. But what shall I say of another, though I are happy to say, not a large class of physicians-men holding certificates from the State Board of Medical Examiners-allowing them to lawfully practice their profession-many of these enjoying the confidence of the people, and a lucrative practice, who are either ignorant of the nature of the affection, or else, for the sake of popularity among a certain class who proclaim themselves opposed to vaccination; others object to quarantine, and look, in their misguided opinions, upon quarantine as a persecution and not in its true light as a means of protection to the people. giving them warning not to enter the premises where the card is placed. and to prevent the persons, where a dangerous disease exists, from mimgling with the people and thus spreading the disease among their unsuspecting neighbors, and endangering their health and lives. There are others who seem to think it is lowering their standing as members of the medical profession to have it known, or to acknowledge they were mistaken, and so they continue to call the disease by some other than its own and true name thus allowing it to spread through the community, and in many cases, over a large area. And I am sorry to state, there are others who, to please their patrons, and to render themselves popular. knowingly and wilfully violate the laws of the state, and the rules and regulations of the State and Local Boards of Health.

Now these men should be prosecuted in the civil courts, and be held financially responsible, for endangering the lives and health of the people. The law is amply sufficient, and convictions could be easily secured against all such offenders. It is also a misdemeanor, and he can be further subjected to imprisonment for such neglect or refusal to obey the rules and regulations of the State and Local Boards of Health in regard to quarantine.

While comparatively few deaths have occurred from this mild form of smallpox, much suffering has been caused, and a great loss to individuals and communities by the expenses of quarantine, disinfection, and the destruction of property, and by the loss and interruption of business. It therefore behaves every community, for financial, if no higher considerations, to be prepared to enforce prompt, vigorous, and, above all, intelligent measures to suppress the disease upon its first appearance.

Smallpox, like fire, is easily stamped out in the beginning. Hence the necessity for prompt action in the first, or initial case, in a community. If prompt measures are then taken, an outbreak or an epidemic may be averted.

It was ordered that a revised edition of Circular No. 8, on smallpox, be issued by the Secretary for free distribution.

SPECIAL DISINTERMENT PERMITS

The board directed the secretary to issue the following special disinterment permits:

Dot ALLEN, 1882, scarlet fever, from Allen's farm, Vernon township, Palo Alto county, by private conveyance to Evergreen cemetery, Emmetsburg, Iowa.

RALPH BRENNAN, 1901. diphtheria, from St. Marguerite's cemetery, Davenport township, Scott county, to another lot in the same cemetery.

ADDIE CHANDLER, 1872, membranous croup, from Franklin Grove cometery, Pierce township, Page county, to Evergreen cemetery, Red Oak.

CABRIE GUPTIL, 1879, scarlet fever, from Eldora cemetery, Dover township, Fayette county, to Waucoma cemetery, Waucoma, Iowa.

ESTHER CARR. 1896, membranous croup, from Woodland cemetery, Des Moines, to another lot in the same cemetery.

NANCY LAMED, 1872, scarlet fever, from Middlefield cemetery, Middlefield township. Buchanan county, to Fairview cemetery, Byron township, Buchanan county.

WILLIE LAIRD, 1875, scorlet fever, same as above.

JAMES B. MCCARTHY, 1894, *diphtheria*, from Mt. Olivet cemetery, Table-Mound township. Dubuque county, to another lot in the same cemetery.

ELLEN MCCORD, 1878, diphtheria, from Oak Hill cemetery, Cedar Rapids, to Linwood cemetery, same city.

MARY I. MCGRATH, 1887, scarlet fever, from St. Mary's cemetery, Davenport, to Holy Family cemetery, same city.

LULA MAY MILLER, 1894, *diphtheria*, from Lake View cemetery, Center Grove township, Dickinson county, to another lot in the same cemetery.

HANNAH RISELY, 1861, *diphtheria*, from Middlefield cemetery, Middlefield township, Buchanan county, to Fairview cemetery, Byron township, Buchanan county.

JACOB RISLEY, 1861. diphtheria, same as above.

ADA VANCERWILL, 1901, diphtheria, from Prine cemetery, West Harrison township, Mahaska county, to Pella cemetery, in the city of Pella.

WILLIAM VAN DOHREN, 1878, *diphtheria*, from cemetery in Galva township, Ida county, to Ida Grove cemetery, Corwin township, Ida county.

HERALD CHARLES VOLLMER, 1898, scarlet fever, from Aspen Grove cemetery, Burlington, to another lot in the same cemetery.

DAVID FORRESTER CALL, 1890, diphtheria, from Oakland cemetery, Iowa City, to Webster City cemetery, Webster City.

HENRY MENGEL, 1890, diphtheria, from St. Mary's cemetery, Davenport, to Fairmount cemetery. Rockingham township, Scott county.

Two applications for disinterment of bodies dead from smallpox were rejected, and permits refused.

All the above were to be removed by private conveyance and under the special conditions required in such cases.

FINANCIAL

The secretary submitted his financial report showing detailed expenditures for the quarter ending October 31. The report was received and referred to the auditing committee, who subsequently reported as follows:

"Your Auditing Committee, to whom was referred the financial report of your Secretary for the quarter ending October 31, 1901, respectfully report that we have carefully audited the same and find it correct in every particular. We find proper vouchers on hand for each item of expenditure. H. MATTHEY, Chairman."

"(Signed.)

The report was received, adopted and placed on file.

The following is the report in full as above referred to:

Board Meeting August, 1901.

MEMBERS' EXPENSE ACCOUNT

F. W. Powers	3					•	• •		•	۰.	•	•																•				*	•		.\$	20.45
H. Matthey .	r r										• •	ē	¥	u.	.		•								•			•					•		8	23.25
J. I. Gibson	• •			•				6			•	• '		*	,					0	•	8	N						•				3			26.58
A. M. Linn .	•	2.0		• 2		• •				• •		•	•			•	۵	ą		s .			•	13										4		10.00
C. B. Adams	•		•	•	•			÷		÷		•							3 * 3			÷				•			•***		¥		34	•		20.71
R. E. Conniff		¥.			÷		4							¥- 4				•				•								r			10			33.50

Total

Paid by State Warrant No. 9812.

CURRENT EXPENSES AUGUST, 1901

J. F. Kennedy, Secretary	\$100.00
Margaret S. Schoonover, Stenographer	65.00
Meyers & Tucker, printing and mailing Bulletin	56.30
R. E. Conniff, telegraph and telephone	4.87
Geo. A. Miller Printing Co., envelopes	1.50
Louis Schooler, postage	80
Adams Express Co	. 1.25
American Express Co	3.29
U. S. Express Co	. 2.70
Wells-Fargo & Co., express	. 1.00

\$134.49

CURRENT EXPENSE ACCOUNT, SEPTEMBER, 1901

J. F. Kennedy, Secretary \$100.00	
Margaret S. Schoonover, Stenographer 65.00	
Louis Schooler, postal supplies 81.87	
Meyers & Tucker, printing and mailing Bulletin 61.88	
Carter & Hussey, binding Bullet n 17.00	
Star Engraving Co., half tones	
C. B. Adams, investigating smallpox S.55	
Adams Express Co	
American Express Co 1.80	
proceeding the second	
Total	\$345.80

I aid by State Warrant No. 10657.

SPECIAL EXPENSE ACCOUNT

C. B. Adams, expenses to Buffalo \$	69.80
Paid by State Warrant No. 10658.	
J. I. Gibson, expenses to Buffalo	100.95
Paid by State Warrant No. 10659.	*
J. C. Schrader, expenses to London, Eng	400.00
Paid by State Warrant No. 10739.	
F. W. Powers, expenses to Buffalo	61.00
Paid by State Warrant No. 10896.	

CURRENT EXPENSE ACCOUNT, OCTOBER, 1901

J. F. Kennedy, Secretary	ofia 15 - 5 Lotaciones Lotaciones
Margaret S. Schoonover, Stenographer	
Meyers & Tucker, printing and mailing Bullet n 56.30	h di kata
J. C. Shrader, investigating smallpox, Grinnell 5.00	a start and a start and a start and a start a s
Harris-Emery Co., felt, etc., for office	1.1.1.1
American Medical Association (Journal)	
Medical Review of Reviews	
Popular Science Monthly	
U. S. Express Co	
and the state of the second	
Total	\$230.90

Paid by State Warrant No. 11055.

The fiscal year ended with September 30th. The entire amount of the appropriation having been expended, the expenditure of \$230.90 for October and the special expenditures of Drs. Shrader and Powers make the total amount expended out of the current appropriation, \$691.90. Leaving unexpended of the appropriation \$4,308.10.

LAND HEATING TO BE A

SCHOOLS

Dr. McKlveen presented the following report on schools, which was read, received and ordered printed:

REPORT OF COMMITTEE ON SCHOOLS

"Contagious Diseases in Schools and the Best Means of Prevention." I find upon looking up reports, rules and regulations adopted by this Board at various times, very little can be added to what has already been said or done as touching the above. The Board has evidently been alive to the fact that no more important matter could come before them for their careful deliberation and action than the best methods for the prevention of contagious diseases in our schools.

Upon examination of the Bulletins and Biennial Reports for years back, I find there is "line upon line and precept upon precept" upon this subject. When we take into consideration the fact, eliminating the single disease tuberculosis, that nine-tenths of the cases of contagious diseases are among school children, and the larger proportion of these cases contract these diseases in the school room, we must be impressed with the importance of throwing around the children every possible safeguard. I have not had time to look up statistics on the subject very carefully, but I believe they will bear me out in the statement just made. It is well known that nearly all cases of scarlet fever and diphtheria occur in children during the period in which they attend school-say from the age of five to fifteen. Scarlet fever seldom attacks persons of adult age, and when it does it is usually very mild and seldom proves fatal. There are three recognized forms of the disease: Scarlatina simplex, scarlatina anginosa and scarlatina maligna. These divisions are arbitrary and simply denote degrees or grades of the disease as to mildness or severity. The germ that produces the one will also produce the others. Simple scarlet fever (scarlet rash, as it is usually called by the laity and even by physicians) may be so mild as not to confine the patient to the house, and when permitted he will often go to school during the whole course of the disease. Herein lies the great danger of infection, as one child may infoct a whole school. Physicians are often not called to see these cases and the parents cannot be made to believe that it is necessary to quarantine or even to keep their children out of school. The bacillus being identically the same in every form of the disease, the milder forms may be converted into the more severe form, as it occasionally is, and it is only then that the true character of the disease is recognized and measures adopted to check its ravages, often too late for some of the little sufferers.

What has been said of scarlet fever may also be said in regard to diphtheria. Both may be so mild as not to require medical aid, and on the other hand, to be so malignant as to cause death in spite of the best medical skill. That both of these diseases in every form are contagious there can be no doubt, hence the importance of being informed with regard to the symptoms and course of these diseases, and especially the milder forms, cannot be too strongly impressed upon the attention of parents and teachers.

It is our opinion that teachers ought to be required, as a part of their training, to study the symptomatology of contagious diseases and pass a satisfactory examination upon the same before receiving a certificate. If a rule of this kind was adopted and strictly enforced it would greatly lessen the danger of epidemics and the spread of contagious diseases, thus sparing the suffering and saving the lives of many of the little ones. As soon as symptoms of any contagious diseases manifest themselves, the child should be sent home immediately by the teacher and not be permitted to return until he brings a health certificate from a competent physician, stating that the child is free from contagious diseases and not in a condition to communicate such diseases to others.

No one should be permitted to teach or attend any school who is suffering from tuberculosis, and teachers should be required to furnish a physician's certificate as a pre-requisite to examination by the County Superintendent for a certificate to teach, certifying that the applicant shows evidence of having been successfully vaccinated and free from any contagious disease, and the certificate of the Superintendent should show upon its face that the holder has furnished such evidence.

The rules and regulations of the State Board of Health do not at this time require the quarantine of measles and chickenpox. Chickenpox is seldom, if ever. fatal, and causes but little suffering and inconvenience; hence the public is not yet ready to willingly submit to a regulation requiring quarantine for a disease so mild as chickenpox.

Measles, however, is much more to be dreaded. It more often proves fatal in its immediate results and its sequela frequently bring suffering and death later on. This disease from time immemorial has been considered by the laity as a kind of necessary evil that had to be endured at some period of life, and the sooner the better, because the disease is milder in early life than in old age. Measles is a preventable disease and can be stamped out by proper methods, and the sooner we set about to accomplish this end the better.

If the people generally could be made to understand this matter they would be as willing to submit to quarantine methods in this disease as in smallpox or any other quarantinable disease.

TAMA INDIANS

Communications and a report by Dr. Linn were laid before the board respecting the outbreak among the Indians on the reservation in Tama county. It was shown that there had been a number of cases and twenty-five deaths from smallpox. It was also reported that proper precautions against its spread had not been enforced, and that the Indians themselves were not having proper care.

A question arose as to what authority the state or local board of health had in localities under federal control. Drs Powers and Gibson were appointed a committee to confer with Governor Shaw and Attorney-General Mullan in regard to the matter. As a result the governor telegraphed the situation to the Secretary of the Interior, and in reply received the following:

"Department will be glad to co-operate with State Board authorities in protecting people in Tama county against smallpox among Indians, and will so instruct Indian Agent in charge. Under the exigency shown in your telegram your State Board of Health and state authorities may take any necessary action. E. A. HITCHCOCK,

"(Signed.)

Secretary of the Interior."

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Upon the receipt of this telegram Dr. Linn was directed, immediately upon the adjournment of the meeting, to go to Toledo and personally assist the Agent there, Mr. Malin, in inaugurating such measures as will best and most promptly relieve the Indians themselves and also prevent its spread outside of the agency.

GASOLINE LAMPS

The following gasoline lamps were approved by the Board and their use permitted in the state: "Standard Gas Lamp;" "Standard Arc Lamp, No. 39;" "Efficient Vapor Lamp, No. 2;" "Efficient Vapor Lamp, No. 6," and "Sun Incandescent Vapor Gas Lamp."

VACCINATION

Communications were laid before the Board asking if the internal administration of vaccine, or any substitute therefor, might under the rules of the Board respecting vaccination, be accepted by local boards in lieu of such vaccination.

The matter was referred to the Committee on Contagious Diseases. Dr. Adams, on behalf of the committee, submitted the following report, which was adopted:

"Your committee, to whom has been referred the communication upon vaccination and substitutes therefor, would respectfully recommend that the communications be referred to a committee consisting of Drs. A. M. Linn and F. W. Powers for immediate investigation, with instructions to report at the next session, and that the Secretary be instructed to inform the parties that this Board does not at present recognize this form of vaccination."

The report was received and adopted.

CEMETERIES AND WATER SUPPLIES

A communication was laid before the Board by the secretary asking the following:

"In what light, as to being dangerous or otherwise, would the State Board of Health consider the locating of a cemetery within twenty rods of a fifty-feet deep well, where the surface of the well is a little lower than the surface of the cemetery, and where there is a depression of the surface between the well and the cemetery? What would be the result upon a well ten rods from the cemetery with the same conditions as to surface?"

The communication was referred to Charles Francis, civil engineer, chairman of the Committee on Plumbing and Ventilation, who reported as follows:

"The committee, to which was referred the letter relating to the location of a cemetery near a well as being dangerous to health, would respectfully report: That it is the opinion of the committee that a well located within ten, twenty or one hundred rods of a cemetery, which well is expected to furnish water for domestic purposes, is exceedingly dangerous to those using the water, and a menace to the health of the neighborhood or community."

The following question was also submitted in the communication above referred to:

"Under what provision, if any, of the Code is given authority to private individuals to locate and maintain a public burying ground within the corporation of a city?"

The reply of the committee to this question was as follows:

"As to the provision of the Code which confers authority, if any is conferred, your committee is unable to say and would respectfully refer this portion of the communication referred to to the Attorney General, a member ex officio of this Board, for his opinion."

The report was received and adopted.

AMERICAN PUBLIC HEALTH ASSOCIATION

The following report was submitted by the undersigned delegates and ordered placed on file:

GENTLEMEN:—As your delegates to the twenty-ninth annual meeting of the American Public Health Association, held at Buffalo, N. Y. September 17th to 20th, inclusive, we beg leave to report as follows:

The sessions were held in the theatrical rooms of the Seventy-fourth Regiment Armory, and the laboratory and bacteriological exhibits were made in the billiard parlors adjoining. No better quarters could have been secured in the city, and the thanks of the association are due the local committee for their untiring efforts in every way to add to the facilities for dispatching the business of the meeting, as well as furnishing all the comforts and pleasure possible for the ladies and gentlemen in attendance.

The pleasure of the meeting, however, was overshadowed by sadness and sorrow occasioned by the death of President McKinley, which made all feel as though they were attending a memorial service in honor of a deceased friend.

Free tallyhos were secured by the local committee for the pleasure of their guests, and those who accepted the courtesy did so in order that [No. 21

they might be driven down Delaware avenue and shown, first, the Milburn house, upon which, through imagination, all the world had gazed the week before in hopes of the restoration to health of him whom all peoples had learned to love and respect, but who succumbed to the assassin's bullet, or, as we prefer to say, bowed to the inevitable, which he was pleased to accept as God's will, and died realizing "His will, not ours, be done." Then to the Wilcox home, where our beloved soldier and patriot, Theodore Roosevelt, took the oath of office and became President of the United States. The feelings of hatred of the damnable anarchistic principles which prompted the assassination, our love for our murdered President, and the principles of love and liberty for which he stood, together with the just pride we feel in our Teddy, are better felt than expressed.

In many particulars the meeting was the best in the history of the association. The reports of the standing committees (copies of which are presented herewith) were all excellent treatises of the subjects before the various committees. We will only mention the topics, as follows:

"Animal Diseases and Animal Foods."

"Transportation of Diseased Tissue by Mail."

"National Leper Homes."

"Pollution of Public Water Supplies."

"Etiology of Yellow Fever."

"Disposal of Refuse Materials."

"Relation of Forestry to the Public Health."

"Car Sanitation."

"Cause, Prevention and Duration of Infectious Diseases."

"Disinfectants and Disinfection."

"Public Health Legislation."

"School Hygiene."

To us the report of the committee on animal diseases and animal food, by the chairman of the committee, Dr. D. E. Salmon, Chief of the Bureau of Animal Industry, Washington, D. C., was of greatest importance. We would recommend that all these committee reports be reproduced in the *Iowa Health Bulletin*, for the benefit of our readers.

The writer, in discussing the attitude of the association toward the question of restrictive measures for the prevention of tuberculosis, was instrumental in calling forth an expression from the association, which is embodied in the following resolutions which were unanimously adopted, and which represent the attitude of the most prominent sanitarians of Canada, Mexico and the United States:

Resolved, That notwithstanding the advances of sanitary science the mortality from tuberculosis continues to be appalling. It has been demonstrated that by the application of proper measures this mortality may be diminished rapidly and to a great degree. Therefore, every effort should be made by sanitarians to carry into effect all reasonable methods which have been shown by experience and research to be effective towards this end.

Resolved, That the increase of tuberculosis in cattle and swine, as shown by investigations of recent years and by meat inspection statistics. is a serious matter from a commercial as well as sanitary point of view, and calls for more systematic attention from those responsible for the integrity of the food supply and for the protection of the public health.

Resolved, That this association is of the opinion that sufficient facts have not been offered by Professor Koch, or other investigators, to prove that human and bovine tuberculosis are different diseases. It is further of the opinion that the variability under different environment common to micro-organisms may, upon further investigation, be found sufficient to account for the differences that have been noted, and that the germs of these diseases may yet be proved to be closely allied or identical. Irrespective of the question of the communicability of bovine tuberculosis to man, the inspection of animals and premises is absolutely necessary in order

1. That the meat and milk of animals suffering from this and other constitutional diseases be not used as human food.

2. That the sanitary condition of dairies, stables, etc., as regards cleanliness, water supply and ventilation, may be maintained.

3. That the health of dairymen and other handlers be closely supervised to prevent the spread of diphtheria, scarlet fever, human tuberculosis, etc., through the milk supply.

Resolved, That this association, while desiring to express its positive opinion as to the importance of dealing with animals and their products, as indicated in the preceding resolutions, does, at the same time, insist upon the necessity for dealing with the still greater dangers now universally recognized, of the transmission of tuberculosis from one person to another by continued personal association through inhalation of the air of infected living rooms, the contamination of clothing, handkerchiefs and similar objects with sputum and other accretions, and would therefore urgently recommend that municipalities adopt regulations as follows:

1. Against expectoration on pavements and in other public places.

2. For the comuplsory notification by physicians of cases of tuberculosis in order that literature may be supplied the householders and municipal aid given where necessary to lessen the dangers to the families of infected persons.

3. For the establishment of municipal sanitoria for the benefit of persons and families of limited means.

4. For the regular inspection of tenements, factories, workshops, schools, and other public institutions to promote cleanliness, ventilation and other sanitary conditions.

Next in importance came the discussion of yellow fever, and what has been accomplished in its prevention and eradication. Dr. Walter Reed, surgeon, U. S. Army, in his paper on "The Prevention of Yellow Fever," gave a detailed account of his work in Cuba and was able to maintain his theory of the spread of yellow fever by the bite of the mosquito, against all the theories presented by others. He gave a full account of their war on mosquitoes and proved his statements by the remarkable decrease in the number of cases following the destruction of mosquitoes in cisterns and cess pools of all kinds.

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On Thursday, September 19th, the association met at 10 a.m., and adopted resolutions of condolence upon the death of President McKinley, and adjourned until Friday. The resolutions were seconded by Dr. Frederick Montizambert, Ottawa, Canada, who assured us that the death of the President was their loss as well as ours, and that the people of Canada mourned the sad event, and by Edwardo Liceaga, City of Mexico, Mexico, who assured us of the sympathy and sorrow felt by the people of our sister republic.

The next meeting will be held at New Orleans.

J. I. GIBSON, C. B. ADAMS, F. W. POWERS, Delegates.

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Dr. Shrader also announced that he was prepared to report the proceedings of the British Congress on Tuberculosis, which, however, was not presented for the reason above given.

On motion the Board adjourned to meet upon the call of the president.

FOURTH QUARTERLY MEETING, FEBRUARY, 1902

The fourth quarterly meeting of the Iowa State Board of Health convened at the office of the secretary, Capitol Building, February 5th, and was called to order at 10 A.M. by the President, Dr. A. M. Linn, Des Moines.

There were present Linn, McKlveen, Gibson, Adams, Powers and Dr. J. H. Sams, appointed to the vacancy occasioned by the retirement of Dr. J. C. Shrader. The minutes of the last regular and of the special meetings were read and approved, and also the quarterly report of the secretary, which was referred to appropriate committees.

The scretary presented the following tribute to the memory of Dr. E. M. Reynolds, which was ordered spread upon the minutes and published in the Health Bulletin:

In Memoriam

Ephraim M. Reynolds

Born, 1843

Died January 15, 1902

Dr. Ephraim M. Reynolds died at his home in Centerville. He was born in Wayne county. Indiana, and when six years old was brought by his parents to Appanoose county, Iowa. He attended the district schools in that county, and later Troy Academy, Davis county. When eighteen years of age he enlisted in Company I, Third Iowa Infantry. Returning from the army, he spent some further time at Troy academy, and thence went to California, where he taught school and studied medicine. He graduated in medicine in Cincinnati, Ohio, in 1870, and later took postgraduate courses at the College of Physicians and Surgeons, Keokuk, and at the Chicago Medical College. The doctor's entire professional life was in Appanoose county. He began practice in Centerville in 1873, where he has been in practice ever since. He served eight years as a member of the Iowa Legislature. The doctor was also a mmber of the American Medical Association, and of the Iowa State and Appanoose county societies, and had been a member of the Appanoose Board of Insane Commissioners for sixteen years.

He was appointed a member of the Iowa State Board of Health in 1880, and served with great fidelity and efficiency for the period of fourteen years. There was seldom a meeting of the Board, during that long period, that Dr. Reynolds was not present, and his voice and vote were ever in the interests of progressive sanitary measures. His genial manners, his conscientious devotion to duty, his excellent judgment and his large experience in legislative matters endeared him to all his associates on the Board, and his untimely removal from life's activities is not only a personal loss to his family and to his professional patrons, by whom he was so greatly beloved for his tender and successful professional ministrations, but to this Board and to his county and state as well.

HOSPITAL FOR INSANE, MT. PLEASANT

A communication was read by the Secretary complaining of the sewage from the Hospital for the Insane at Mt. Pleasant as being a nuisance and a source of danger to the township contiguous to its output, and asking the State Board of Health to give them relief. A committee was appointed, with Dr. Linn as chairman, to investigate and afford such

TAMA INDIANS

Dr. Linn reported as to the condition of the Tama Indians relative to smallpox and read some communications relative thereto. He also read the following telegram from the Indian Commissioner:

Washington, D. C., February 4, 1902.

[No. 21

Replying to your telegram to Secretary Shaw. An item in urgent deficiency bill provides for funds to disinfect Indian camps, and for supplying them with new outfits. As soon as the bill passes the office will take action at once and asks your co-operation. W. A. JONES.

In response to a telegram from Missouri Valley, Dr. Adams was directed to go there as early as possible and investigate conditions and assist in quarantine.

SMALLPOX AT ONSLOW

Dr. Matthey reported the following:

I desire to submit to your honorable body the following report on

the condition of the smallpox epidemic existing at Onslow, Jones county: In accordance with the request of the President of your Board, I visited the city of Onslow on the third day of February. In company with the physician of the local board of health, Dr. Knittle, I found over thirty cases distributed through ten families, which have now been placed under quarantine.

The original cases of the disease appeared soon after Christmas, 1901, and were of so mild a character that they were regarded by the attending physician as chickenpox.

In a meeting of the city council, acting as a board of health, the following measures were resolved upon:

1. To make vaccination a compulsory procedure among school children.

2. To strongly recommend vaccination as a protective measure to the public at large.

3. To close all schools, churches and places of public amusement and to forbid all public gatherings while the epidemic lasss.

4. To request all neighboring cities and townships to execute like measures and establish a strict qparantine on all existing cases.

Respectfully submitted,

H. MATTHEY.

U. S. MAIL SERVICE

Dr. Powers introduced the following, which was unanimously adopted:

WHEREAS, Cases of smallpox exist in nearly every county in this state; and.

WHEREAS, smallpox has occurred in the family or person of some of the postmasters of the state: therefore,

Resolved, That the Postmaster General be requested to require so far as possible all postmasters in Iowa and their employes, including city and rural carriers with their families, to be vaccinated, and to furnish to the local boards of their respective localities satisfactory evidence of successful vaccination

SMALLPOX IN DES MOINES

Mr. Powers moved that the condition of Des Moines relative to smallpox be referred to a special committee for investigation and for consultation with the Attorney-General, Governor and city board of health as to what the powers of the Board are in cases where local boards are unable or unwilling to intelligently cope with the disease. The motion was adopted and Linn, Powers and McKlveen were appointed such committee. The following relative thereto was also adopted:

Be it Resolved. By the Iowa State Board of Health in conference assembled: That our committee appointed to confer with the local board of health of the city of Des Moines, and to make such investigation into the smallpox situation in said city as they deem wise be, and the same is hereby, directed that if after such conference or investigation the majority of the committee have reason to believe that the rules and regulations of the State Board of Health are not being enforced with such rigidity and efficiency as to prevent the further spread of this loathsome disease; and that should this disease appear to their minds to be likely to continue and to be a menace to the public health of our commonwealth on account of the city of Des Moines, said committee shall inform the local health authorities of said city in unequivocal terms that if after seventeen days probationary period a majority of this committee has reason to believe that the local authorities have demonstrated their failure to successfully cope with the situation, the President of the State Board of Health, upon receiving such information, shall convene the said Board in special session for a conference and for such action relative thereto as may be thought best for the public health.

GASOLINE LAMPS

The following gasoline lamps were passed as reasonably safe and their use permitted:

"F P. Lighting System." "Twentieth Century Light," "Acme Are Vapor Lamp."

The following lamps had been previously approved:

"Standard Gas Lamp," "Standard Arc Lamp No. 39," "Efficient Vapor Lamp No. 2," "Efficient Vapor Lamp No. 6," "Sun Incandescent Vapor Cas Lamp," "Welsbach Incandescent," all styles.

"Turner Arc Pressure Lamp No. 10," "Little Wonder No. 20," "Delmar Vapor Lamp," "Improved Welsbach-Students' Lamp,"

"Nulite Arc," "Bystrom Gas Lamp," "Corona," "Columbia," "Morey's No Mantle," "Grinnell Lamp," "Sterling Arc," "Sterling Gravity," "White Star," and "One Galion Doran."

"The American Arc No. 2," "The Magic Arc," "The Magic Gravity," "The Solar Arc."

"The Simplicity style B," "The Efficient No. 6," "Pressure Arc Lamp No. 5 E," "New Century Lamp No. 50," "The Rockford X-Ray," "Omaha Automatic Gas Lamp." "The Columbian," and "The Imperial Lamp." "The M, & M, Arc," two styles, one for store and one for street, and the "No. 5 Special."

It is to be understood that the Board does not issue guarantees of safety for any of these lamps and does not specially commend any one as more than reasonably safe under proper care.

No gasoline lamp not having the approval of the Board, after due test and consideration, can be used in Iowa without violating the law and subjecting those using them to severe penalties.

VACCINATION BY INTERNAL REMEDIES

The committee to whom was referred the question of the approval by this Board of vaccination by internal remedies reported as follows:

Your committee to whom was referred the matter of vaccination by internal remedies beg leave to report: This method of vaccination is comparatively new. Its usefulness is not yet sufficiently determined to warrant your committee in endorsing it as an efficient method for preventing smallpox. We therefore ask that for the present the whole matter be laid upon the table. (Signed.) A. M. LINN.

F. W. POWERS.

The report was received, the matter laid upon the table and the committee continued.

(Note—It may be proper to state here that thus far the deliberate action of the Board has been adverse to its use as a substitute for ordinary vaccination.—Secretary.)

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SPECIAL DISINTERMENT PERMITS

The Board directed the Secretary to issue special disinterment permits as follows:

CARL CROUT, 1901, membranous croup, by private conveyance from one lot in Woodland cemetery, Des Moines, to another lot in same cemetery,

FLORENCE HURLEY, 1883. *diphtheria*, by private conveyance from Locust Grove cemetery, Locust Grove township, Fremont county, to Hamburg cemetery in the town of Hamburg.

VIRGIL HURLEY, 1877 membranous croup, same as foregoing.

PEARL HURLEY, diphtheria, 1883; same as preceding.

SYLVIA KAETSCHMER, membranous croup, 1897, by private conveyance from one lot to another in Linwood cemetery, Dubuque,

SPECIAL POWERS FOR BOARD

On motion Drs. Linn and Powers were instructed to confer with the Attorney-General relative to drafting a bill for consideration by the present general assembly empowering the State Board of Health, if it has not such authority now, to take charge of quarantine where infectious diseases exist, in cases where the local board of health refuses or neglects to comply with its rules and regulations and the public health is endangered thereby.

DR. J. C. SHRADER--TESTIMONIAL

The following testimonial was unanimously passed by a rising vote:

WHEREAS. The time draws near when we must sever the official relations which exist between this Board and our President, Dr. J. C. Shrader, it seems there can be no more fitting time than the present for us to convey to him our great appreciation of the valuable services that he has rendered this Board in the past. As the senior member of the Board, in point of years of service, he has been able to do much in its interests. As the presiding officer we have always found him just in his ruling, and, as a working member of this body, always ready and willing to perform the duties assigned to him. We feel that this Board will sustain a great loss by his absence. In the time that we have been connected with this Board we have formed strong ties of personal friendship with him that we trust may be continued. We wish him Godspeed in his future undertakings. (Signed) C. B. ADAMS.

C. B. ADAMS, F. W. POWERS, J. I. GIBSON, A. M. LINN, J. A. MCKLVEEN, H. MATTHEY, R. E. CONNIFF,

FINANCIAL

The Secretary submitted the following itemized report of expenditures for the quarter ending January 31, 1902; which was received and referred to the auditing committee:

Board meeting, November 21, 1901

MEMBERS' EXPENSE ACCOUNT

J. C. Shrader .		 12	×					•	•		•	1						12			•		*] :	•				¥.	\$ 26.76
H. Matthey	• •		÷		÷	÷			+	4	4	2		. ,		÷	•		÷		20			į.	£	÷	i.	ŝ	 32.50
R. E. Conniff .		 	×	Ð						+	•	•								6	A 3		*		54	e.			 36.00
C. B. Adams	3				1		3					i.	S					,	i e										 27.71
J. A. McKiveen																	•												 25.32
J. I. Gibson	• •	×								- 18		12							•	¥.)		•		100			,		 31.58
A. M. Linn								6		4			14												2				 15.00
Chas. Francis .												•			÷									*		×			 32.80
F. W. Powers .			• • •		÷	•			•			•				5			• •		÷					•			 27.70

Total

\$255.37

Paid by State Warrant No. 11564.

CURRENT EXPENSE ACCOUNT, NOVEMBER, 1901

J. F. Kennedy, Secretary \$100.0)0
Margaret S. Schoonover, Stenographer 65.0	00
F. W. Powers, investigating smallpox 35.9	95
J. C, Shrader, investigating smallpox 16.5	54
American Public Health Association, transportation 3.0	00
American Public Health Association, fee, 1901 5.0)0
American Vet. Review, subscription 3.0	00
Popular Science News, subscription 1.6	50
Babyhood, subscription 1.	00
Langan Bros., 2,000 pamphlets, envelopes 3.3	30
U. S. Postal Guide 2.0	00
Health Publishing Co., subscription 1.0	00
Popular Science Monthly, extras	50
Adams Express Co 1.3	15
U. S. Express Co	35
Wells Fargo & Co., express 3.	61

Total Paid by State Warrant No. 11622. \$243.00

CURRENT EXPENSES, DECEMBER, 1901

J. F. Kennedy, Secretary	i.		 \$100.00
Margaret S. Schoonover, Stenographer			 65.00
Puck Mfg. Co., printing Circular No. 8			 100.00
Meyers & Tucker, printing and mailing Bulletin .		• •	 61.94

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F. Kennedy, telegrams and street car, 1901	5.04
E. Conniff, telegraph and telephone	4.60
Junn & Co., Scientific American.	5.00
merican Vet. Review	3.25
Postal Telegraph Co	2.27
Junicipal Engineering Co., magazine.	2.00
Manufacturing Co., envelopes	1.75
Adams Express Co	1.40
American Express Co.	.55

Total

Paid by State Warrant No. 12361.

Special board meeting, January 15, 1902

MEMBERS' EXPENSE ACCOUNT

Shrader						v.	1	-					2					2					2		•0				é:		.\$	22.28	
McKlyeen		١.		-						2002 138											•						•				•	16.80	
Conniff.																																34.75	
Gibson			<u> </u>														4															27.08	
Adams.																	•															20.46	
latthey															2											-						29.50	
Powers.	1.2																														•	19.70	
. Linn		•		•			•	•		•							٠		•	1	•		• •		• •		• •		•	•	•	5.00	
Total																														10	-		-
	Shrader McKlveen Conniff Gibson Adams Jatthey V. Powers Linn Total	Shrader McKlveen Conniff Gibson Adams Iatthey V. Powers I. Linn Total	Shrader McKlveen Conniff Gibson Adams Iatthey V. Powers I. Linn Total	Shrader McKlveen Conniff Gibson Adams Iatthey V. Powers I. Linn Total	Shrader McKlveen Conniff Gibson Adams Jatthey V. Powers Linn Total	Shrader McKlveen Conniff Gibson Adams Iatthey Y. Powers I. Linn Total.	Shrader	Shrader McKlveen Conniff Gibson Adams Iatthey V. Powers I. Linn Total.	Shrader	Shrader. McKlveen Conniff. Gibson. Adams. Iathey V. Powers. Linn. Total	Shrader	Shrader. McKlveen Conniff. Gibson. Adams. Jatthey V. Powers. Linn. Total	Shrader. McKlveen. Conniff. Gibson. Adams. Adams. Jathey. V. Powers. Linn. Total	Shrader. McKlveen Conniff. Gibson. Adams. Iathey V. Powers. Linn. Total	Shrader. McKlveen Conniff. Gibson. Adams. Iathey V. Powers. Linn. Total	Shrader. McKlveen. Conniff. Gibson. Adams. Iathey V. Powers. Linn. Total	Shrader. McKlveen Conniff. Gibson. Adams. Iathey V. Powers. Linn. Total	Shrader. McKlveen. Conniff. Gibson. Adams. Jathey V. Powers. Linn. Total	Shrader. McKlveen Conniff. Gibson. Adams. Iathey V. Powers. Linn. Total	Shrader. McKlveen. Conniff. Gibson. Adams. Jathey V. Powers. L Linn. Total	Shrader	Shrader. McKlveen. Conniff. Gibson. Adams. Iathey. V. Powers. Linn. Total	Shrader. McKlveen. Conniff. Gibson. Adams. Iathey V. Powers. Linn. Total	Shrader. McKlveen. Conniff. Gibson. Adams. Iathey. V. Powers. Linn. Total	Shrader	Shrader. McKlveen. Conniff. Gibson. Adams. Iathey. V. Powers. Linn. Total	Shrader	Shrader. McKlveen. Conniff. Gibson. Adams. Iathey. V. Powers. Linn. Total	Shrader	Shrader. McKlveen. Conniff. Gibson. Adams. Jathey. V. Powers. L Linn. Total	Shrader	Shrader	Shrader. \$ 22.28 McKlveen. 16.80 Conniff. 34.75 Gibson. 27.08 Adams. 20.46 Iatthey 29.50 V. Powers. 19.70 I. Linn. 5.00

\$175.57

\$352.80

Paid by State Warrant No. 12686.

J

CURRENT EXPENSE ACCOUNT, JANUARY, 1902

E Kennedy Secretary	\$100.00	
largaret S. Schoonover, Stenographer	65.00	
argaret S. Schoolever, Schoolegrapher	72.85	
lowers & Tucker, printing and mailing Bulletin, December	59.55	
avis Schooler nostage stamps	15.00	
awa Brinting Co. 300 rentints	10.95	
C Shrader Com expenses as per bill	12.53	
V H Hosking Journal	3.00	
lostrude Kennedy services in office	2.00	
dame Evorace Co	2.20	
L C Express Co. November	.85	
J. S. Express Co., December	2.20	
		\$346.13
Paid by State Warrant No. 12928.		
Fotal expenditures for the quarter	1,372.87	
October expenditures	691.90	
Total paid from appropriation		\$2,064.77
Leaving unexpended	1	\$2,935.93
the state of the s		

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REPORT OF AUDITING COMMITTEE

Your Auditing Committee, to whom was referred the foregoing report of the Secretary, would respectfully report that we have carefully examined the same and find it to be correct in every particular, and that proper vouchers are on file for each item of expenditure.

Respectfully submitted.

(Signed)

H. MATTHEY, Committee.

LEGISLATION

Considerable time of the meeting was taken up in consulting with members of the legislature and with each other relative to some important change in the law, and especially with a view of establishing a well-equipped bacteriological laboratory.

On motion the board adjourned to meet in May unless sooner convened by the President.

ANNUAL MEETING, MAY, 1902

The State Board of Health convened in regular annual session at the office of the Secretary, capitol building, May 14th, and was called to order at 10 A. M., by President A. M. Linn, Des Moines.

There were present Linn, McKlveen, Conniff, Francis, Adams, Sams, Powers and Paul O. Koto, Forest City, State Veterinary Surgeon. Dr. Koto succeeds Dr. J. I. Gibson, whose term of service had expired.

The minutes of the Secretary were read and approved. The Secretary submitted his quarterly report which was received and assigned to the respective committees.

The report contained the following respecting

INFECTIOUS DISEASES

While during the months of February and March there were an unusual number of outbreaks of infectious diseases, especially smallpox, reported, there has been during the month of April quite a subsidence which is notably increasing. It is painfully apparent, however, that in many localities there are many physicians and health authorities who are, through ignorance, prejudice or neglect lacking in the application of those means that science and the law have prescribed as the only reliable measures for preventing or restricting the spread of these diseases. There are yet in Iowa physicians who call smallpox Cuban itch or chickenpox even in the face of consulting physicians who would seek to put them right.

The bill passed by the last General Assembly granting this Board authority to go into communities where such conditions prevail will contribute mightily towards the adoption and enforcement of proper sanitary measures. It will greatly contribute to the correction of the errors of diagnosis referred to and render these occurrences less frequent.

One of the most important and impressive object lessons during the quarter, from a sanitary point of view, was the very thorough and successful disinfection of the Indians in Tama county by your efficient president, Dr. Linn. Few have any idea of the difficulties encountered within and without the camp in the prosecution of this work; nor of the magnitude of the undertaking. A detailed history of this outbreak of smallpox among these, our unfortunate wards, together with a detailed account of the means of disinfection and the result of the same would prove highly interesting to the readers of the *Bulletin*, and a valuable chapter to our next biennial report. Of course no one could do this so well as your President.

The following communication was laid before the Board:

Chicago, April 8, 1902.—J. F. Kennedy, M. D., Secretary Iowa State Board of Health. Dear Sir: If you can through your official connection with the State Board bring up the question of dietetics, physico-mechanical therapeutics and hydro-therapy, I would ask you if it would be possible for you to introduce the following resolution at the next meeting?

Resolved. That we are in favor of introducing into the medical schools of the United States the practical teaching of the three subjects: dietetics, physico-mechanical therapeutics and hydro-therapy.

The communication was placed in the hands of Drs. Powers and Sams who reported in favor of the resolution and it was adopted unanimously.

PERSONAL

Dr. Conniff introduced the following which was unanimously adopted by a rising vote.

WHEREAS, the services of our associate, Dr. J. I. Gibson, late State Veterinarian, as a member of this Board have ended by expiration of his term, and

WHEREAS, we the members of the State Board of Health recognize in Dr. Gibson an able and conscientious member, therefore,

Resolved, That we express to Dr. Gibson our appreciation of the valuable services he has rendered the state while a member of this Board.

MT. PLEASANT SEWAGE INVESTIGATION

The committee appointed to investigate the complaint made by the trustees of Center township. Henry county, relative to the disposal of the sewage from the Hospital for the Insane at Mt. Pleasant, made the following report:

Your committee appointed to investigate the complaint of the trustees of Center township relating to the nuisance created by the discharge of the sewage of the Insane Hospital at Mt. Pleasant into the creek that runs through the township, beg leave to report as follows:

The committee visited the location of the alleged nuisance and found that there was abundant cause for complaint as the discharge of the sewage of the hospital into the creek had already created a nuisance of a very dangerous character.

Your committee, however, found by investigation and inquiry that the State Board of Control had taken this matter in hand and would construct during the present season a septic tank with the necessary filters or some equally efficient system of disposing of the sewage of the Mt. Pleasant Insane Hospital, and an appropriation had been made for this purpose by the legislature at its last session.

In view of these facts your committee would respectfully recommend that the trustees of Center township, Henry county, be informed by the Secretary of the State Board of the contemplated action of the State

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Board of Control in relation to the construction of a sewage disposal system for the Mt. Pleasant Insane Hospital, after obtaining the official notice or information from the State Board of Control that the above mentioned action is to be carried out this season and the nuisance complained of, abated.

Respectfully submitted, CHARLES FRANCIS, A. M. LINN,

Committee.

The report was received and adopted.

TAMA INDIANS

Dr. Linn made an interesting report of his experiences and observations, as well as the methods used by him in disinfecting the camp, as well as an itemized statement of the expenditures. The report was received with marked attention and interest by the board and his actions heartily approved.

GASOLINE LAMPS

The Committee on Gasoline Lamps recommended for approval "The American Lamp," and "The Overhead Generator Automatic Gas Lamp." The report was adopted and the lamps approved as contemplated by law.

The following is a complete list of the lamps approved by the Board, including the two above named:

June Meeting, 1900-

"Welsbach." gravity, underneath burner; "M. & M.," air pressure; "Special No. 5." gravity, overhead generator, "New Century," gravity,

underneath generator. August Meeting, 1900-

"X Ray," gravity, underneath generator; "Omaha Automatic;" "Standard," gravity, underneath generator; "Columbian;" "Imperial," gavity, underneath generator.

November Meeting, 1900-

"Simplicity," gravity, overhead generator; "Efficient No. 6," air pressure; "No. 5 E," air pressure.

December 18th Meeting, 1900-

"American No. 2," air pressure; "Magic," air pressure; "Magic," gravity, overhead generator, "Solar, No. 36," air pressure. May Meeting, 1901—

"Bystrom," gravity, underneath generator; "Nulite," gravity, underneath generator; "Corona," gravity, underneath generator; "Columbla;" "No-Mantle," gravity, gasometer generator; "Sterling White Light," gravity, underneath generator; "Sterling Air Pressure;"''Grinnell''lamp, gravity, underneath generator; "White Star," gravity, underneath generator; "One-Gallon Doran," air pressure. August Meeting, 1901"Turner No. 20," air pressure, and "Little Wonder," air pressure; "Welsbach Improved;" "Delmar."

November Meeting, 1901-

"Standard," air pressure, "Efficient No. 6," air pressure; and "Efficient No. 2," gravity and air pressure combined, overhead generator; "Sun," gravity, overhead generator.

February Meeting, 1902-

"Twentieth Century Lighting Machine," underneath generator; "F. P. Lighting Machine," "Acme," air pressure.

SPECIAL DISINTERMENTS

The committee on "Corpses" recommended the issuance of the following special disinterment permits. The reccommendation was adopted and the Secretary directed to issue the same:

HANNAH MARIE BECKSTROM, *diphtheria*, 1895, by private conveyance, from Swan Lake cemetery, Laurens, to East cemetery in Swan Lake township.

NIOMIE VICTORIA ELINORE BECKSTROM, membranous croup, 1895, by private conveyance from Swan Lake cemetery, Laurens, to East cemetery in Swan Lake township.

NORA BELL COONS. scarlet fever, 1882, by private conveyance from Hazelwood cemetery, Grinnell, to a lot in Odd Fellows' addition to the same cemetery.

FRANK DINUZZIO, diphtheria, 1902, from one lot to another in St. Ambrose cemetery, Des Moines.

ANDY IVERSON FEDSON, croup, 1886, from the N. E. Lutheran Congregation cemetery, St. Ansgar, to a lot in the St. Ansgar City cemetery.

LOUIE JANE HAMMER, membranous croup, 1872, from one lot to another in Friends cemetery, Kellogg township, Jasper county.

ANNA HELLMAN, diphtheria, 1890, by private conveyance from Germantown cemetery, Caledonia township, to Prairie View cemetery, Union township, same county.

ANNA HOLUB, diphtheria, 1888, from Oxford Junction cemetery to Wyoming cemetery in the town of Wyoming.

D. KEINTZ, *diphtheria*, 1879, from the Keintz cemetery, Clear Creek township, Jasper county, by private conveyance to Collins cemetery in the town of Collins.

EDITH LAW, scarlet fever, 1880, by private conveyance from Lincoln cemetery, Lincoln township, Cerro Gordo county, to Elmwood cemetery, Mason City.

JOHN PETER LEY, diphtheria, 1901, from St. Mary's cemetery, Remsen, to St. Joseph cemetery, LeMars, by private conveyance.

WILLIAM NEWMAN, scarlet fever, 1887, from one lot to another in Woodland cemetery, Des Moines.

ELCENAY IRENA ORR, diphtheria, 1862, from one lot in Greenwood cemetery, Muscatine, to another lot in the same cemetery. 1903]

HELEN ROBOSKY, diphtheria, 1901, from Oak Hill cemetery, Cedar Rapids, to another lot in the same cemetery.

JOHN KOBUS, croup, 1892. from Senti cemetery, Burlington, to Aspen Grove cemetery in the same city.

HAROLD BARNES SHERBURNE, diphtheria, 1902, Fairview cemetery, Waterloo, to Linwood cemetery, Clarksville.

JACOB LYLER WOODWARD, diphtheria, from Avery cemetery, Union township, Des Moines county, to Aspen Grove cemetery, Burlington.

STATE CONTROL.

Under the new law authorizing the State Board of Health to go into districts, townships or incorporated towns to establish, maintain and release quarantine, and otherwise assume all the lawful functions of a local board, Dr. Linn as President of the Board in three localities of the State, deputized parties to represent the State Board and the practical results were most excellent and fully demonstrated the wisdom of the legislature in vesting this Board with such added power.

When local boards refuse or neglect for any reason to discharge their duties as health officers, under the law the State Board can step in, and the cost of services on the part of said Board must be paid by the local board as though incurred by them.

FINANCIAL

The Secretary presented the following financial statement for the quarter, which was received and referred to the Auditing Committee:

Board Meeting, February, 1902.

MEMBERS' EXPENSE ACCOUNT

J. I.	Gibson								•												*	•		÷	٠	6 1			+	.\$	33.08
Ј . Н	. Sams									•		•	•									+	•							•	31.32
J. A.	McKlveen			×							•									*								•			27.35
С. В	. Adams		4					()														*									31.46
H. M	latthey	• •			• •		•	*	•			•	•	2	•		•	•	•	•	•	•		•	•	•	•	•			34.00
F. N	7. Powers .	• •	•			*		•	•	4	•	•	•	•	•	*	•	•	•	•	•	•	•	•		•	•	•			29.20
A. N	I. Linn	•••	• •	•	•	•••				٠	•	٠	•	•				• •		• •		• •	5 G	* *		• •		• •			20.00

Paid by State Warrant No. 13423.

Total

\$206.41

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RECAPITULATION

Board meeting			14 A A A	6.4) X			\$206.41
Current expenses,	February .					** *	. 339.11
Current expenses,	March			5 x 3 x 3		••••	. 430.04
Current expenses,	April		++: ++			• • •	. 241.80
Total							\$1,217.42
January 31st. app	ropriation u	nexpende	ed				\$2,935.93
Less				x × +			1,217.42
Balance v	nexpended				• •		\$1,718.51

REPORT OF AUDITING COMMITTEE

Your committee, to whom was referred the foregoing report of the Secretary, would respectfully report that we have carefully audited the same and have found it correct in every particular.

Respectfully submitted,

(mt	H. MATTHEI,
(Signed)	Committee.

The report was adopted.

ELECTION OF OFFICERS

Dr. A. M. Linn was re-elected President and Dr. J. F. Kennedy, Secretary.

Margaret S. Schoonover was re-elected Stenographer; Dr. Eli Grimes, Bacteriologist, and Prof. S. R. Macy, Chemist.

On motion Board adjourned to meet in August upon call of the President.

CURRENT EXPENSES, FEBRUARY, 1902

J. F. Kennedy, Secretary	\$100.00
Margaret S. Schoonover, Stenographer	65.00
Talbot-Koch Printing Co., Cir. No. 1	. 89.00
A. M. Linn, investigating smallpox	35.53
J. A. McKlveen, investigating smallpox	22.10
Geo. A. Miller Printing Co., 5,000 blanks	12.75
The Sanitarian, subscription (1902)	4.00
U. S. Express Co	2.94
Western Union Telegraph Co	4.14
Mutual Telephone	3.30
Wells Fargo & Co., express	

\$339.11

Paid by State Warrant No. 13953.

CURRENT EXPENSES, MARCH, 1902

J. F. Kennedy, Secretary				\$100.00
Margaret S. Schoonover, Stenographer				65.00
Meyers & Tucker, Bulletin, January and February				119.14
Geo. A. Miller Printing Co., marriage blanks				36.50
Geo. A. Miller Printing Co., circulars	• •	• •		5.50
C. B. Adams, investigating smallpox				6.56
Puck Mfg. Co., disinterment blanks			• •	6.00
Puck Mfg. Co., 3,000 envelopes		• •	• •	2.50
Iowa Litho. Co., 500 letterheads (Linn)				8.00
Postage stamps, Louis Schooler				75.00
Western Union Telegraph Co		• •		4.99
Adams Express Co	• •			.30
U. S. Express Co	• •	• •		.55

\$430.04

Paid by State Warrant No. 15172.

CUBRENT EXPENSES, APRIL, 1902

J. F. Kennedy, Secretary \$100.00	
Margaret S. Schoonover, Stenographer 65.00	
Lewis Schooler, stamps and envelopes 30.00	
Smith Premier Typewriter Co., repairs	
Puck Mfg. Co., Circular No. 8 26.00	
Domestic Engineering, subscription 2.00	
Adams Express Co 2.10	
American Express Co	
U. S. Express Co	
Adams Express Co 2.00	
Wells Fargo & Co., express	
Western Union Telegraph, March 1.43	
Western Union Telegraph, April 1.22	
Total	1.86

Paid by State Warrant No. 16363.

SECOND QUARTERLY MEETING-AUGUST, 1902

The State Board of Health met in regular quarterly session at the office of the Secretary and was called to order by the President, Dr. A. M. Linn, at 3 p. m., August 6th.

There were present Linn. Adams, Powers, McKlveen, Matthey and Francis.

The minutes of the last meeting were read by the Secretary and approved.

INFECTIOUS DISEASES

The Secretary reported the following relative to infectious diseases:

For the last quarter, ending July 31st, there have been reported ourbreaks of infectious diseases as follows:

Diphtheria: In May. 11 localities; June. 11; July 7. Total. 29., Scarlet fever: May, 12; June. 15; July, 8. Total. 35. Measles: May. 5; June. 2; July, 1. Total, 8. Smallpox: May, 37; June. 63; July, 25. Total. 125. Typhoid fever: May. 1; June. 3; July. 3. Total. 7. Whooping cough: May, 2; June, 2; July, 1. Total, 5.

For the last quarter, ending July 31st, there have been reported outbreaks of infectious diseases as follows:

Daily reports have been made to this office from the health department in Des Moines and it is a satisfaction to report that there is no case of smallpox at present within the city limits nor has there been for several weeks past. In the case of smallpox above reported there seems to be no disposition for the disease to spread, because of the prompt measures taken to stamp it out supplemented by better atmospheric conditions.

VARIOLINUM

The question of the internal use of "variolinum" as a substitute for vaccination by scarification was called up.

The following resolution was introduced and its adoption moved:

Resolved, By the Iowa State Board of Health, that vaccination for immunization against smallpox is defined as: An inoculation by scari-

fication of the epidermis to the derma and an immediate application thereto of sterile bovine virus, producing in a reasonable time the typical vaccine vesicle and resultant scar, with the associating constitutional symptoms common to such an application.

The resolution was made the special order for the afternoon of the first day of the next meeting.

FINANCIAL

The Secretary presented the following financial statement for the quarter ending July 31, 1902:

Board meeting, May, 1902.

MEMBERS' EXPENSE ACCOUNT

																											1.8	\$	21.70
F. W. Powers	••	•	•	• •	•	*	•	*	•	1	•												10.0	-					19.80
J. A. McKlvee	n	•		•			•	•	•	•		*	•	٠			1	• •		•••	10							174	25.82
P. O. Koto	• •	10	6.3		•	•	•	•			18	•		•		• •		• •		• •		•				-		200	24 96
C. B. Adams			•		• •		• •		•	•		•	•	•		•	2			••	3	•	• •	•	•	• •		•••	22.50
R. E. Conniff		• •		•					3			•			1	• •		• •		• •	1		• •		•	•	•	• •	95.00
Chas. Francis											• •		•	•	•	•		•		• •		•	• •	٠	•		•		20.00
A M Linn													•					•	•	• •		• •	•	• •	•		•	• •	10.00
J. H. Sams .									•	•	•	•		•	•	•	1	• •		• •	1			•	•	•	•	•••	16.49
Total								•		• •		•		•	•	•			÷							×	•	• •	

\$177.27

Paid by State Warrant No. 16543.

CURRENT EXPENSE ACCOUNT, MAY, 1902

\$10).00
F. Kennedy, Secretary 6	5.00
Margaret S. Schoonover, Stenographer 7, 1977	9.35
Meyers & Tucker, printing and maning band	0.00
	9.82
C. B. Adams, investigating smanpox	6.35
R. E. Conniff, telegraph and telephone	2.00
Puck Mfg. Co., envelopes	1.25
Puck Mfg. Co., envelopes	8.00
Chas. Francis, visiting Mt. Pleasant	3.00
Popular Science Monthly, 1902	3.00
Am. Vet. Review, 1902	1.85
U. S. Express Co	.95
Wells Fargo & Co., express	

\$330.57

Paid by State Warrant No. 16986.

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STATE BOARD OF HEALTH.

CURRENT EXPENSE ACCOUNT, JUNE, 1902

J. F. Kennedy, Secretary	00.00
Margaret S. Schoonover, Stenographer	5 00
Meyers & Tucker, printing Bulletin	4.00
B. Murphy, printing June Bulletin	4.80
A. M. Linn, delegate to New York	8.05
A. M. Linn, investigating, Mt. Pleasant 1	1.75
A. M. Linn, telephone and stenographer	5.81
Puck Mfg. Co., billheads	4.00
Langan Bros., Manilla tissue	.75
Western Union Telegraph Co	2.94
American Express Co	.50
U. S. Express Co	1.47
Total	

\$419.07

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Paid by State Warrant No. 17724.

CURRENT EXPENSE ACCOUNT, JULY, 1902

J. F. Kennedy, Secretary \$100.00	
Margaret S. Schoonover, Stenographer	
Talbot-Koch Printing Co., binding	
Puck Mfg. Co., Bulletin, mailing list, etc	
Iowa Lith. Co., letterheads	
B. Murphy, July Bulletin	
Des Moines Paper Box Co., tubes	
L. Schooler, Bulletin postage	
Gertrude Kennedy, services in office	
Buck Bros., brush and paste	
Adams Express Co., May and June	
American Express Co., June	
U. S. Express Co., June	
Wells Fargo & Co., express May	
Total	

\$459.40

Paid by State Warrant No. 18344.

RECAPITULATION

Board meeting		• •	• •									.,					\$177.27	1
Current expenses, M	ay																330 57	
Current expenses, Ju	ne	• •															419.07	r
Current expenses, Ju	ly	• •	••	• •	•	•	•	•	• •		•	• •	•	• •	•		459.40)
Total for quarter										5						-		
Previously expended								•				•••						3,282.1
Total	•										K 10							\$4,668.50

Leaving unexpended of the appropriation for August and September \$331.50.

The report was referred to the Auditing Committee, which reported as follows:

Your Auditing Committee would respectfully report that we have examined the foregoing report and find it correct.

Respectfully submitted.

H. MATTHEY.

Chairman of Committee.

The report of the committee was adopted.

DISINTERMENT PERMITS

The Secretary reported the following:

Immediately after the adjournment of the Board I issued the seventeen disinterment permits as authorized. From the first day of May until the 31st of July there were issued 156 ordinary permits from the office. The attached applications are respectfully referred to your Board for special action, the cause of death being from prohibitive infective diseases:

GEORGIA ALBRIGHT, age 5 years, 1878, membranous croup, from Washburn cemetery, Cedar township, Black Hawk county, to Mount Vernon, cemetery. Vernon township. same county, for reinterment.

HARVEY BAILEY, age 2 years, diphtheria, 1883, from Grant township cemetery, Hardin county, to Hubbard cemetery, in the town of Hubbard.

THEODORE TARLTON BAILEY, age 3 years, diphtheria, 1881, removal same as foregoing.

LENA BUNTE, age 6 years, diphtheria, 1892, from one lot to another, in the cemetery of the town of Rock Rapids.

CARL BUNTE, age 2 years, diphtheria, 1892, same disposition as foregoing.

HARRY CLEVELAND, age 13 years, diphtheria, 1897, from one lot to another in Aspen Grove cemetery, Burlington.

BLANCHE DEMPSEY, age 10 months, scarlet fever, 1890, from Lincoln cemetery. Lincoln township, Cerro Gordo county, to the cemetery in the town of Clear Lake.

PHOEBE BELL DEMPSEY, age 2 years, scarlet fever, 1890, same as the foregoing.

ALTON EARL, age 20 years, scarlet fever, 1874, from abandoned cemetery in Chester township, Howard county, to Chester Hill cemetery in same township.

PETER FABER, age 4 years, diphtheria, 1891, from Waveland cemetery, Prairie City, to another lot in same cemetery.

ALPHEUS SHAW HOLDEN, age 19 years, scarlet fever, 1902, from one lot to another in Oak Hill cemetery, Troy township, Iowa county.

FRANK CHESLEY HOWARD, age 9 years, scarlet fever, 1894, from one lot to another in Strawberry Point cemetery in the town of Strawberry Point.

NELLIE MAY JOHNSON, age 1 year. scarlet fever, from Woodland cemetery, Des Moines, to Greenwood cemetery, Douglas township. Polk county.

GUVENEUR MAYER, age 3 years. scarlet fever, 1873, from one lot to another in Woodland cemetery, Des Moines.

ALACE LUCETTA PARKHURST, age 9 years, scarlet fever, 1889, from Knowlands cemetery, Princeton township, Scott county, to Le Claire cemetery in the township above named.

JESSE H. POWELL, age 4 years. scarlet fever. 1881, from York Prairie cemetery, Center township, Cedar county, to Masonic cemetery, Tipton.

All the foregoing were to be removed by private conveyance.

The Committee on Corpses reported in favor of the disinterments under the special conditions required in such cases.

VITAL STATISTICS

The Secretary made the following statement and suggestions which were duly approved by the Board.

Your attention is respectfully called to the fact that the report of vital statistics—births, marriages and deaths—have been accumulating for twenty two years. They are bound in large volumes and the resources of this office are sorely taxed to accommodate them. Mr. Aldrich, the Curator of the Historical Department, would be glad to accept of them and appropriately display them for all time to come, including any subsequent volumes that are bound by this office. As births, marriages and deaths constitute the most important events of any person, and as these reports afford a personal history of several hundred thousand individuals of Iowa, it seems to me eminently proper that their final depository should be with the Historical Department of the State. There is nothing in the law requiring them to be kept in this office. The duty of this Board being simply to supervise their registration. I would be glad to have you authorize me to dispose of those on hand and subsequent volumes as bound as above suggested.

DELEGATES

Drs. Powers and Adams and Col. Francis were elected degelates to the Pan-American Sanitary Congress to be held in Washington; Dr. Matthey was elected delegate to the Conference of Provincial and State Boards of Health to be held in New Haven. Connecticut, and Drs. Linn and McKlveen to the meeting of the American Public Health Association to be held in New Orleans, La.

On motion the Board adjourned to meet first Thursday in November, unless otherwise ordered by the President.

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SEMI-ANNUAL BOARD MEETING, SEPTEMBER, 1902.

The Iowa State Board of Health met at the office of the Secretary, Capitol Building Des Moines, November 5, 1902, and was called to order by Dr. A. M. Linn, Des Moines, President.

There were present Linn, McKlveen, Same, Francis, Adams, Koto, Powers and Conniff. The minutes of the last meeting were read and approved. The Secretary submitted a report for the quarter ending October 31, 1902.

. INFECTIOUS DISEASES

The Secretary reported that outbreaks of infectious diseases were reported during the quarter as follows:

Diphtheria. (Aug.) Des Moines; Boone; Lee; Ft. Madison. (Sept.) McKee Twp., Allamakee County; Des Moines; Maynard; Modale; Swan Lake Twp., Emmet County; Waverly; Ashton; Davenport; Marion Twp., Plymouth County; Winfield; Wayne Twp., Henry County; Allison Twp. Osceola County. (Oct.) Des Moines; Hedrick; Battle Twp., Ida County: Low Moor; Wapello; Waverly; Linn Grove; Sibley; Colesburg and Guttenberg.

Measles. (Aug.) Ft. Madison. (Sept.) Montrose.

Scarlet Fever. (Aug.) Zearing; Des Moines; Allerton; Ft. Madison; Grant Twp., Buena Vista County. (Sept.) Farragut; Jefferson Twp., Warren County; Des Moines; Elk Creek Twp., Jasper County; Zearin; Washington Twp., Harrison County; Iowa City; Davenport. (Oct.) Des Moines; Hedrick; Iowa City; Garfield Twp., Mahaska County; Ottumwa; Cook Twp., Sac County; Vinton; Center Twp., Fayette County; Battle and Griggs Twp., Ida County; Mapleton; Vail; Wapello; Winterset; Sibley; Iowa Twp., Cedar County.

Smallpoz. (Aug.) Dow City; Lake Park; Peterson; Allerton; Alton; Ft. Madison; Unionville; Logan Twp., Ida County; Settlers Twp., Sioux County; Woodland; High Point Twp., Lucas County. (Sept.) Davenport; Marion; Bayard; Grandview; Hopkington; Union and Delhi Twps., Delaware County; Iowa City. (Oct.) Byron Twp., Buchanan County; Iowa City; Dodge Twp., Dubuque County; Meadow Twp., Clayton County; Almoral; Melvin; Clinton; Mt. Hamil; Penn Twp., Johnson County; Fairbank; Bonaparte; North Liberty; Turin; Mapleton; Wapello; Harrisburg Twp., Van Buren County; Winterset; Dyersville; Washington County; Winneshiek County; Indianola.

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STATE BOARD OF HEALTH.

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Typhoid Fever. (Aug.) Ft. Madison. (Sept.) Des Moines; Douglas Twp., Adams County; Ottumwa; Colfax Twp., Grundy County; Waterloo; Davenport; Bradgate. (Oct.) Ottumwa; Pulaski; Des Moines. Whooping Cough. (Aug.) None. (Sept.) Douglas Twp., Adams

County. (Oct.) Scranton and Ottumwa.

SPECIAL DISINTERMENT PERMITS

The following special disinterments and reinterments were approved:

ANNIE BITTER, age 3 years, diphtheria, 1886, from one lot to another in St. Mary's cemetery, Dubuque.

JAMES CALVIN BLYTHE, age 3 years, membranous croup, 1884, from Ottawa cemetery, Jackson township, Clarke county, to Woodburn cemetery, town of Woodburn.

HENRY DICKINSON, age 11 years, diphtheria, 1888, from Riverton cemetery, Riverton township, Floyd county, to Oak Hill cemetery, town of Nashua.

LEONARD DICKINSON, age 14 days, croup, 1882, same as foregoing.

ESTHER CHRISTINA GUSTAFSON, age 6 years, diphtheria, 1890, from one lot to another in Woodland cemetery, Des Moines.

DALTON BINGHAM MANLEY, age 5 years, diphtheria, 1890, from Clinton township cemetery in Sac county to Early cemetery, town of Early.

MARY C. MILLER, age 4 years, croup, 1887, from one lot to another in Woodland cemetery, Des Moines.

EVA NELSON, age 1 year, croup, 1882, from Larson cemetery, Douglas township, Adams county, to Walnut Grove cemetery in the city of Corning.

SOPHIE SCHWARTZ, age 5 years, croup, 1894, from St. John's cemetery, Dubuque, to another lot in same cemetery.

JACOB WALTERS, age unknown, cause of death unknown, from one lot to another in Walnut Grove cemetery, Corning.

JOHN WINGERT, age 4 years, scarlet fever, 1887, from York Prairie cemetery, Center township, Cedar county, to Masonic cemetery, Tipton.

All the foregoing were to be disinterred in compliance with specified conditions and were to be removed by private conveyance to place of reinterment.

GASOLINE LAMPS

The attention of the Board was called to the fact that gasoline lamps were being sold and used in the state in defiance of the law relating thereto. The Secretary was directed to ascertain the facts relating thereto and report at next meeting.

The following additional lamps were approved by the Board :

The following additional lamps were approved by the Board;

"One Minute" Light, Model No. 9; "Models 206 and 212;" "The Canton Arc." and "The Bystrom Arc Lamp."

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The following lamps had been previously approved: June Meeting, 1900-

"Welsbach," gravity, underneath burner; "M. & M." air pressure; "Special No. 5," gravity overhead generator; "New Century," gravity, "underneath generator.

August Meeting, 1900-

"X-Ray." gravity, underneath generator; "Omaha Automatic;" Standard," gravity, underneath generator; "Columbian;" "Imperial," gravity, underneath generator.

November Meeting, 1900-

"Simplicity," gravity, overhead generator; "Efficient No. 6," air pressure; "No. 5 E," air pressure.

December 18th Meeting, 1900-

"American No. 2," air pressure; "Magic," air pressure; "Magic," gravity, overhead generator; "Solar, No. 36," air pressure.

May Meeting, 1901-

"Bystrom," gravity, underneath generator; "Nulite," gravity, underneath generator; "Corona," gravity, underneath generator; "Columbia;" "No-Mantle," gravity, gasometer generator; "Sterling White Light," gravity, underneath generator; "Sterling air pressure; "Grinnell Lamp," gravity, underneath generator; "White Star," gravity, underneath generator; "One-Gallon Doran," air pressure.

August Meeting, 1901-

"Turner No. 20," air pressure, and "Little Wonder," air pressure; "Welsbach Improved;" "Delmar."

November Meeting, 1901-

"Standard," air pressure; "Efficient No. 6," air pressure; and "Efficient No. 2," gravity and air pressure combined, overhead generator; "Sun," gravity, overhead generator.

February Meeting, 1902-

"Twentieth Century Lighting Machine," underneath generator; "F. P. Lighting Machine;" "Acme," air pressure.

May Meeting, 1902-

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"The American Lamp" and "The Overhead Generator Automatic Gas Lamp."

CIRCULAR NO. 3

The Secretary was directed to have a third edition of Circular No. 3 printed. It relates to Infectious Diseases in the Public and Private Schools of Iowa-the edition to consist of six thousand copies.

PERSONAL

Dr. Conniff offered the following resolution, which was unanimously adopted: and the second second

WHEREAS, The term of service of our esteemed colleague, Dr. A. M. Linn, as a member of the Board is about to expire by limitation, therefore,

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Be it Resolved. That the lowa State Board of Health hereby testifies with great pleasure to his faithful and efficient labors in connection with this Board. He has always proved himself deeply interested in all the affairs of the Board, he has been able in judgment, prompt in action, capable as a sanitarian, courteous in manner, and in every way not only endeared himself to his colleagues, but has shown himself a valuable as well as faithful public servant; and it is with great regret that the time of our official separation is so near at hand.

CONFERENCE OF STATE AND PROVINCIAL BOARDS OF HEALTH OF NORTH AMERICA

The Secretary presented the following report:

The seventeenth annual meeting of the above organization was held in North Sheffield Hall. Yale University, New Haven, Connecticut, October 28th and 29th. There were thirty-four present representing Ontario, Canada. Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Delaware, Pennsylvania, Ohio, Indiana, Michigan, Wisconsin, Illinois, Iowa. South Carolina, Louisiana, Cuba, and the U. S. Army and Navy. The conference embraces Canada, the United States of America, Republic of Mexico and the Republic of Cuba—the last being admitted at this meeting. The officers of the conference were: President, H. M. Bracken, Minnesota; Vice President, R. H. Lewis, North Carolina; Secretary, G. T. Swarts, Rhode Island; Treasurer, J. A. Egan, Illinois. The meeting was a very industrious one and quite a good deal of important work was accomplished.

COMMUNICABLE DISEASES

A committee had been appointed at the last meeting to report a list of diseases believed to be communicable, dangerous to the public health and such as boards of health may properly endeavor to prevent or restrict. This committee made its report, which was amended so as to embrace the following:

Actino nycosis (Lump Jaw); Anchylostomiasis (Tropical Anemia); Anthrax Beri-beri (epidemic neuritris); Bubonic Plague; Chicken Pox (Varicella); Cholera Asiatic (Cholera, Epidemic Cholera); Diphtheria (Croup, Membranous Croup); Epidemic Cerebro-Spinal Meningitis (Spotted Fever); Epidemic Dysentery; Erysipelas; German Measles (Rotheln); Glanders; Gonorrhœa; Hydrophobia (Rabies); Health Influenza (Grip); Leprosy; Malaria (Intermittent, Remittent or Pernicious Fever); Measles (Rubeloe, Morbili); Mumps (Epidemic Parotitis); Pneumonia (Lobar or Croupous Pneumonia); Puerperal Fever (Puerperal Septicæmia); Scables (Itch); Scarlet Fever (Scarlatina, Canker Rash); Smallpox (Variola, Varioloi); Syphilis; Tetanus; Trachoma; Trichinosis; Tuberculosis; Typhoid (Enteric) Fever; Typhus (Ship) Fever; Whooping Cough (Pertussis); Yellow Fever.

The report as amended was adopted. The alphabetical order observed in the above list does not represent the relative importance of the diseases named so much as convenience for reference.

CONSTITUTION

A constitution was adopted. In as much as it had struggled along for sixteen years without any constitution whatever, it is hoped that being thus essentially equipped the conference may become more robust and hence more efficient in deeds as well as in resolutions.

The name adopted is as given above. The membership consists of executive officers of state and provincial boards of health and delegates appointed by such boards to attend its meetings.

The officers consist of a President, Vice President and Treasurer to be elected annually, and a Secretary to be elected for three years. The President, Secretary and Treasurer constitute the executive committee.

The duties of the officers are such as usually pertain to officers so designated. The duty of the executive committee shall be to prepare, at a reasonable time before each meeting, a program of subjects for special consideration; to solicit papers and reports on practical questions of applied sanitary science; to consider and recommend measures for promoting the objects of the conference and to aid in carrying its plans into operation. The time and place of the meetings may be fixed by the conference when in session, or may on the petition of five members and a vote of two-thirds of the executive committee be called at other times. There is a strong sentiment in favor of having the meetings held at the place where the meetings of the American Public Health Association are held on the Friday and Saturday immediately preceding the annual session of said association. There are many reasons why this should be done, and it is to be hoped that the executive committee, in the absence of any definite action by the conference just closed, relative to the place of the next meeting, will in the interests of efficiency, of economy of time and money and of convenience, call the next meeting in accordance with the above suggestion.

Dr. U. O. B. Wingate, Secretary Wisconsin State Board of Health, read a paper submitting some questions relative to the "Production and Control of Vaccine Virus and Anti-Toxine," and Dr. C. O. Probst, Secretary of the Ohio State Board of Health, presented a brief paper and submitted some questions relative to smallpox and its management.

VACCINATION

The special committee on vaccination reported as follows:

VACCINATION

The special committee on vaccination reported as follows:

1. That vaccination may be defined, as follows: An inoculation by scarification, puncture or injection beneath the epidermis of a vaccine which produces, with some constitutional disturbance, the typical vaccine vesicle, which leaves, after the pock has healed, its characteristic scar.

2. That in order to obtain the most satisfactory results, vaccine must be produced either by federal, state or provincial officials, or by

private producers under the closest supervision of qualified government officials.

3. That for the greatest protection against smallpox, state and provincial laws should provide machinery whereby certified public vaccinators must be appointed for the systematic vaccination, by house to house visitation, of all children born during any year, and at public stations or otherwise of such others as circumstances may make necessary.

4. That the evidence of successful vaccination of all school children, naturally forms a part of any system of public vaccination, and certificates of such should be accepted only when signed by a municipal or local health officer.

5. That in order that the best results may be obtained, it is essential that medical colleges should be urged to provide for thorough instruction in the theory and practice of vaccination, and that all licensed physicians must hold certificates of having had practical instruction in the operation of vaccination in medical colleges, dispensaries, or public vaccine stations.

The report was unanimously adopted.

Prof. C. A. Lindsley, Secretary of the Connecticut State Board of Health, read an interesting paper upon "Summer Resorts."

Two papers on "Yellow Fever and Methods of Prevention" were presented—one by Major W. C. Gorgas, M. D., U. S. A., Havana, Cuba, and the other by Dr. C. T. Finlay, Chief Sanitary Officer of Havana. Both regarded the mosquito as the sole cause of the disease. Dr. Stevens of the Louisiana State Board of Health strongly dissenting from this view alleging that the disease was spread by fomites as well. The conference pending the results of investigation still in progress did not commit itself by definite expression to any theory.

PRESIDENT'S ADDRESS

The address of the President, Dr. H. M. Bracken, Secretary of the Minnesota State Board of Health, was upon "The State in its Relation to the Tuberculous." He treated it from the following standpoints:

1. The care of the advanced or incurable cases.

2. The care of the incipient cases.

3. The protection of the uninfected.

He strongly advocated the use of properly equipped and judiciously managed sanatoria.

TRANSPORTATION OF THE DEAD

The Maryland State Board of Health, through its Secretary, Dr. J. S. Fulton of Baltimore, submitted a number of amendments to the rules and regulations now in force for the transportation of the dead. It was ordered that a committee be appointed to meet with like committee to be appointed by the National Funeral Directors' Association, the National Association of General Baggage Agents and the American Public Health Association. The committee was not named.

VITAL STATISTICS

Dr. Cressy L. Wilbur, Chief of Division of Vital Statistics, Michigan Department of State, presented two papers: one upon the "Progress of the Movement for Uniform Statistics of Causes of Death," and the other "How Shall Births be Registered?" The conference strongly recommended the adoption of uniform methods for collecting and reporting births, deaths and marriages throughout the territory embraced by the conference and appointed a committee consisting of Drs. Watson, Lindsley and Bryce, with the assistance of Dr. Wilbur to formulate such plans and inaugurate such methods of execution as will most surely and promptly secure the desired object.

TYPHOID FEVER

Dr. H. B. Baker, Secretary of Michigan State Board of Health, read a paper upon typhoid fever with especial reference to its cause.

In addition to the danger of spreading the disease by means of the discharges from the bowels, containing the typhoid bacillus he emphasized the danger from discharges from the bladder and from the mouth showing that these bacilli may often be found in the sputum long after the patient is convalescent. He strongly urged the disinfection of all discharges from typhoid patients.

CALIFORNIA AND BUBONIC PLAGUE

The State Board of Health of Maine presented the following relative to the conduct of the health authorities of California in dealing with the plague question:

WHEREAS, Bubonic plague has been present in California since March. 1900. complete information as to the extent of the disease being withheld by the local authorities, no effective measures of restriction having been put into operation, and the history of the outbreak, so far as we can ascertain from authoritive sources, being as follows; * * * and

WHEREAS. Twenty-five of these cases have ocurred in the months of July, August, September and October, 1902, no information as to their origin or exact location having been furnished, no effective steps having been taken to restrict the spread of the disease, the City Board of Health of San Francisco being helpless, and the mala fides of the State Board of Health of California having been fully established by the foregoing history supported by documentary evidence in the possession of the conference; therefore

Be it Resolved, That the conference of State and Provincial Boards of Health of North America views with abhorrence the irretrievable disgrace of the present State Board of Health of California, and pronounces the plague situation in California a matter of grave national concern; and

Be it Further Resolved, That the National Conference of State and Provincial Boards of Health of North America does hereby advise the various state boards of health of the United States to consider the pro-

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priety of calling upon the surgeon-general of the United States Public Health and Marine Hospital Service to arrange at the earliest possible date a joint conference for the purpose of eradicating plague from the United States."

The resolutions were unanimously adopted.

OFFICERS

The following officers were elected for the ensuing year:

President, Dr. I. A. Watson, New Hampshire. Vice President, Dr. John Guiteras, Cuba, Secretary, Dr. G. T. Swartz, Rhode Island. Treasurer, Dr. J. A. Egan. Illinois. Conference adjourned sine die.

FINANCIAL

The Secretary presented the following report of expenditures for the quarter ending October 31st.

Board meeting, August 7, 1902.

MEMBERS' EXPENSE ACCOUNT

Charles Francis	27.00
H. Matthey	27.00
P. O. Koto	22.82
J. A. McKlveen	15.80
2. B. Adams	20.96
A. M. Linn	10.00
7. W. Powers	16.70
J. H. Sams	13.85

\$154.13

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Paid by State Warrant No. 18531.

CURRENT EXPENSES FOR AUGUST, 1902

J. F. Kennedy, Secretary	00.00
Margaret S. Schoonover, stenographer	35.00
B. Murphy, printing August Bulletin	59.00
Conference State and Provincial Board of Health, dues	10.00
Adams Express Company	.35
American Express Company	.45
United States Express Company	.80
Western Union Telegraph Company	.29
and the second	

\$245.89

Paid by State Warrant No. 18957.

CURRENT EXPENSE ACCOUNT, SEPTEMBER, 1902

F. Kennedy, Secretary	\$100.00
largaret S. Schoonover, Stenographer	65.00
Murphy, printing September Bulletin	69.00
opular Science Monthly	3.00
Vestern Union Telegraph Company	91
dams Express Company	

Total \$238.41

Paid by State Warrant No. 19593.

CURRENT EXPENSES FOR OCTOBER, 1902

J. F. Kennedy, Secretary	\$100.00	
Margaret S. Schoonover, Stenographer	65.00	
B. Murphy, printing October Bulletin	69.00	
Gertrude Kennedy, services	11.00	
J. F. Kennedy, street car, telegraph, etc	5.25	
Geo. A. Miller Printing Co., blank receipts	1.25	
Adams Express Company	30	
American Express Company	65	
Wells Fargo & Co., express	30	
Total		\$252.75

Faid by State Warrant No. 351.

RECAPITULATION

Board meeting. A	ugu	ist		 	 • •	••	• •	\$154.13	
Current expenses	for	August :.	 	 • •	 	• •		245.89	
Current expenses	for	September	 	 	 			238.41	
Current expenses	for	October	 	 	 			252.75	
								_	

\$891.18

The fiscal year was changed by the legislature from October 1st to begin with July 1st. There were expended for the month of July \$459.40.

Making total expenditure of fiscal year to date, \$1,350.58.

leaving unexpended of the appropriation, \$3,649.42.

The report was received and referred to the Auditing Committee which reported as follows:

Your Committee to whom was referred the financial report of the Secretary report that we have carefully audited the same and find it correct and that proper vouchers appear for each item of expenditure. H. MATTHEY, Chairman. (Signed)

The report was adopted and the committee continued:

VACINATION DEFINED

On motion the Board adopted the following definition of vaccination—it being the same as was unanimously apopted by the Conference of State and Provincial Boards of Health of North America, as shown by the foregoing report of the meeting held in New Haven: "An inoculation, by scarification, puncture or injection beneath the epidermis, of a vaccine which produces, with some constitutional disturbance, the typical vaccine vescicle, which leaves, after the pocket is healed, its characteristic scar."

On motion the Board adjourned sine die.

FOURTH QUARTERLY MEETING-FEBRUARY, 1903

The fourth quarterly meeting of the State Board of Health met in the Capitol building, Des Moines, February 18th, and was called to order by President A. M. Linn.

There were present, Linn, McKlveen, Matthey, Francis, Sams, Koto, Adams, Powers and Conniff. The minutes of the November meeting were read and approved.

The report of the Secretary for the quarter ending January 31st was read and considered *seriatum*.

Among the items of interest reported were the following:

INFECTIOUS DISEASES

Outbreaks of the following infectious diseases were reported as having occurred during January at the places respectively designated, the reports of such diseases for November and December having been published in the *Bulletin*:

January:

Diphtheria: Fayette; Silver Creek Twp., Ida county; Milo Twp., Delaware county; Leland; Indianola; Meadow Twp., Clayton county; Westfield Twp., Fayette county; Zearing; Newton Twp., Winnebago county; St Charles Twp., Floyd county.

Measles: Boone; Pleasantville; Exira; Highland Twp., Washington county; Freeman and Lake Twps., Clay county; Des Moines; Wyman.

Scarlet Fever: Colo; Grant Twp., Lyon county; Des Moines; Farmersberg and Garnavillo Twps., Clay county; Rutland; Barclay Twp., Black Hawk county; Washta; Akron; Mason City; Pleasant Valley Twp., Fayette county; Independence; Summit Twp., Adair county; Zearing; Garnavillo; Salem Twp., Henry county; Rockford Twp., Pottawattamie county; Carpenter; Hedrick; Indianola; Gilford Twp., Monroe county; Kellogg; White Oak Twp., Mahaska county; Kirkville; Gilman; Avery.

Smallpox: Stuart; Clinton, 10 cases; Clearfield, 2; Anderson Twp., Mills county, 1; Patterson; Hardin Twp., Johnson county, 2; State Center Twp., Marshall county, 8; Des Moines, 12; Lee Twp., Madison county, 4; Crawford and South Twps., Madison county, 72; Booneville, 1; Walcott, 2; Victor Twp., Cass county, 1; Washta; Logan, 2; Pacific Junction, 1; Iowa City, 15; Tipton, 1; Keokuk, 1; Webb, 4; Jackson Twp., Warren county; Union Twp., Kossuth county, 1; State Center, 7; Cumming; Vincent, 1; No. 21

Walnut, 1; North Liberty, 1; Clarion. 2; Millville Twp., Clayton county, 1; Lakeville Twp., Dickinson county, 1; Winterset, 1; Union Twp., Dallas county, 1; Libertyville, 1; Villisca, 1; Wapello, 3; Grove Hill, 3.

Typhoid Fever: Des Moines; Lincoln Twp., Jones county; Gilford Twp., Monroe county.

SPECIAL DISINTERMENTS

The attached applications for special disinterment permits have been filed with the Secretary during the quarter and are respectfully submitted for your consideration:

ALICE LOUISE CLARKE, age 5 years, *smallpox*, 1894; by private conveyance from Tabor cemetery. Rawles Twp., Mills county, to another lot in the same cemetery.

MARGUERITE AGNES DONNELLY, age 26 years. *diphtheria*, 1887; by private conveyance from St. Mary's cemetery, Davenport, to St. Marguerite's cemetery, Davenport Twp., Scott county.

LEMUEL GRANTY DEPUY, age 6 years, membranous croup, 1882; by private conveyance from Linwood cemetery, Cedar Rapids, to another lot in the same cemetery.

ARAMINTO FLORENCE FELGER, age 1 year, membranous croup, 1883; by private conveyance from Ottawa cemetery, Jackson Twp., Clarke county, to Oak Hill cemetery, Woodburn, Iowa.

CLABA DANT KRUGER, age 3 years, *diphtheria*, 1880; by private conveyance from Cagley cemetery. Bradford Twp., Chickasaw county, to Greenwood cemetery in the same township.

REINHART MANTHEI KRUGER, age 6 years, diphtheria, 1880; by private conveyance same as above.

EDWARD WILLIAM MAHER, age 16 years, *diphtheria*, 1890; by private conveyance from Windham cemetery, Hardin Twp., Johnson county to Gosgrove cemetery in the same township.

JOHN JOSEPH MAHER, age 15 years, diphtheria, 1890; by private conveyance same as foregoing.

CARL ARTHUR NELSON, age 8 years. *diphtheria*, 1902; by private conveyance from Oakland cemetery, Keokuk, to another lot in the same cemetery.

CLYDE IRWIN NELSON, age 3 years, *diphtheria*, 1902; by private conveyance, same as foregoing.

CORIE ELMA RATHBUN, age 15 years. *diphtheria*, 1877; by private conveyance from Hickory Grove cemetery, Belmond Twp., Wright county, to Upper Grove cemetery, Avery Twp., Hancock county.

HAROLD STONE, age 5 years, *diphtheria*, 1901; by railroad, from Glenwood cemetery, city of Glenwood, to Woodland cemetery, city of Des Moines.

RALPH VAN WORMER, age 6 years, membranous croup, 1898; by railroad from Main's cemetery, Reeves Twp., Franklin county, to the town of Clarence. FRANCIS XAVIER VOEGTLI, age 4 years, *diphtheria*, 1870; by private conveyance from Baden cemetery, *l.afayette* Twp., Keokuk county, to St. Elizabeth's cemetery in the same township.

DORA VOSS, age 5 years. *diphtheria*, 1890; by private conveyance from Davenport city cemetery to Fairmount cemetery, Rockingham Twp., Scott . county.

HUGO WRAAGE, age 10 years, *diphtheria*, 1895; by private conveyance, same as foregoing.

CHICKEN POX

A communication was read from Dr. J. C. Shrader, Iowa City, calling attention to the fact that smallpox was so often called chicken pox that the disease should be quarantined the same as smallpox. The communication was referred to a committee composed of Matthey and Adams. The committee subsequently reported the following, which was adopted:

Your committee having under consideration the communication of Dr. Shrader relative to quarantining chicken pox would respectfully report that in our opinion the people, in view of the fact that this disease *per se* is so harmless, could not be persuaded that such a measure is demanded and that in consequence such a measure would be practically a dead letter. We would recommend that physicians be required to report to the mayor, or township clerk all cases of chicken pox and that the premises where such cases are found shall be *placarded* and the children of the family isolated and be excluded from the schools until recovery has taken place, the premises disinfected and the danger signal removed.

Respectfully,

H. MATTHEY, C. B. ADAMS.

CIRCULAR NO. 2

The Secretary called attention to the fact that the present edition of Circular No. 2, relating to local boards of health was about exhausted and asked that the same be revised and an edition of 4,000 copies be issued. The matter was referred to the committee on "Publications and Rules," who subsequently reported in favor of revision of a third edition. The report was received and the Secretary was directed to have 4,000 copies of the same printed. [No. 21

PERSONAL-RESIGNATION

Dr. A. M. Linn, whose term of service ended January 31st, and who under appointment by Governor Cummins, entered upon a second term, tendered the following resignation:

Iowa State Board of Health:

Gentlemen: I am mindful of the generous impluse which prompted your selection of myself as your presiding officer before the expiration of my brief term as a member of this Board. That term was recently extended by reappointment. While entertaining a lively appreciation of the courtesy I am conscious of the fact that a longer retention of this honorable office by me would work to the disadvantage of my colleague, whose term of service expires within a year. I, therefore, tender my resignation as president to take effect immediately and in retiring express my hearty thanks to you my colleagues for the uniform consideration and forbearance shown me during my incumbrance of this office. Very truly, A. M. LINN.

The resignation was accepted and Dr. Charles Beecher Adams of Sac City was elected in his stead.

AMERICAN PUBLIC HEALTH ASSOCIATION

Dr. McKlveen presented an interesting report, on behalf of himself and Dr. Linn, of the Thirtieth Annual Meeting of the American Public Health Association held at New Orleans, La., December 8-12, 1902.

The report was listened to with interest and ordered placed on file.

PAN-AMERICAN SANITARY CONFERENCE

Dr. F. W. Powers, on behalf of himself and Dr. C. B. Adams, delegates, presented a concise though brief report of the Pan-American Sanitary Conference, which was held at Washington, D. C., December 2-6, 1902, which was received and ordered placed on file.

PLAGUE CONFERENCE

The secretary presented the following report respecting the Plague Conference lately held in Washington, D. C. The report was received and ordered printed in the *Bulletin*.

Gentlemen of the Iowa State Board of Health:

In response to an appointment by your honored president and by His Excellency, Gov. Cummins, your Secretary had the pleasure of attending the Plague Conference, held in Washington City, January 19th, upon a call issued by the Surgeon General of the Public Health and Marine-Hospital Service in accordance with Sec. 7 of an Act of Congress, approved July 1, 1902.

The call was issued by the Surgeon General upon a request signed by five or more state boards of health of which the Iowa Board, through your Secretary, was one.

The conference convened at 10 A. M., in the office of the Surgeon General and was presided over by him. The following states and territories were represented: California. Connecticut, Colorado, Delaware, District of Columbia, Indian Territory, Iowa, Indiana, Louisiana, Maine, Maryland, Minnesota. North Carolina, New Jersey, New York, Pennsylvania, Rhode Island, South Carolina, Tennessee, Vermont and Virginia each state being entitled to representation by one delegate.

Dr. G. T. Swartz. Rhode Island, was elected secretary, Surgeon General Wyman delivered a brief address of welcome and made in connection therewith a detailed statement of the plague situation in the United States and Mexico. The latest information received from California was a telegram from Surgeon Glennan, the representative of the Public Health and Marine-Hospital Service for the state of California as well as for the city of San Francisco. The telegram was dated January 17th, two days before the meeting of the conference and was as follows: "San Francisco. Calif., Surgeon General Wyman, Washington, D. C.: Eightyseven cases have occurred in Chinatown, six sickened in other parts of the city, none proven to have originated in the country. Total, six whites, four Japanese and eighty-three Chinese (Since March, 1900. Last case outside of Chinatown, october 31). As man's personal habits were bad, possibly Chinatown origin, but could not trace connection."

The meeting was a very spirited one indeed. There was not only a strong undercurrent of intense earnestness, but the State Board of Health of California, the late Governor and others who were opposed to the efforts of the city board of health and largely counteracted the measures recommended by the Public Health and Marine-Hospital Service for stamping out the disease were denounced in scathing terms.

A committee was appointed to prepare a formal expression of the sentiment of the conference on this question. The following resolutions were presented by this committee and unanimously adopted by the conference:

I

The presence of plague in California is established beyond debate by-

1. The investigations of Kellogg of the San Francisco Board of Health, Ryfkegal for California State Board of Health and Kinyoun for the United States Marine-Hospital Service.

2. By the later investigations of Pillsbury for the State Board of Health, and by those of J. White, M. White, Flint, Currie, Carmichael, Blue and Glennan for the United States Marine-Hospital Service. [No. 21

3. By the findings of Flexner, Barker and Novy, composing a special committee acting under federal authority.

4. By the findings of independent and disinterested investigators (supplied with materials from autopsies made at San Francisco, and working in San Francisco, Chicago, Boston, New York, Washington, Bal timore, Philadelphia and Ann Arbor).

5. By the occurrence of a case of human plague in Ann Arbor due to an accident in the manufacture of Haffkine's prophylactic fluid with a culture of plague bacillus obtained in California.

6. By the autopsy records of ninety cases of plague, now in the possession of the United States Marine-Hospital Service and of the San Francisco Board of Health, and published in part in the Occidental Medi cal Times of San Francisco.

II

The presence of plague in any community where proper restrictions are not taken to prevent its spread is an injury to the best interests of that community. Such injury is in any case avoidable by the proper cooperation of all interests involved, commercial, professional and governmental. This conference regards the habitual publication of the actual facts relative in infectious disease and preventive procedures as the surest route to popular confidence, and is one of the means best adapted to minimize the injury liable to result from the presence of such diseases.

III

The present danger to California and the United States lies primarily in the persistence, during nearly three years, of a definite *nidus* of piague infection in that part of San Francisco known as Chinatown; but the gravity of this circumstance is greatly increased by the gross neglect of official duty by the State Board of Health of California, and the obstructive influence of the recent Governor of California, by the failure of the city government of San Francisco to support its city board of health, and by the obstacles opposed to the operations of the United States Public Health Service.

IV

The conference will consider the safety of the country sufficiently assured as soon as satisfied that a competent city board of health of San Francisco, and a competent State Board of Health, in co-operation with the United States Public Health Service, will proceed under definite, harmonious and effective laws and ordinances; that they are provided with ample funds, and that they are jointly and severally in the free exercise of their lawful powers.

The conference expresses its conviction that the United States Public Health Service has deserved well of the state of California and of the country, and that it would go far towards the restoration of popular confidence if the United States Public Health officials were admitted to the same relations with the State Board of Health as have been steadily maintained with the city board of health of San Francisco.

The praise of this conference and the gratitude of the city of San Francisco are due to Drs. John M. Williamson, Vincent P. Buckley, W. B. Lewitt, Rudolph W. Baum, Louis Bazett and Dr. McCarthy of the city board of health of San Francisco, these men possess the unreserved confidence of the executive health officers of the country.

VI

Resolved. That the Surgeon General of the Public Health and Marine-Hospital Service be requested to inform the various state boards of health at least two weeks before the annual meeting of the Public Health and Marine-Hospital Service and the state boards of health to what exent the sanitary recommendations this day made to control and prevent the existence of plague in California have been carried out, to the end that they may be prepared to take further action that may be necessary to accomplish the desired end.

There were some other resolutions presented but as they were regarded as rather extreme they were withdrawn or rather laid over until the annual meeting which will be called for April or May. If it shall then appear that the state and city authorities of San Francisco have not co-operated with the federal authorities and that the conditions are still a menace to the country there will be action taken looking to the petitioning of the Secretary of War to close San Francisco as a transport station for American troops and to inquire as to what extent the plague situation is a menace to the St. Louis Exposition.

Surgeon General Wyman said that under the authority granted by congress he had full authority to take charge of the sanitary interests of that port or any point in the United States where the local authorities were unable or unwilling to cope with a situation that was a menace to the public health, and he assured the conference that he would exercise all the authority placed in his hands if the conditions were such as to warrant it.

The following from the Surgeon General gives the situation since the adjournment of the conference to the time indicated therein:

A great deal of highly interesting telegraphic communication between Surgeon General Wyman and the California health authorities must be omitted owing to the limited space in the *Bulletin*. The following is furnished as an exhibit of the result of the meeting of the conference:

RESOLUTIONS OF MERCANTILE JOINT COMMITTEE

San Francisco, Calif., February 2, 1903.

WHEBEAS, The boards of health of other states and territories have become alarmed at the reports of bubonic plague in San Franciscoduring the past three years; and

5

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[No. 21

WHEREAS, But ninety-three cases have been reported by all health authorities during a period of these thirty-five months and that the last case reported was December 11, 1902; and

WHEREAS, The health authorities of twenty-one states and territories, in a conference called for that purpose at Washington, January 19th, declared that the presence of plague had "been established beyond debate by the investigations of Kellogg of the city board; by Pillsbury and Ryfkogel of the state board; by J. White, M. White, Flint. Currie, Carmichael, Blue and Glennan of the Marine-Hospital Service; by Flexner, Barker and Novy, a special commission acting under federal authority; by independent and disinterested investigators in Chicago, Boston, New York, Washington, Baltimore, Philadelphia and Ann Arbor working from material obtained in San Francisco; by a case of human plague in Ann Arbor due to an accident in the handling of a culture of plague bacillus obtained in California, and said plague conference did attempt to declare a quarantine against California, to cause the transport service to be removed from San Francisco, and to place medical inspectors upon all of the trains going out of the state, and but for the most strenuous efforts of Dr. Gardner, representative of the State Board of Health, could have succeeded in so doing; and

WHEREAS, Said conference did demand that the city and state health authorities act in harmony with the United States Marine-Hospital Service to carry out any sanitary regulations which that service may deem necessary or quarantine would be established against California, at its next meeting to be held in April; and

WHEREAS. The great interests of California and especially those of San Francisco, demand that no neglect of our citizens should hinder the march of progress which has now been so happily begun; it is therefore

Resolved, That this Mercantile Joint Committee, consisting of the officers and other representatives of the State Board of Trade, the San Francisco Board of Trade, the San Francisco Chamber of Commerce, the Merchants' Association of San Francisco, the Merchants' Exchange of San Francisco, the Manufacturers' and Producers' Association of California and the California Promotion Committee, hereby strongly urges the governor of the state and the mayor and supervisors of San Francisco to take such steps at once as shall secure a prompt co-operation of the boards of health of the city and the state, under the supervision of the United States Marine-Hospital Service, to the end that all danger from the bubonic plague may be eradicated, that all fears of infection may be removed, that the confidence of the boards of health of the other states and territories may be restored, and that no injury, however, remote, may result to the foreign and interstate commerce, and to this end we hereby pledge to the officials of the state and city every aid and support of the various commercial bodies which we represent. And we also ask that the governor of the state and the Mayor of the city join in the signing of the following statement:

"WHEREAS, Competent medical authority has declared that bubonic pest has existed to a limited extent in the restricted area known as Chinatown in San Francisco, the last case having been reported December 11, 1902, and although the health authorities have exercised sanitary supervision over this section in the past,

"NEVERTHELESS, this undersigned joint official statement is promulgated in accordance with the resolutions adopted at the Conference of State Health Officers, held at Washington, D. C., January 19, 1903, as an assurance that there is no present or future danger from that disease, inasmuch as complete and harmonious action by all the health authorities concerned is hereby assured and will be maintained."

GEO. C. PARDEE, GOVERNOR. M. GARDNER, M. D., Representative State Board of Health. E. E. SCHMITZ, Mayor, San Francisco. A. P. O'BRIEN, M. D., Health Officer, San Francisco. A. H. GLENNAN, Surgeon United State Public Health and Marine-Hospital Service. ARTHUR R. BRIGGS, Vice-President, California State Board of Trade. A. A. WATKINS, President, San Francisco Board of Trade. GEORGE A. NEWHALL, President, San Francisco Chamber of Commerce. FRANK J. SYMMES, President, Merchants' Association of San Francisco. GEORGE W. MCNEAR, President, Merchants' Exchange of San Francisco. A. SCARBORO, President, Manufacturers' and Producers' Association of California. RUFUS P. JENNINGS, California Promotion Committee. (Telegram.) San Francisco, California, February 9, 1903.

FINANCIAL

The following represents the expenditures of the Board for the quarter ending January 31, 1903:

SPECIAL EXPENSE ACCOUNT

\$ 93.89

J. F. Kennedy, New Haven meeting Paid by State Warrant No. 390.

Board Meeting, November 6, 1902.

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STATE BOARD OF HEALTH.

MEMBERS' EXPENSE ACCOUNT

C. B. Adams	96
J. A. McKlveen	30
H. Matthey 31.	00
Chas. Francis	00
A. M. Linn	00
R. E. Conniff	00
P. O. Koto	82
F. W. Powers	95
J. H. Sams	00
Total	\$217.03

Paid by State Warrant No. 454.

CURRENT EXPENSE ACCOUNT FOR NOVEMBER, 1902

J. F. Kennedy, Secretary	(a) a	\$100.00
Margaret S. Schoonover, Stenographer	4.4	. 65.00
B. Murphy, November Bulletin		69.00
Lewis Schooler, postage stamps	* *	40.00
Inland Printing Co., blanks		22.50
Gertrude Kennedy, mailing Bulletin		4.00
E. H. Colgrove, books	12 A	15.65
Postal Telegraph Co	• •	59
Western Union Telegraph Co	14	
Total		
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\$316.99

Paid by State Warrant No. 761.

CURRENT EXPENSE ACCOUNT FOR DECEMBER, 1902

J. F. Kennedy, Secretary	\$100.00
Margaret S. Schoonover, Stenographer	65.00
C. B. Adams, Washington meeting	113 25
F. W. Powers, Washington meeting	103.25
A. M. Linn, New Orleans meeting	78.65
B. Murphy, December Bulletin	69 00
B. Murphy, Circular No. 3	32.00
L. Schooler, Bulletin postage	30.00
Inland Printing Co., blanks	34.50
F. W. Powers, investigating smallpox, etc	18.05
American Medical Association, fee	5.00
Gertrude Kennedy, mailing Bulletin	4.00
Babyhood Publishing Co., subscription	1.00
Adams Express Co	.95
Wells-Fargo & Co., express	75
Western Union Telegraph Co	.83
Total	
worder to an extra an an at the second second states and	\$ <i>C</i>

Paid by State Warrant No. 1421,

1903] FOURTH QUARTERLY MEETING-FEBRUARY, 1903. 69

CURRENT EXPENSE ACCOUNT FOR JANUARY, 1903

J. F. Kennedy, Secretary	\$100.00
Margaret S. Schoonover, Stenographer	65.00
B. Murphy, January Bulletin	69.00
J. F. Kennedy, Plague Conference, Washington	84.00
Geo. F. Lasher, Postal Guide	2.00
Gertrude Kennedy, mailing Bulletin	4.00
Iowa Litho. Co., letterheads (Powers)	5.00
Américan Public Health Association	5.00
Geo. A. Miller Printing Co., blanks	6.50
	1730.
Total	\$240.30

Paid by State Warrant No. 2535.

RECAPITULATION

Special expense account \$ 93.89	
Members expense account 217.03	
Current expense account	
Current expense account, December 656.23	
Current expense account, January, 1903	
Total	,624.14
Previously expended	1,350.58
Total expenditure to date \$	2,974.72
Appropriation unexpended	
· · · · · · · · · · · · · · · · · · ·	

The report was received and referred to the Auditing Committee.

REPORT OF AUDITING COMMITTEE

Your Auditing Committee, to whom was referred the financial report of the Secretary for the quarter ending January 31, 1903, beg leave to report that we have carefully audited the same and find it to be correct. We find vouchers on hand covering each item of expenditure.

H. MATTHEY,

Committee.

GASOLINE LAMPS

The following lamps were approved by the Board: U. S. Street Lighting Co., House System No. 1. U. S. Street Lighting Co., House System No. 2. Searchlight 3, 4, 6, 7, 12, 15, 22, 47. On motion the Board adjourned sine die.

\$656.23

1903

ANNUAL MEETING-MAY, 1903

The twenty-third annual meeting of the Iowa State Board of Health convened at the office of the Secretary, Capitol Building, Des Moines, May 20th, and was called to order at 10:30 a.m., by President Dr. C. B. Adams.

There were present Adams, Linn, Koto, Sams, Conniff, Francis, McKlveen, Matthey and Powers.

The minutes of the last meeting were read and approved.

The quarterly report of the Secretary was submitted and considered seriatim.

The Secretary in his report called attention to the reports of outbreaks of infectious diseases throughout the State during the quarter, to disinterment permits issued—special and ordinary, and to application on file for other special permits; to various items of unfinished business; to special communications requiring action by the Board; to the expiration of his Notarial Commission; to the fact that the last edition of Circular No. 7— "Rules and Regulations recommended for adoption by Local Boards"—was exhausted; to the expenditures of the Board during the quarter and for the fiscal year thus far, etc.

The Secretary was directed to renew his Notarial Commission.

GASOLINE LAMPS

The Committee on Gasoline Lamps, Francis and Koto, reported in favor of the approval by the Board of "The Ann Arbor System of Lighting." The report of the committee was adopted.

DISINTERMENT OF DEAD BODIES

Dr. Conniff on behalf of the Committee on Corpses reported in favor of the following applications for special disinterment permits. The report was adopted and the Secretary was ordered to issue the permits accordingly:

HARRY BLOOMER, age 19 years, *diphtheria*, 1903, to be removed from one lot to another in Greenwood cemetery, Muscatine.

AGNES CARVIEZEL, 5 years, *diphtheria*, 1864, from Baden cemetery, Lafayette township, Keokuk county, to St. Elizabeth's cemetery in the same township.

CAECILIA CLARKSON, 9 years, diphtheria, 1892, same as last named.

ROSA CLARKSON, 15 years, diphtheria, 1892, same as last named.

NELLIE GAGE, 5 years, scarlet fever, 1899, from Pleasant Hill cemetery, Harrison township, Harrison county, to another lot in the same cemetery.

MATTE HINERICHSON, 12 years, *diphtheria*, 1892. from Andover cemetery, Elk River township, Clinton county, to Oakland cemetery, Spring Valley township, Clinton county.

THEODORE JOHANN HENRY JASPER, 2 years, *diphtheria*, 1902, from one lot to another in Woodland cemetery, Des Moines.

LAURA MUDGE, 4 years, *diphtheria*, 1882, by U. S. Express from Walnut cemetery, Council Bluffs, to the City cemetery, Ottumwa.

PETER PETERSON, 8 years, scarlet fever, 1871, from private cemetery, Lincoln township, Clay county, to Riverside cemetery, Spencer.

ARTHUR PLETZ, 6 years, scarlet fever, 1901, from one lot to another in Woodland cemetery, Des Moines.

ELLEN STODDARD, 10 years, scarlet fever, 1875, from Red Oak cemetery, Red Oak township, Montgomery county, by railroad to Fremont cemetery, Fremont, Dodge county, Nebraska.

MRS. LORA STOCKER, 19 years, *diphtheria*, 1890,, from Cox cemetery, Union township, Harrison county, to the City cemetery, Logan.

BERTHA TIEDERMANN, 7 years, diphtheria, 1885, from one lot to another in Fairmount cemetery, Rockingham township, Scott county.

FRANCIS HEARY TOWERS, 3 years, *diphtheria*, 1873, from a private grave in Highland township, Greene county, to the Churdan (town) cemetery.

DONA E. TURNER, 6 years, diphtheria, 1883, from one lot to another in Oakland cemetery, Keokuk.

EDNA WALKER, 4 years, diphtheria, 1895, from Shaul cemetery, Ottumwa, to the City cemetery, Ottumwa.

OSCAR WHITE, 21 years, diphtheria, 1890, from Cox cemetery, Union township, Harrison county, to the Logan (city) cemetery.

All the foregoing were to be removed by private conveyance except the two as above indicated.

CIRCULAR NO. 7

The Secretary was authorized to have six thousand copies of Circular No. 7, as revised, printed and furnished to township boards as called for.

ELECTION

The following were elected for the ensuing year:

PRESIDENT-J. A. MCKLVEEN, Chariton. SECRETARY-J. F. KENNEDY, Des Moines.
STENOGRAPHER Mrs. Bessie Omstead, Eagle Grove. CHEMIST-Prof. C. N. KINNEY, Highland Park College, BACTERIOLOGIST-Eli Grimes, Des Moines.

Highly complimentary resolutions were adopted, unanimously, commending the efficient and faithful services of Mrs. Margaret S. Schoonover, who after five years' of service, declined a re-election as stenographer.

FINANCIAL

The following financial exhibit for the quarter ending April 30, 1903, was presented by the Secretary:

The following represents the expenditures of the Board for the quarter ending April 30, 1903:

Board Meeting, February 19, 1903.

The following financial exhibit for the quarter ending April 30, 1903, was presented by the Secretary:

The following represents the expenditures of the Board for the quarter ending April 30, 1903:

Board Meeting, February 19, 1903.

MEMBERS' EXPENSE ACCOUNT

J. H. Sams	\$ 26.20
C. B. Adams	
H. Matthey	
J. A. McKlveen	19.80
A. M. Linn	10.00
R. E. Conniff	
Chas. Francis	32.00
F. W. Powers	
P. O. Koto	

Total

\$224.48

Paid by State Warrant No. 2895.

CURRENT EXPENSE ACCOUNT, FEBRUARY, 1903

J. F. Kennedy, Secretary	\$100.00
Margaret S. Schoonover, Stenographer	65.00
B. Murphy, Bulletin	69.00
J. A. McKlveen, New Orleans meeting	102.96
The Sanitarian, subscription	4.00
Mutual Telephone Co	9.00
Postage stamps	50.00
Chauncy Wing, sharpening knives	

Total

\$400.31

Paid by State Warrant No. 2943.

\$319.62

CURRENT EXPENSE ACCOUNT, MARCH, 1903

I. F. Kennedy, Secretary	
Margaret S. Schoonover, Stenographer 65.00	
3. Murphy, Bulletin 69.00	
3. Murphy, printing Circular No. 2, etc	
H. Welch, binding 36 Bulletins 18.00	
Langan Bros. clasp envelopes 13.88	
Gertrude Kennedy, mailing Bulletin 8.00	
American Veterinary Review, subscription	
angan Bros., crushed envelopes 2.99	
Franklin Printing Co., printing portfolios 2.00	
towa Telephone Co	
American Express Co	
Western Union Telegraph Co	

Paid by State Warrant No. 3806.

CURRENT EXPENSE ACCOUNT, APRIL, 1903

J. F. Kennedy, Secretary	\$100.00
Margaret S. Schoonover, Stenographer	65.00
B. Murphy, printing Bulletin	69.00
Iowa Litho. Co., letterheads	5.00
Mutual Telephone Co	3.00
American Medical Association, journal	5.00
Franklin Printing Co., circulars	1.50
Wells-Fargo & Co., express	75
Adams Express Co	1.04
American Express Co	25

Total \$250.54

Paid by State Warrant No. 4548.

The fiscal year ends with June 30th. The expenditures for the year thus far have been as follows:

uly, 1902	 	\$ 459.40
Quarter ending October 31st	 	 891.18
Quarter ending January 31, 1903	 	 1,624.64
Quarter ending April 30th	 	 1,194.95

Total		\$4,170.17
Leaving unexpended	for the months of May and June.	\$829.83

The report was received and referred to the Auditing Committee.

On motion the Board adjourned to meet on Wednesday, August 5th, proximo.

II

RAILROAD ACCIDENTS

From the reports of the Railroad Commissioners for 1901 and 1902 the following interesting data respecting deaths and injuries from railroad accidents occurring in the State of Iowa are presented:

ACCIDENTS	TO	PERSONS	IN	IOWA
-----------	----	---------	----	------

1		Killed	L	I	jured	ł.,
Year	Pas-engers.	Employes.	Others.	Passengers.	Employes.	Others
878	20257774698804953777462754970	29 42 37 67 88 82 72 61 59 101 35 78 80 81 84 80 81 84 80 81 86 90 65 100 65	31 40 38 34 69 65 57 75 62 69 69 91 76 90 82 90 114 90 82 90 114 151	51 12 9 7 60 255 47 9 85 8 28 7 7 25 67 8 8 8 8 8 7 8 8 8 8 8 8 8 8 8 8 8 8	187 103 140 146 502 255 348 5720 386 354 442 579 258 682 569 258 682 387 350 411 301 348 449 656	353 34 31 720 59 64 75 86 47 58 86 40 101 92 77 66 74 86 70 123 142

The foregoing table gives the comparative record of "killed" and "injured" for each year from 1898 to 1902, both inclusive. Comparing the record of 1898 with that of 1902 it would seem as if the automatic couplers and airbrakes in use today had not been productive of the saving of life and limb that could reasonably have been expected. In 1878, 29 employes were killed and (75)

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137 injured. In 1902, 64 employes were killed and 853 injured. It would be interesting to know to what extent the increase in railway mileage and in the increased number of employes is responsible for the great increase in "killed" and "injured." The total number of passengers, employes and others killed in 1878 was 80, and of injured 223. The total number of passengers, employes and others killed in 1902 was 195 and injured 1,095. Total casualties for 1878, killed and injured were 303; for 1902, 1,290. The employes killed in 1878 numbered 29; the employes injured 137. Total employes killed and injured in 1878, 266. Employes killed in 1902, 64; employes injured, 853. Total number of employes killed and injured in 1902, 917.

The number of miles operated in 1878 were 14,157.14; in 1902, 41,396.44. The number of employes in 1878 in Iowa were 13,518, and in 1902, 40,613.

The following tables from the reports of Railroad Commissioners furnish interesting data for each year since, and including 1878, relative to railroad casualties and the beneficial results of modern methods of coupling and braking on the trains so far as railway employes are concerned:

AUTOMATIC COUPLERS AND TRAIN BRAKES

Number of cars equipped and number of employes and accidents to employes from coupling cars and falling from trains

Year	Number of all cars.	Equipped with automatic couplers.	Equipped with power or train brake.	Number of em- ployes.	Number killed coupling cars	Number injured coupling cars.	Number killed falling from trains.	Number injured falling from trains.
1878	29,057			13, 518				
879	31, 584			15, 841				
880	54, 451			18, 985				
881	67, 510			21,974				
882	85, 206		1, 531	17,273	16	182	81	57
888	98, 106		1,814	27, 112	16	98	33	45
884	103, 337		1,917	26, 731	8	109	10	57
885	102, 835		2,200	25,666	13	174	16	34
886	106, 178		2, 164	25, 761	10	126	25	88
387	91,097		2,545	29,088	9	184	23	3
888	118,975		1,864	30, 794	19	240	32	55
889	120, 757	4,210	3, 636	24,642	8	149	5	4
890	127, 464	9, 194	10, 422	24, 351	14	203	17	5
	130, 103	18, 178	14, 395	27, 589	13	242	23	8
892	149, 781	34, 315	29,047	30, 192	14	198	28	61
893	142,730	49,871	89, 296	31, 127	10	196	22	6
394	127, 171	46, 558	37 784	29, 308	7	91	17	8
95	158, 721	58, 862	58,078	24, 107	5	80	20	8
96	182, 529	70,718	87,050	28, 165	6	97	19	8
97	171, 909	101,851	90,648	28, 690	7	80	14	6
898	176,085	142, 638	105, 528	30,009	4	75	18	5
399	190,730	180, 505	127,907	32, 385	12	72	12	6
	200, 814	188,656	184, 691	87, 696	8	59	20	5
901	211,888	210, 464	158,712	37,886	6	52	21	100
902	287, 289	286, 276	188, 712	40, 686	4	40	6	96

RAILROAD ACCIDENTS.

There is much food for thought in the foregoing figures from a social and humanitarian as well as economic standpoint. It is pertinent to inquire as to what extent these accidents could have been avoided by proper care. All great corporations are responsible for the lives and health of their employes and patrons; and where it can be shown that death and injury come to employe, passenger or others through neglect or through the employment of persons incapacitated mentally, physically or through intoxication the courts as well as the people should place the blame where it belongs and prevent further loss of life and limb. It would seem that the competitive ambition to greater speed should only follow double or quadrupled tracks and the use of the latest and best methods of protection against accidents.

III

INFECTIOUS DISEASES REPORTED

The Secretary sent for 1901 and 1902, respectively, the following circular to every local board of health in the State:

REPORT OF INFECTIOUS DISEASES

To the Iowa State Board of Health:

2



Important Notice. Section 2571, the Code, defining the duties of local boards of health, says: "And through their physician or clerk shall make general report to the State Board of Health at least once a year, and special reports when it may demand them, of its proceedings and such other facts as may be required, on blanks furnished by them and in accordance with instructions from it."

As the "health officer" or physician of the local board does not have the data upon which to make such a report, the State Board requires it to be made by the Clerk. The Clerk of each local board of health, whether city, town or township, must keep a complete record of all the cases of the above named diseases, reported by physicians or others, as a basis upon which to make this report. If no such diseases have been reported, return this blank reporting that fact.

These reports should be sent to the Secretary of the State Board of Health on or before January 31st in each year.

In addition to the above report, the Clerk of each local board of health, whether city, town or township, must report to the Secretary of the State Board of Health, at once, as reported to him, outbreaks of any of the above named diseases, the source of the infection, and the measures adopted to prevent its spread. No special form for this report is required.

Every such Clerk must also report to the Secretary of the State Board of Health, as soon as determined, the name and postoffice address of the health officer elected as required by Section 2568, the Code.

Send all reports and communications to

J. F. KENNEDY, Secretary, Des Moines.

These circulars were sent in 1901 to 725 incorporated cities and towns and to 1,612 townships. Total circulars sent 2,337. Reports were received from 320 cities and towns and 934 from townships. Total, 1,254. There were 405 cities and towns and 678 townships not reported. Total, 1,083.

In 1902 circulars were sent to 781 incorporated towns and cities and to 1,611 townships. Total circulars sent 2,398. Reports were received 347 cities and towns and 823 from townships. Total 1,170. There were from 434 cities and towns and 794 townships that did not make any report. Total not reporting 1,228.

The reports as received showed the following:

-		1901	1902	
Diseases.	Cases	Deaths.	Cases De	aths
Asiatic cholera			2	
Diphtheria Leprosy	1,277	150	841	116
Measles		-	1	
Puerparal force	2,070	10	3,044	29
Grantet Sever	46	9	23	13
Smallnor	2,480	75	2,548	69
Typhoid form	4,496	19	6,724	15
Wheenley	612	73	549	101
whooping cough	1,356	17	3,196	33

1903]

For the biennial period the cases and deaths were as follows:

Diseases	Cases	Deaths
Asiatic cholera	2	1) cauno
Diphtheria	2.118	266
*Leprosy	. 1	200
Measles	5.114	39
Puerperal fever	. 69	22
Scarlet fever	5.028	144
Smallpox	1,220	34
Typhoid fever	1,161	174
Whooping cough	4,552	50
The second second	56	

*Humboldt county.

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It will be seen from the above that the most fatal disease was diphtheria, and following that was typhoid fever and scarlet fever. Smallpox was the most serious disease from an economic standpoint. A low estimate would place the cost to the State of each case at \$20, which would make the aggregate cost \$224,400. There was also a loss of thirty-four lives. In the above footings it must be borne in mind that 1,082 local boards out of a total of 2,333 in the State, made no report. Could there be a stronger argument for prompt and efficient preventive measures?

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IV

REGISTRATION OF VITAL STATISTICS*

Vital statistics are valuable from a genealogical, historical, sociological and scientific standpoint. The data embraced in such statistics differ in various states and countries. When the Iowa State Board of Health was created by the legislature in 1880, among other duties specified under the statute, it was required to supervise a registration of marriages, births and deaths occurring within the state. In some other states such statistics also embrace divorces.

Upon the organization of the State Board of Health, in accordance with the obove requirement blanks were adopted requiring the following data:

MARRIAGES

Number of license; date of license; by whom affidavit was made; by whom consent to marriage was given; full name of groom; place of residence; occupation; age; place of birth; father's name; mother's maiden name; color; race and number of marriage; full name of bride; maiden name—if a widow; place of residence; age; place of birth; father's full name; mother's full maiden name; color; race and number of marriage; where and when married; by whom married—name and official position; witnesses; date of return of marriage and when registered.

The clerk of every county in the state has a copy of this blank form and is expected to enter therein the data called for, and the law requires him on or before the first day of June of each year to furnish a copy thereof to the scretary of the State

*By J. F. Kennedy, M. D., secretary State Board of Health. From the January number of the Annals of Iowa,

Board of Health, who as they are received, arranges them by counties alphabetically and has them substantially bound.

A moment's reflection will show the great value and importance of such a record from a domestic, social and legal, as well as historical standpoint, especially when it is considered that the original records have been destroyed in some of the counties from which they were sent to the office of the State Board of Health. It ought also to emphasize the importance of care and fidelity on the part of the respective county clerks in requiring all the data indicated to be furnished them and in making full and complete returns to the State Board of Health as the law directs. The fact is, however, that many of these items have been omitted from our reports by the county clerks and to that extent they are imperfect. The probability, however, is that the reports of marriages so far as number and names are concerned are approximately, if not absolutely, correct.

BIRTHS

From 1880 until 1896 the physicians and midwives of the state were obliged, under a penalty of ten dollars for each neglect, to report within thirty days after their occurrence, to the clerk of the county in which they occurred, all births and deaths coming under their professional observation.

This requirement, though it may be somewhat humiliating to admit, was never very cordially approved by the medical profession, from the fact that it entailed a duty and a labor in its performance, without any compensation. Because of this, some, and because of indifference, others, refused or neglected to comply with the law. The supreme court, however, in a case to test the constitutionality of the requirement, declared the law a reasonable and constitutional one that the physicians as members of a noble profession should cheerfully comply with.

The data required to be furnished by physicians and midwives in the case of births, embraced the following items:—Full name of child; sex; number of child by this mother; color; time of birth; place of birth; born in wedlock? yes or no; father's full name; age; occupation; and place of birth; mother's place of birth; age; maiden name and residence; name and address of medical or other attendant; returned by; date of return. As in the case of marriages and deaths, the county clerks are obliged to furnish the Secretary of the State Board of Health, on or before the first day of June a report of all births occurring within their respective counties for the year ending with the thirty-first day of December immediately preceding.

Notwithstanding, however, the decision of the supreme court above referred to, and the professional obligations resting upon the physicians of the state to make these reports to the county clerks, from which only his returns could be copied, there were many who still neglected or refused to do so; and hence their patrons do not have the pleasure and benefits, and the state and science lose the benefits to be derived from such records when faithfully reported, compiled and deposited in the archives of the respective counties and State. This neglect however, does not lessen the value of those that are reported and are thus incorporated into the history of the State.

Because of the failure on the part of the physicians of the state to faithfully report births and deaths, the legislature of 1894 relieved the physicians and midwives of this obligation, and so changed the law as to have these casualties collected by the assessors appointed by the county auditors, upon blanks furnished by the State Board of Health.

In order to render this task as easy as possible for the assessor the State Board of Health only required information as to the name of the child; sex; date of birth; place of birth; mother's full maiden name; and father's full name. It is to be regretted that the change in the method of collecting these statistics was not an improvement upon the former one. The assessors, though, furnished with proper blanks, by the county auditors and paid and sworn to do their duty, neglected to do so in so many cases that the county clerks, in a State Convention held in the City of Des Moines in the fall of 1901, unanimously declared the present law ineffective and recommended a return to the former one. The former law with a reasonable compensation for each complete return of a birth or death, and a sufficient penalty including the right and duty of the State Board of Medical Examiners to revoke the certificates of physicians convicted of neglecting or refusing to comply with the law, would secure, as they have in most of the eastern states, vital statistics so complete and reliable as to be valuable for historical, legal and sanitary purposes.

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DEATHS

The law relating to the reporting of deaths, both prior and subsequent to 1894 was the same as in case of births. The data sought to be obtained were as follows:—Name of deceased; nationality; sex; color; age; occupation; date, cause and place of death; social condition—single, married, widow or widower; place and date of burial and name of physician making report.

After the law was changed so as to place the collection of these data in the hands of the assessors as above stated in the case of births, the data required were as follows:—Full name, sex, age, occupation, place and date of birth and death; social condition; cause of death and place of burial. The same incompleteness obtained in regard to these, yet with all these defects, not in the facts reported, but because of the data not reported, the vital statistics thus collected, arranged and conveniently and substantially bound are invaluable to the State as exploiting important events in the personal history of persons who were born, married or who died in Iowa.

Births, marriages and deaths are important, if not the most important epochs in the life of any individual. There is a natural and commendable pride in the place of one's birth and surely to be born in Iowa is to be born well.

Reliable vital statistics, furnishing the data above suggested are of great value as a basis for sanitary operations. Such returns would not only show the relative proportion of deaths to births and of births to marriages and the ratio of increase of population by births and by immigration, respectively, but by giving the causes of death in different localities would enable the State and local board of health, where there is an apparent or real excess of deaths from any disease to ascertain the cause and to more intelligently adapt and apply remedies for its removal.

Every state should have a reliable bureau of information, especially relating to the personnel of its citizens and the vital statistics above detailed is the nearest and only approach to it in Iowa. Some interesting incidents might be given illustrating the advantages of such records. A gentleman came to this state from England some years ago, leaving his wife and family behind him. His wife heard from him for two or three years and then there came a lapse in the correspondence. The wife sought to get information in various ways and finally wrote to the Secretary of the State Board of Health. She gave the name of the county from which he had last written. An examination of . the records in the office of the State Board of Health showed that in the county named a person corresponding to the name given had died, that he was a native of England, married, etc.; the date and cause of death; place of burial; and name of the attending physician. The facts were reported to the wife and a letter received from her later expressed her gratitude and appreciation at the information furnished, sad as it was.

There have been innumerable instances where parents have sought information respecting the birth or death of their children and where parents have looked for a record of their marriage. In counties where the original records have been destroyed by fires or otherwise, the copies of these records deposited safely with the State are of inestimable advantage.

The foregoing is suggestive of what the State has aimed to do in the way of collecting vital statistics; what it has done; what it has failed to do and the cause of such failure as well as some of the benefits of such statistics. It also suggests the duty of the legislature to so amend our present law as to cure its defects and assure such a registration in the future as will reflect the intelligence of our people, and place our State alongside of the most progessive states in the union. VITAL STATISTICS-PART 1

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REGISTRATION OF VITAL STATISTICS

VITAL STATISTICS-PART 1-CONTINUED

		3.000			1900	
Counties	Marriages.	Births.	Deaths.	Marriages.	Births.	Deaths.
dams llamakee ppanoose udubon enton lack Hawk cone remer. uchanan uena Vista ntler sihoun arroll ass edar eror Grordo herokee hickasaw arke ay bloune </td <td>$\begin{array}{c} 117\\ 116\\ 130\\ 271\\ 66\\ 200\\ 282\\ 259\\ 144\\ 168\\ 119\\ 149\\ 127\\ 132\\ 207\\ 118\\ 196\\ 149\\ 127\\ 132\\ 207\\ 118\\ 191\\ 124\\ 104\\ 104\\ 105\\ 188\\ 201\\ 142\\ 166\\ 156\\ 824\\ 70\\ 401\\ 75\\ 245\\ 160\\ 180\\ 185\\ 175\\ 207\\ 221\\ 174\\ 115\\ 98\\ 166\\ 197\\ 223\\ 175\\ 218\\ 186\\ 197\\ 223\\ 175\\ 218\\ 189\\ 374\\ 498\\ \end{array}$</td> <td>$\begin{array}{c} 297\\ 229\\ 310\\ 517\\ 266\\ 401\\ 394\\ 540\\ 308\\ 268\\ 275\\ 428\\ 824\\ 440\\ 358\\ 890\\ 328\\ 897\\ 272\\ 252\\ 536\\ 679\\ 409\\ 280\\ 333\\ 541\\ 162\\ 740\\ 833\\ 541\\ 178\\ 890\\ 282\\ 288\\ 802\\ 298\\ 802\\ 298\\ 802\\ 298\\ 802\\ 802\\ 802\\ 802\\ 802\\ 802\\ 802\\ 80$</td> <td>$\begin{array}{c} 77\\ 103\\ 124\\ 193\\ 77\\ 128\\ 173\\ 149\\ 114\\ 131\\ 57\\ 134\\ 192\\ 108\\ 115\\ 128\\ 57\\ 78\\ 104\\ 148\\ 196\\ 246\\ 123\\ 107\\ 118\\ 258\\ 21\\ 169\\ 105\\ 769\\ 985\\ 121\\ 184\\ 276\\ 985\\ 55\\ 142\\ 151\\ 127\\ 120\\ 153\\ 295\\ \end{array}$</td> <td>$\begin{array}{c} 141\\ 125\\ 130\\ 265\\ 72\\ 222\\ 829\\ 292\\ 196\\ 176\\ 128\\ 114\\ 149\\ 182\\ 186\\ 156\\ 198\\ 166\\ 122\\ 186\\ 156\\ 198\\ 166\\ 122\\ 186\\ 122\\ 186\\ 122\\ 186\\ 122\\ 186\\ 122\\ 186\\ 122\\ 186\\ 175\\ 129\\ 184\\ 175\\ 129\\ 134\\ 176\\ 1171\\ 135\\ 107\\ 208\\ 200\\ 112\\ 88\\ 174\\ 188\\ 272\\ 163\\ 193\\ 225\\ 216\\ 191\\ 88\\ 174\\ 188\\ 272\\ 163\\ 193\\ 225\\ 216\\ 191\\ 88\\ 174\\ 188\\ 272\\ 163\\ 193\\ 225\\ 216\\ 191\\ 88\\ 174\\ 188\\ 272\\ 163\\ 193\\ 225\\ 216\\ 191\\ 88\\ 174\\ 188\\ 272\\ 163\\ 193\\ 225\\ 216\\ 191\\ 88\\ 174\\ 188\\ 272\\ 163\\ 193\\ 225\\ 191\\ 88\\ 174\\ 188\\ 225\\ 216\\ 191\\ 88\\ 174\\ 188\\ 225\\ 216\\ 191\\ 88\\ 174\\ 188\\ 225\\ 216\\ 191\\ 88\\ 174\\ 188\\ 225\\ 216\\ 191\\ 88\\ 174\\ 188\\ 225\\ 216\\ 191\\ 88\\ 174\\ 188\\ 225\\ 216\\ 191\\ 191\\ 88\\ 174\\ 188\\ 225\\ 216\\ 191\\ 191\\ 191\\ 191\\ 191\\ 191\\ 191\\ 1$</td> <td>$\begin{array}{c} 302\\ 261\\ 362\\ 435\\ 282\\ 435\\ 282\\ 473\\ 388\\ 639\\ 321\\ 353\\ 279\\ 430\\ 478\\ 329\\ 350\\ 854\\ 347\\ 254\\ 258\\ 292\\ 308\\ 425\\ 542\\ 258\\ 292\\ 308\\ 426\\ 537\\ 164\\ 677\\ 208\\ 445\\ 251\\ 288\\ 292\\ 308\\ 425\\ 255\\ 2359\\ 427\\ 494\\ 494\\ 494\\ 324\\ 494\\ 324\\ 494\\ 324\\ 493\\ 594\\ \end{array}$</td> <td>$\begin{array}{c} 868\\ 899\\ 1644\\ 138\\ 711\\ 138\\ 105\\ 169\\ 107\\ 181\\ 107\\ 189\\ 250\\ 167\\ 189\\ 250\\ 167\\ 189\\ 250\\ 167\\ 189\\ 250\\ 167\\ 189\\ 107\\ 189\\ 250\\ 167\\ 189\\ 107\\ 128\\ 172\\ 55\\ 708\\ 188\\ 180\\ 148\\ 1227\\ 121\\ 147\\ 121\\ 147\\ 117\\ 117\\ 117\\ 117\\ 117\\ 117\\ 11$</td>	$\begin{array}{c} 117\\ 116\\ 130\\ 271\\ 66\\ 200\\ 282\\ 259\\ 144\\ 168\\ 119\\ 149\\ 127\\ 132\\ 207\\ 118\\ 196\\ 149\\ 127\\ 132\\ 207\\ 118\\ 191\\ 124\\ 104\\ 104\\ 105\\ 188\\ 201\\ 142\\ 166\\ 156\\ 824\\ 70\\ 401\\ 75\\ 245\\ 160\\ 180\\ 185\\ 175\\ 207\\ 221\\ 174\\ 115\\ 98\\ 166\\ 197\\ 223\\ 175\\ 218\\ 186\\ 197\\ 223\\ 175\\ 218\\ 189\\ 374\\ 498\\ \end{array}$	$\begin{array}{c} 297\\ 229\\ 310\\ 517\\ 266\\ 401\\ 394\\ 540\\ 308\\ 268\\ 275\\ 428\\ 824\\ 440\\ 358\\ 890\\ 328\\ 897\\ 272\\ 252\\ 536\\ 679\\ 409\\ 280\\ 333\\ 541\\ 162\\ 740\\ 833\\ 541\\ 178\\ 890\\ 282\\ 288\\ 802\\ 298\\ 802\\ 298\\ 802\\ 298\\ 802\\ 802\\ 802\\ 802\\ 802\\ 802\\ 802\\ 80$	$\begin{array}{c} 77\\ 103\\ 124\\ 193\\ 77\\ 128\\ 173\\ 149\\ 114\\ 131\\ 57\\ 134\\ 192\\ 108\\ 115\\ 128\\ 57\\ 78\\ 104\\ 148\\ 196\\ 246\\ 123\\ 107\\ 118\\ 258\\ 21\\ 169\\ 105\\ 769\\ 985\\ 121\\ 184\\ 276\\ 985\\ 55\\ 142\\ 151\\ 127\\ 120\\ 153\\ 295\\ \end{array}$	$\begin{array}{c} 141\\ 125\\ 130\\ 265\\ 72\\ 222\\ 829\\ 292\\ 196\\ 176\\ 128\\ 114\\ 149\\ 182\\ 186\\ 156\\ 198\\ 166\\ 122\\ 186\\ 156\\ 198\\ 166\\ 122\\ 186\\ 122\\ 186\\ 122\\ 186\\ 122\\ 186\\ 122\\ 186\\ 122\\ 186\\ 175\\ 129\\ 184\\ 175\\ 129\\ 134\\ 176\\ 1171\\ 135\\ 107\\ 208\\ 200\\ 112\\ 88\\ 174\\ 188\\ 272\\ 163\\ 193\\ 225\\ 216\\ 191\\ 88\\ 174\\ 188\\ 272\\ 163\\ 193\\ 225\\ 216\\ 191\\ 88\\ 174\\ 188\\ 272\\ 163\\ 193\\ 225\\ 216\\ 191\\ 88\\ 174\\ 188\\ 272\\ 163\\ 193\\ 225\\ 216\\ 191\\ 88\\ 174\\ 188\\ 272\\ 163\\ 193\\ 225\\ 216\\ 191\\ 88\\ 174\\ 188\\ 272\\ 163\\ 193\\ 225\\ 191\\ 88\\ 174\\ 188\\ 225\\ 216\\ 191\\ 88\\ 174\\ 188\\ 225\\ 216\\ 191\\ 88\\ 174\\ 188\\ 225\\ 216\\ 191\\ 88\\ 174\\ 188\\ 225\\ 216\\ 191\\ 88\\ 174\\ 188\\ 225\\ 216\\ 191\\ 88\\ 174\\ 188\\ 225\\ 216\\ 191\\ 191\\ 88\\ 174\\ 188\\ 225\\ 216\\ 191\\ 191\\ 191\\ 191\\ 191\\ 191\\ 191\\ 1$	$\begin{array}{c} 302\\ 261\\ 362\\ 435\\ 282\\ 435\\ 282\\ 473\\ 388\\ 639\\ 321\\ 353\\ 279\\ 430\\ 478\\ 329\\ 350\\ 854\\ 347\\ 254\\ 258\\ 292\\ 308\\ 425\\ 542\\ 258\\ 292\\ 308\\ 426\\ 537\\ 164\\ 677\\ 208\\ 445\\ 251\\ 288\\ 292\\ 308\\ 425\\ 255\\ 2359\\ 427\\ 494\\ 494\\ 494\\ 324\\ 494\\ 324\\ 494\\ 324\\ 493\\ 594\\ \end{array}$	$\begin{array}{c} 868\\ 899\\ 1644\\ 138\\ 711\\ 138\\ 105\\ 169\\ 107\\ 181\\ 107\\ 189\\ 250\\ 167\\ 189\\ 250\\ 167\\ 189\\ 250\\ 167\\ 189\\ 250\\ 167\\ 189\\ 107\\ 189\\ 250\\ 167\\ 189\\ 107\\ 128\\ 172\\ 55\\ 708\\ 188\\ 180\\ 148\\ 1227\\ 121\\ 147\\ 121\\ 147\\ 117\\ 117\\ 117\\ 117\\ 117\\ 117\\ 11$

	1899			1900		
Counties	Marriages.	B1rths.	Deaths.	Marriagea.	Births.	Deaths.
Lonisa. Lucas Lucas Lyon Madison Mahaska. Marion Marshall Mills. Mitchell Monona Monroe Montgomery Montgomery Muscatine. O'Brien O'Brien O'Brien Osceola Page. Palo Alto Piymouth Pocahontas Polk Pottawatta nie Poweshiek. Ringgold Sac. Scott. Shelby. Sioux Story. Tama. Taylor. Union Van Furen Washington. Wayne Winnebago.	$\begin{array}{c} 106\\ 166\\ 71\\ 160\\ 538\\ 217\\ 266\\ 194\\ 126\\ 140\\ 178\\ 166\\ 282\\ 86\\ 77\\ 198\\ 126\\ 140\\ 178\\ 199\\ 989\\ 192\\ 130\\ 141\\ 5125\\ 145\\ 180\\ 188\\ 184\\ 154\\ 177\\ 149\\ 858\\ 152\\ 172\\ 174\\ 295\\ 95\\ \end{array}$	286 224 815 569 415 522 284 288 891 278 289 289 279 289 289 271 474 394 394 394 394 394 394 394 394 394 39	$\begin{array}{c} 137\\ 64\\ 62\\ 144\\ 199\\ 210\\ 217\\ 166\\ 94\\ 96\\ 184\\ 81\\ 134\\ 72\\ 39\\ 192\\ 43\\ 64\\ 884\\ 77\\ 154\\ 89\\ 78\\ 628\\ 89\\ 181\\ 149\\ 160\\ 86\\ 149\\ 188\\ 109\\ 160\\ 95\\ 183\\ 89\end{array}$	$\left \begin{array}{c}95\\171\\92\\155\\874\\290\\841\\147\\99\\186\\156\\186\\186\\273\\111\\88\\240\\166\\186\\240\\165\\125\\149\\165\\125\\149\\567\\181\\156\\125\\149\\567\\181\\156\\182\\168\\182\\149\\567\\181\\156\\185\\168\\182\\168\\182\\168\\182\\168\\188\\285\\188\\285\\285\\188\\285\\285\\285\\188\\285\\285\\285\\285\\285\\285\\285\\285\\285\\2$	252 249 319 309 590 495 587 281 481 379 224 415 257 497 2281 379 224 415 257 415 229 503 844 741 308 280 280 848 280 848 895 848 807 296 502 296 296 296 296 296 296 296 296 296 29	$\begin{array}{c} 107\\ 58\\ 54\\ 905\\ 178\\ 202\\ 183\\ 181\\ 117\\ 96\\ 94\\ 109\\ 95\\ 42\\ 169\\ 95\\ 42\\ 169\\ 95\\ 138\\ 79\\ 95\\ 195\\ 92\\ 90\\ 106\\ 142\\ 78\\ 92\\ 80\\ 142\\ 140\\ 189\\ 88\\ 83\\ 142\\ 240\\ 107\\ 156\\ 125\\ 188\\ 88\\ 83\\ 142\\ 240\\ 107\\ 156\\ 125\\ 188\\ 88\\ 874\\ 74\\ 74\\ 74\\ 74\\ 74\\ 74\\ 74\\ 74\\ 74\\ $
Woodbury Worth. Wright	536 70 153	838 230 302	217 67 59	586 100 217	1,007 264 257	214 244 74 60
Total	14.224	89.897	13, 887	19.175	48. 465	12,890

1903] **REGISTRATION OF VITAL STATISTICS**

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VITAL STATISTICS-PART II-CONTINUED.

	1801		1901 1902		1962		
Counties	Mar- riages.	Edirtha.	Deaths.	Mar- riagos.	Births.	Deaths.	
Adlairs Adlains Adlains Allamakee Appancose Andubon Benton Benton Black Hawk Boone Bremer Buchash Buchash Buchash Carroll Carroll Cass Cherokee Charke Clay Clay ton Clay Clay cond Delaware Decatur Delaware Decatur Delaware Decatur Franklin Franklin Franklin Franklin Franklin Hamo	139 132 212 120 77 229 3249 167 168 132 147 171 218 240 167 145 147 171 218 240 167 145 147 171 218 240 167 145 147 171 222 8138 198 199 198 199 198 198 198 198 198 19		8757855798555277811178275451282277811178774528622111010728862211288857488857128882278811288858885886712888571288				

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Counties		1901			1902			
	Mar- riages.	Births.	Deaths.	Mar- riages.	Births.	Deaths.		
Montgomery	180	307	76	195	240	71		
Museatine	286	219	105	297	303	119		
N'Brian	104	1869	106					
Oseenla	79	222	55	77	245	41		
Paga	276	359	135	217	426	190		
Palo Alto	80	825	55	94	291	41		
Plymonth	144	448	110	168	447	61		
Porshontas	116	847	68	98	410	66		
Polk	1.008	1.295	440	1.079	1.238	289		
Pottawattamie	686	867	875	749	848	38		
Poweshiek	150	830	93	164	295	121		
Ringand	156	357	65	146	281	8		
ac	42	299	87	131	261	6		
Scott	574	801	675	564	810	84		
shelby	129	381	100	153	441	8		
lant	188	546	180	209	687	12(
Hory	134	432	108	233	432	164		
Pama	213	633	100	210	399	1 11		
Tavlor	154	278	98	158	812	90		
Inton	218	238	83	197	189	1 71		
Van Buren	159	264	141	114	813	160		
Wanello	381	601	261	894	462	18		
Warren	164	389	89	166	808	110		
Washington	191	878	169	198	835	140		
Wayne	226	864	105	123	830	108		
Webster	272	407	194	246	586	210		
Winnebago	114	282	97	98	269	6:		
Winneshiek	173	483	213	179	486	20		
Woodbury	521	1,020	875	577	854	31		
Worth	88	265	77	92	280	61		
Wright	141	691	79	156	238	71		
Total	20, 227	56, 347	14,003	20, 503	46, 759	12, 49		
Total for biennial period	40.780	103, 106	28.500					

DEATHS OCCURRING IN STATE INSTITUTIONS UNDER THE BOARD OF CON-TROL FOR THE BENNIAL PERIOD ENDING JUNE 30, 1903

Institutions	Male.	Female	Total.
Soldiers' Home, Marshalltown	•26	6	102
Soldiers' Orphans' Home, Davenport.		1	1
College for Blind, Vinton.			
School for Deaf, Council Bluffs.			
nstitution for Feeble Minded, Glenwood.	41	34	71
ndustrial School for Boys, Edora	2		2
tate Hospital (Insens) Mr. Pleasant	100	57	1.
tate Hospital (Insane), Independence	110	54	10
tate Hospital (Insane). Clarinda.	108	57	16
State Hospital (Insane). Cherokee	28	21	4
Jospital for Inebriates, Mt. Pleasant	5		1
dospital for Inebriates, Independence	1		
Iospital for Inebriates, Clarinda			
lospital for Inebriates, Cherokee.	1		
Cententiary, Ft. Madison	8		
renitentiary. Anamosa	6	2	1
Total for all institutions	508	295	745

•Does not include deaths outside of institution -of those absent on parole.

The returns of marriages, births and deaths show the following for the State:

	Marriages	Births	Deaths	
1901	20,227	56,347	14,003	
1902	20,503	46,759	12,497	
	Marriages	Births	Deaths	
Total for biennial period ending Decen	nber			
31, 1902	40,730	103,106	26,500	

DUTIES AND RESPONSIBILITIES OF LOCAL BOARDS OF HEALTH

V

BY J. F. KENNEDY, M. D., DES MOINES, SECRETARY STATE BOARD OF HEALTH

Local boards of health, whether in cities, town or townships, like the State Board of Medical Examiners, are a kind of wheel within a wheel. The latter consists of the physicians of the State Board of Health and yet finds its duties defined by a different statute entirely from that providing for and regulating the State Board of Health.

So, too, boards of health are also councilmen with duties assigned under different statutes.

In looking this matter up I was surprised to find that I was so long ignorant of the fact that the board of health of a city or town does not comprise all the members of the city or town council. I have been in the habit of stating to those making the inquiry, and our literature teaches, that the local board of health is composed of the entire council with the mayor. The statute relating to local boards of health, however, does not so read. The organization of local boards of health and a declaration of their duties is set forth in title 5, chapter 14, of the Code, beginning with section 1024 and ending with section 1046.

Respecting the organization of the board in cities and towns section 1025 says:

"There shall be appointed in every such city a local board of health consisting of five members, a majority of whom, including the mayor, shall be members of the city council. The mayor of the city shall be *ex officio* one of said members and the chairman thereof. The manner of appointment and duration of office of said board shall be determined by ordinance of said city.

I was surprised in reading that section to find that however large the council might be, the board of health was limited to only five members and the mayor, and that two of the members need not be members of the council.

Another surprise I found in section 1026, which declares that this board and not the council as such shall appoint the physician to the board. The city clerk need not necessarily be the clerk of the board of

1903] DUTIES OF LOCAL BOARD OF HEALTH

STATE BOARD OF HEALTH

[No. 21

health. "The board of health with the consent of the council shall appoint all officers and agents necessary to execute their rules and orders and fix the compensation of these appointees, subject to approval by the council. The majority of the members of the board shall constitute a quorum for the transaction of all business and the exercise of powers conferred upon the board."

It will be noticed that this direction as to the organization of boards of health in cities differs from section 2568 of the statute relating to the State Board of Health wherein it states that "the mayor and council of each town or city shall constitute a local board of health." I do not know and would be pleased to learn under which section of the Code local boards of cities are really organized.

The duties and responsibilities as defined by the Code are as defined by the sections above referred to:

To report to the State Board of Health at least once a year, the proceedings of the board and such other facts as there may be, and also to make special reports when required to do so by the State Board; make rules, regulations and orders respecting the connection of buildings with sewers; the approval of plans for plumbing; the inspection of all plumbing; the inspection of milk, provisions and all food products sold within the city and their condemnation and destruction when impure or diseased; the collection and disposal of garbage; the condemnation of impure wells and cisterns; the prompt report to the mayor and Secretary of the State Board of Health of infectious diseases; to investigate and remove all nuisances, sources of filth and causes of sickness within their jurisdiction, on all boats in its ports or harbors, or on railroad cars passing through such city; to make such rules, regulations and orders for the prevention of nuisances and the preservation of the public health as said board may judge necessary for the public health and safety, and shall from time to time report to the city council, for adoption, ordinances for carrying such rules, regulations and orders into effect, and for the appointment of the proper inspectors and officers necessary to enforce the same.

Section 1029 empowers the local board to provide ordinances for the punishment by fine and imprisonment of any one who knowingly violates or fails to comply with any of the above-named rules, regulations or orders.

Sections 1031, 1032, 1033 and 1034 give specific details as to "Sewer connections; plumbing and nuisances," as well as to the abatement and enjoining of the same.

It would be well for every city official to carefully and prayerfully study these sections and to resolve that their responsibilities under the law relating to the public health shall be fully met.

Section 1035 declares that rules and regulations for the public health when passed and duly signed and attested, shall be published twice in the official newspaper of the city. This is an important provision. The courts in several instances have dismissed cases against violators of such rules and regulations because it could not be shown that they had, after being adopted, been properly published. Section 1036 declares that any notice relative to quarantine, nuisances. etc., may be served by any one designated by the local board. All such notices must be in writing, a copy of which should be left with the party, and acknowledged by him, and a copy kept in the office of the mayor or city clerk.

Section 1037 relates to "premises unfit for habitation." I am led to believe from the filthy and unhealthy condition of many residences, office buildings, jails, etc., in most of our cities that the responsibilities of local boards of health as placed upon them by this most important section are not appreciated as they should be, or are far from being properly met.

It is a fact well known to physicians and sanitarians that diseases of various kinds, especially those dependent upon filth combined with poverty, are the almost constant guests in the homes of the poor, as found in many, if not most, of our Iowa cities. This feature of the law should have more consideration and faithful observance both from a humane as well as from an economic standpoint. These unfortunate people are generally from necessity, if not from choice, found segregated in the most undesirable and most unhealthy portions of our cities, a fact that adds greatly to the amount and character of their sickness when supplemented with filthy and often with vicious habits. The local board of health is under the law, responsible for much of this sickness if it does not carry out the provisions of this section. The section referred to is as follows:

"The board, when satisfied upon due examination that any cellar, room, tenement or building in said city, ocupied as a dwelling house, has become, by reason of the number of inhabitants or want of cleanliness or other cause, unfit for such habitation, and a cause of nuisance or sickness to the occupants thereof or to the public, may issue a notice to the occupants thereof or any of them, requiring the premises to be put into a proper condition as to cleanliness or health, or may require the occupants to remove from the premises, within such time as the board seems reasonable. If the persons so notified neglect or refuse to comply with the terms of the notice, the board may cause the premises to be properly cleaned at the expense of the owners of property, or the board may remove the occupants forcibly and close up the premises, and the same shall not again be occupied as a dwelling place until put in a sanitary condition to the satisfaction of the board."

The county ought to pay at least half the expenses of carrying out the provisions of this section, since the expenditures of the pauper fund would be greatly lessened thereby.

Sections 1038, 1039, 1040, 1041 and 1042 give in detail the measures required to prevent the spread of infectious diseases together with the legal procedures necessary to enforce these measures. In section 1044 it is made the duty of city councils to pass and enforce such ordinances as will enable the board of health to exercise all the powers conferred upon such board.

In addition to the above-named responsibilities laid upon the local board of health by the sections quoted, chapter 16, title 12, of the Code, relating to the State Board of Health imposes the following:

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"To protect the people against rabid animals, and to proclaim and establish quarantine against all infectious or contagious diseases dangerous to the public and maintain and release the same, as may be required by regulations of the State Board."

To avoid a repetition of the duties enjoined by the sections previously quoted and to give the State Board authority to impose upon local boards and upon' individuals added obligations having the force of legislative enactments, section 2572 was enacted. This section plainly makes it the duty of local boards not only to obey themselves, all the rules and regulations of the State Board but to enforce them as well, that is to see to it that others obey them. These rules and regulations are found in circulars 1, 2, 3, 5 and 8 as issued by the State Board and others as are announced from time to time in the Iowa Health *Bulletin*, the official organ of the Board.

In addition to the duties and responsibilities specifically expressed in the statutes and in the rules and regulations of the State Board of Health, there are others equally important that suggest themselves to a board or commission to whom are entrusted the lives, health and safety of the people. It seems there can be no more important function entrusted to any official or body of officials than that of the prevention of sickness, accident and death.

Every defective sidewalk; every sidewalk covered with ice; every building or bridge believed to be unsafe; every hotel, office or other building without adequate fire escapes; every decayed tree overhanging a public thoroughfare; every stagnant pool, affording a breeding place for mosquitoes, and omitting noxious vapors; the great volumes of coal smoke vomited hourly from our chimneys; every filthy, stinking alley with its garbage and rotting manure; noxious wastes from creameries: filthy stockyards; every cess-pool and neglected privy, in fact everything that polutes the air, earth, water or food, is a menace to the public health and safety and legitimately comes within the perview of a local board of health. There is scarcely a week passes but that complaints from one or more places are laid before the Secretary of the State Board of Health to the effect that a nuisance dangerous to the public health exists; that the attention of the local board has been called to it; that no attention has been paid to the appeal for relief, and asking the State Board to come to their relief. The reply always has been that the State Board has no jurisdiction whatever in such matters, with the further statement that the attorney general advises that where a local board neglects or refuses to investigate and abate an alleged nuisance, if believed to be a menace to the public health, that complaints should be filed with the grand jury which has co-ordinate authority in the abatement of nuisances.

EXPENSES

Perhaps I ought to say a word relative to expenses of local boards of health especially in the enforcement of quarantine. Fortunately the law at present is more explicit as amended by the last general assembly. There seemed to be no question in the Code of 1897, as to the payment of such expenses when incurred by townships but there always has been a conflict as to whether the county should be held responsible in any way for the payment of bills nade by municipal boards. As a result many cities, at great inconvenience, were obliged to meet enormous expenses in their efforts to protect not only their citizens but those of the county outside of the corporation limits.

The last general assembly repealed the entire section 2570 and enacted a new one in its stead which provided that all such expenses shall be certified to by the president and clerk of the local board whether city, town or township and laid before the county auditor for action by the county supervisors at their next meeting. If the parties receiving the services are able to pay, that fact is to be set forth by the local board and the amount due from each such party is to be definitely stated. It then becomes the duty of the Board of Supervisors, unless the bills are evidently extortionate, to pay all the bills whether the parties receiving the services are able to pay or not and when the board levies the general taxes it shall "levy on the property of the city, town or township, from which such expenses were certified a sufficient tax to reimburse the county to the extent of one-third of the amount paid it under the provisions of this act."

It then becomes the duty of the county to collect from parties able to pay, and not the city, town or township; and when this has been collected by the county one-third of the amount received therefrom shall be credited to said city, town or township.

The advantages of this change in the law are that it insures the prompt payment of all such expenses; both municipality and township have the same standing before the law; the county pays two-thirds of the amount and the collection of any part of the claims from private parties devolves upon the county. The statute specifically states that "all expenses of a local board in establishing, maintaining and raising a quarantine, including fumigation, disinfection and the building and providing any pest house, detention or other hospital, shall, alfter being properly certified to be paid as above stated by the county."

There is to my mind, however, a glaring conflict between section 2570-a and 2570-b and 2571 as shown in the Supplement to the Code as adopted by the Tweny-ninth general assembly. Section 2570-b should be repealed and all of 2571 after the word "it" in the tenth line.

An important regulation as amended by the last general assembly is section 2572 of the Supplement, which declares that "if any local board of health shall refuse or neglect to enforce the rules and regulations of the State Board of Health, the State Board of Health may enforce its rules and regulations within the territorial jurisdiction of such local board, and for that purpose may have and exercise all the powers given by statute to local boards of health; and the peace and police officers, of the state, when called upon by the State Board of Health to enforce its rules and regulations shall execute the orders of such board. All expenses incurred by the State Board of Health in determining whether its rules and regulations are enforced by a local board of health and in enforcing the same when a local board has refused or neglected to do so, shall be paid in the same manner as is now provided for the payment of the ex-7

penses of enforcing and such rules and regulations by local boards of health."

This is a very wise and judicious provision as it insures to any community the enforcement of the rules and regulations of the State Board either by the local or State Board itself, and insures the pay of the State Board should it be called upon to assume the duties of the local board. Very few local boards will place themselves in a position to be supplanted by the State Board as such action would not only be humilating but much more expensive. There have only been two or three instances where such extraordinary measures have been resorted to by the State Board but in each case the results have been highly satisfactory.

The law in regard to the location of pest houses or hospitals declares that when a dispute arises relative to the location of such buildings the President of the State Board shall appoint three members of the State Board who shall investigate the facts and make such order as the facts may warrant and their conclusion should be final.

VACCINATION

A school board in Lucas county excluded the unvaccinated children of a family from the public schools in acordance with the rules and regulations of the State Board of Health. The parents of the children brought two suits against the school board, one to compel the board to admit the children and the other asking damages for depriving the children of the benefits of the public schools. The first suit was tried before Judge Vermilion and he decided that the State Board had exceeded its authority in making and trying to enforce such a requirement. The judge said the legislature would have the authority to make vaccination compulsory but has not seen fit to do so, nor has it invested the State Board of Health with such authority that under the police powers of the state, the State Board of Health may require, and local boards of health would be bound to enforce the requirement that when smallpox has appeared in any locality, or when a locality is threatened with such disease unvaccinated scholars and teachers may be kept out of schools until all danger is over; that, however, when the disease has disappeared and all danger is over, parties having been thus excluded should be readmitted. In view of this decision the State Board has so modified its regulations respecting vaccination as to authorize local boards to consider the necessity of applying the rules which are still in force, in their respective localities, and to act accordingly.

OBEY THE LETTER OF THE LAW

A late decision rendered by the Iowa Supreme Court should impress upon local boards of health the importance of complying with the letter as well as the spirit of the law. Suit was brought against Dr. S. C. Kirby of Grand Junction for violating the quarantine regulations of the state and local board of health by leaving his premises when quarantimed for smallpox and thus exposing others to the disease. The case was carried through the district to the supreme court which decided in favor of defendant Kirby, on the ground that the law requires a "written" notice from the physician as to the existence of an infectious disease and the necessity for the establishing of quarantine. The evidence in this case showed that no "written" notice was served on the mayor and that the quarantine was established by the mayor upon a mere verbal notice. Hence the verdict was in favor of the defendant—the law not having been complied with.

To a health department striving to protect the lives and health of the people this may seem to be an unreasonably technical decision and yet there is no question but that when the law defines a particular way in which a duty shall be performed the only proper way is to do it exactly in that way. It is not long since an Iowa court decided that a party could not be held for violating the quarantine regulations of a local board because it was shown that the quarantine card—the danger signal —was not eighteen inches square as prescribed by the rules and regulations of the State Board of Health.

In another case a physician was prosecuted for not reporting for quarantine a case of diphtheria. A neighbor not knowing of the existence of this disease because there was no danger signal—the prescribed quarantine card—visited the place with a child. The visiting child contracted diphtheria and died and the physician attending the first case was prosecuted under section 2573 of the Code. It was shown that the local board of health—a district township—had failed to publish or post the rules and regulations adopted by them respecting quarantine and the reporting of such infectious diseases and the presiding judge gave a verdict for the defendant doctor. It is very important to obey the law in the letter and in the spirit.

And now, gentlemen, in conclusion let me assure you that the State Board of Health has the highest possible regard and the most cordial feeling for every local board in the state. Some of its rules and regulations may seem not only arbitrary but useless. The State Board has been entrusted with a general supervision of the lives and health of the people. You are made the lieutenants of the State Board in its conflict against transmissable diseases. Just as in military battle the general officers can do nothing without the aid of his subordinate officers and of his privates, so in this sanitary conflict the State Board must depend upon you. The rules and regulations adopted and which you are asked to obey and enforce are not experimental, they have passed that stage. They have been demonstrated to be most effectual, and where they are promptly and faithfully carried out a large class of diseases, most of which are more or less fatal are either prevented, greatly restricted or promptly stamped out. Let us therefore stand "pat" as the politicians say-stand shoulder to shoulder in this great conflict and thus bring happiness and prosperity because of health and strength to every home possible.

VI

SANITATION AND HYGIENE OF CITIES

BY DR. GEO. P. NEAL, FORT MADISON, IOWA

Gentlemen, this meeting of the Health Officers of Iowa is an initial movement of prime importance. History is but a record of incidents and occurrences. It is an assemblage of the conservators of the health of the people of the domain of the great state of Iowa. Iowa is a healthful, fruitful state. Iowa is noted for its brave men and its fair women. Iown ranks first in all that is best. Iowa produces much of everything, many times beyond her needs. Iowa men are in demand—in high places they are in evidence. No class of men have done more to mould the thought and opinion of the state than the doctors.

Gentlemen, the Health Officer is the holder of the most important office in the city, town or township. Health is of much more importance than wealth. Health is the first requisite. Cato, the censor, said: "I would rather my daughter should marry a man without an estate, than to marry an estate without a man." Health is conducive to nobility of character. Health produces wealth.

How do the streets become so dirty? This question is often asked--Where does all the refuse and dirt come from? It seems queer, until you notice the growth of piles of refuse that evolve into nuisance in the streets. Take one of the paved streets of Fort Madison, Iowa. It is Saturday a. m. The street gang have swept, raked and scraped the refuse into piles, the wagon has driven up and the heaps are loaded and all is hauled away, leaving a nice clean street. In front of the post office, 10 a. m., a business man comes out or the office, tears the wrapper off of a circular, crushes it in his grasp and throws it into the street. Next a doctor finds a journal devoted to the propagation of Christian science in his box. As soon as he discovers the nature of the print, he throws it into the street and goes his way. This is repeated, and in a short time a bunch of paper collects. A farmer drives up to drop a letter into the office. He drags a little straw out of his vehicle and a little half dried mud drops from his boots. A dude comes along and throws a fragment of a cigarette into the growing heap. A little skinny boot-black adds a banana peel as his contribution. A wagon with muddy wheels stops,

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and much mud is added to the growing accumuation. The street sprinkler comes along and dampens the mass. More paper is added. The wind adds some leaves and dust, an orange peel finds its home in the midst of all, the milk wagon halts. The boy goes into the office. He tarries to chat with a friend. The horses add some partially digested oats to the collection. It grows rapidly. The wind blows a little excelsior from a side door of the furniture store. The sprinkler comes back and more moisture added more cigarettes and cigar stumps, with a circular from a "Get-Rich-Quick" concern, a strawberry box, some cotton twine, a rag gets into the heap, a broken bottle, a rheumatism cure circular, some more horse manure. An Irishman comes along, and seeing an English sparrow dissecting, disintegrating and partially devouring the horse manure, takes a fall out of the poor bird, simply because it is of English origin. He with an oath throws a quid of tobacco into the heap. He expectorates and strikes the center. By the time the mass is dampened down once or twice more, with more cigar and cigarette relics, it gets into shape to really receive supplies, and the powers of cohesion are made manifest. At this stage, it is astonishing how many people will throw something into the heap. Every other man will spit at it, and spit viciously, as though shooting at a target. A paste board box gets intothe heap. The lid is off, the sprinkler partially fills it, a team stops, more horse manure is added. The area increases, it begins to take on more growth. It is taken for granted by every careless passerby that this is a legalized dumping spot. Torn envelopes, wrapping paper, moretwine, more peelings, more dirt, and more tidbits and refuse find a resting place. By 2 p. m. the pile begins to stink. It gives off a vapor, it gets still muddler, it becomes suggestive of filthy associations. The English sparrow considers it unsanitary and goes to fresher fields. By lateafternoon, the pink, red, white, blue and buff papers, with the straw. sand, expectoration, manure, twine, leaves, cigar and tobacco, straw. mud. and moisture have formed a mass which was truly odoriferous, loathsome, disgusting to behold, a menace to health, and a reflection on twentiethcentury manners.

It is an object lesson. It shows want of respect for municipal authority. While this nuisance is being created, the gentler sex is not idle. When it comes to creating a nuisance, there is always a woman in evidence. Walk down an alley in the residence portion, and see what the gentle housewife has cast into the alley in the rear of the home. An old pair of shoes, a defunct fowl, a bucket of rotten potatoes, slops galore, a lot of old wall paper, some tin cans, a few broken bottles, some old rags, a piece of carpet, a dead rat, trimmings of a rose bush, a faded bouquet, a bunch of onion tops, a dirty newspaper, night refuse scattered promiscuously over this unsanitary salad, and Mrs. A. no doubt thinks and fully believes that she has placed her premises in a good healthful condition.

"Over the fence is out." This was recognized by the school-boy when engaged in a game of town ball. In the early days of the career of the writer, especially so. When the health officer finds the above condition of things, in an alley, and issues a notice to clean up or abate, the gentle. meek and weaker vessel is transformed into a she-devil of magnificent proportions.

It is my observation and experience that to be a successful health officer, one must of necessity be endowed with the wisdom of Solomon, the strength of Sullivan, and the determination of Satan; at the same time be the embodiment of Good Samaritanism. His very presence must of necessity be a "bluff" of the first magnitude, inspiring respect of law and authority, and fear of its violation. He must of necessity occupy the position of judge, advocate, jury, and prosecutor at the same time. He must be as "wise as a serpent, harmless as a dove," on the one hand, and on the other a "long-clawed, strong-jawed, tough-hided devil." The more he magnanimously looks after the health of his constituency, the more cheerfully he incurs their hatred. He is condemned positively if he does some work, comparatively if he does a little more, and superlatively if he manfully enforces the rules of the laws of health.

The proper time to form character is previous to birth. The selection of the parents and grandparents if of all things the most important. Like begets like. The mother of Napoleon Bonaparte had a strong desire to give birth to a son who would become a great warrior. She read of herioc deeds of warriors bold, hung pictures of battle on the walls where they met her every gaze. She thus bred the greatest military genius the world has seen. The Greeks were aware that genius or beauty could be produced at will. The Greek mother was surrounded with most beautiful pictures, everything was suggestive of beauty and high art. The result was the growth of a nation of perfect figures-Apollo, Venus and Diana. What can be expected of the offispring of a neglected mother. who lives in squalor and poverty, a leaky roof, an unpainted house, with broken plastering, a foul privy, impure water, impure food, poor clothing, broken windows, smoky chimneys, nothing to cheer, not a suggestion of the bright side of life, or even a gleam of the sunshine of a better life, The offspring consequently are scrofulous, semi-demented cowardly degenerates, a menace to society and a burden upon the community.

The needs of the nation demand a strong, self-reliant, self-sustaining, self-respecting type of citizenship, clean of mind as well as clean of body. The citizen who does not work to place his town or city upon a higher plane, is not only a drone, but he is a nuisance. His room is much superior to his company. There is no excuse for filthiness-none should be expected or accepted. The poor can rise, if possessed of the proper spirit. Many of our presidents, who have been chosen to the first position in our land, were born in log cabins with dirt floors. The floors, however, were kept clean, the future magistrate being compelled to go to bed while his tidy maternal ancestor put his only shirt through the wash. The mother, in every instance, had a desire for her son to rise in the world-Jackson. Lincoln, Johnson, Grant and Garfield, were of this class. The mother of each one of them, kept them clean. They were born, bred and nourished upon the frontiers-children of nature. During their childhood they communed with nature and drank of her inspirations. Crowded cities do not produce heroes or statesmen. The city-bred youth too often loses his individuality. He may play pool or billiards and smoke cigarettes, but he

scarcely has the courage to conquer worlds or aspire to become a ruler of men.

To sustain the great military establishment and the great commercial enterprises of the world, it is necessary to go to the rural districts to procure the brain and brawn. There seems to be a lack of stamina in the urban youth, in gait, in the bearing, voice or frame. The muscular system is rarely fully developed or well strung. They are not of the caliber from which we may expect either a vigorous or healthy offispring. They are not adapted to the strenuous life. The urban is more social. but in individuality he is much inferior to the ruralite. The hope of the nation in the future will rest largely upon the rural population. The city-bred youth is much like a caged bird; he lacks the symmetry of form. motion and mind. There is no fresh air for him, he breathes his own exhalations and that of his neighbors, over and over again. Want of space in which to develop both body and mind are productive of limitation of thought and ambition; there is a tameness, a sameness, a monotony; there is a lack of the ardor and impetuosity of the rustic. Man can not arrive at his full stature in the crowded cities. To develop a being after the likeness and image of God, the environment must be suggestive of the grandeur and glory of the Creator.

Man is the creature of his environment; in mind, action, development, he is largely a creature of circumstance, from birth to death—his pathway in life is not always of his own choosing.

Hygiene is strictly a French word. The goddess of health, Hygeia, of the Greeks, was the daughter of Aesculapius, god of medicine. Her name was mentioned with the other deities in the Hippocratic oath, which every loyal physician is required to take, as one of the Aesculapiadae. "By Apollo, the physician, by Aesculapius, by Hygeia, Panacea, and all the gods and goddesses."

Hippocrates was the first of the early writers upon hygiene. In his work on "Air, Waters and Places:" A treatise in which the influence of climate and locality, not only upon health, but upon the character of races of men was pointed out clearly and sagaciously. Plutarch also wrote early hygienic treatises. Positive measures of public hygiene were instituted in Athens by Ocron, who is said to have dissipated the causes of the plague by fires burned in the streets. Empedocles, afterward found it possible to destroy or impede the action of malaria, in one instance by draining a swamp, and in another by building a high wall to protect an exposed town.

The wall around Rome was sixty-five feet high, sixteen feet wide, and there were twelve gates which closed perfectly tight.

There was a yearly visitation of cholera at Rome, until the authorities caused the gates to be closed at sundown. When this was done it shut out the cholera.

Herodotus was so famous for his application of gymnastics and regimen for the improvement of health, that Plato accused him! of doing an ill service to the state—by keeping people alive who ought to die, because, being valetudinarians and below par, they cost more than they were worth to the community. Rome showed her appreciation of sanitary

art by extensive drainage of the base of the hills upon which the city was built; by the magnificent sewer Cloaca Maxima, of which a part is yet left, the oldest ruin in Europe, thirteen feet in diameter at the outlet; by the aqueducts, and by the suburban interments, whose number is attested all along the Appian Way; and by the appointment of the aediles. officers whose duties were to inspect and regulate the construction with a view to salubrity and safety of all public and private buildings. Regulations of internal sanitary police in regard to impurities of all kinds were also highly advanced among the ancient Romans. Celsus and Galen were also writers upon hygiene. Moses, the Hebrew, in the Levitical code, which is acknowledged to be of divine origin, extended the provisions reouired for the health of the children of Israel. The fact that he retained some of the ritualism of the land of Egypt is no disparagement. His education was that of an Egyptian of the royal family, by reason of his environment, he necessarily drank of the wisdom of the priesthood, whose knowledge of preventive medicines and hygienic principles, was of the highest order. The great pyramid of Cheops is most admirably arranged for the purpose of ventilation of its dark interior chambers.

Egypt was the seat of the most potent civilization of antiquity. It was the cradle of knowledge and learning of the ancients of the present known world. Everything modern necessarily bears the finger marks of paganism—the days of the week are a daily reminder of the pagan; the months were divided and decided by the pagans; most of our church ostentation and tinselry are but a continuation of paganism. Out of the unknown and undefinable after many evolutions, there has sprung the animal—man. Out of this man, trained for centuries under the standard of the heathen, there is evolving a much superior being under the guidance of the Supreme Being.

Man can never rise to the height or image of the Creator until he lives in acordance with the strictest hygienic and sanitary laws. No dirty, filthy, unsanitary denizen can expect to pass the pearly gates. The pious Jew, who observes the Mosaic law concerning food, ablutions and other purifications and segregations of persons with certain diseases. which are imperative and precise, stands a much better chance of a final reward, than the man who during the period of his earthly sojournage. was the recipient of but two baths, at entrance and exit, one at birth and one at death. The most signal triumph of preventive medicine, we may rank the introduction of vaccination, by Dr. Edward Jenner, in 1798. There is nothing to equal it in the annals of medicine. The discovery of the properties of Cinchona in the cure of malarial disease, is probably a close second, but there is no equality, no comparison. Smallpox when vaccinnation, is properly attended to and rigidly enforced, is no longer to be dreaded, as in the olden time, when an attack was the occasion of despair and the ultimate result, death.

Prof. Henry Hartshorne, in an introductory lecture to a course of hygiene in 1886, to the class of the University of Pennsylvania, said: "Without any intent to arrogate more than belongs to the department of hygiene, it appears to me not too much to say, that it is hardly second in intrinsic importance to any of those taught in the university. If preven-

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tion is always better than cure-if the enjoyment and strength of life depend not only on rescue from dangerous diseases, but also on the possession of vigorous health-and if a large part of sound practical therapeutics consists of measures rather hygienic than medicinal, as I believe, then I think my proposition is sustained. Should more be wanted to enforce it, it may be found in a relation of sanitary science, public hygiene to the vitality and mortality of communities. Sanitary science is essentially state medicine. There is no other therapeutic for masses of men, and when we compare results involving large numbers of human beings, does not preventive medicine exhibit triumphs greater than curative practice? I have no wish to depreciate these; I rejoice in them all. But look at the facts. In Constantinople in the year 543, 10,000 people for a time died daily of plague. In eight years from 1345, plague destroyed in all in various places, about one-half of the then existing population of the globe, now from hygienic measures, there is no reason to doubt, from the application of sanitary principles, it has come that plague has been banished from Europe, and almost extinguished in the East." These words were spoken thirty-seven years ago. He continued: "Let us glance now for a few moments at the history of our subject. Hygiene as an art is older than therapeutics; as the avoidance must have been from instinct as well as intelligence, an object sought before the discovery of means for its medicinal relief. First hygiene, then surgery. then medicine; was the natural and historical order. Mr. Chadwick asserts that in a well marked instance involving a number of families, intemperance hopeless to all appearance, in a low insalubrious quarter of London became curable-yielded to reform under effort-when the subject of it was transferred to an open healthful and comfortable locality

Our bodies and our spirits are held fast in close companionship. To raise the one is to help the other. Past all doubt, sanitary improvement promotes domestic, social and moral reform. The Board of Health is a good handmaid or helpmate for the Board of Missions. Bread in the one hand and the Bible in the other will do more for the feeble, suffering and degraded poor, than two Bibles and no bread.

In France, in 1772, the annual proportion of deaths was one in twentyfive; in 1845-46 one in forty-five. The mean duration in the same country was in 1806 twenty-eight and one-half years; in 1866 it was thirty-three and six-tenths years. In London in 1685—not a sickly year—one in twenty of the inhabitants died; now it is but about one in fifty-five. Macaulay, in his history, estimated that the difference between London in the seventeenth and London in the nineteenth centuries is as great as between the same city in ordinary years and those in which the cholera prevailed. In the sixteenth century at Geneva, the mean probability of human life was eight or nine years; in the seventeenth, thirteen to fourteen; the eighteenth, about thirty; and in the nineteenth, forty to forty-five. Sanitation and hygiene contributed to this result, after giving due allowance to the advances in therapeutics, surgery and obstetrics.

In 1850, the mean duration in New York and Philadelphia was but between twenty and twenty-one years. How long should we live? In China, men who have reached the age of 70 are designated as "rare birds;" those who have reached the age of 90 years are "old loiterers." Man's life will hardly be prolonged beyond a century. We should be content with the three score and ten. What an old loiterer our ancestor, Methusalah, must have been. He was a whole flock of rare birds. It has been said that a woman is as old as she looks, a man as old as he feels, or as old as his arteries.

The conditions of health as unfolded by physiology may be briefly stated to consist of five necessary requirements: air, exercise, water, diet and nervous repose. These are undeniably essential to the preservation of health. No human being can possibly continue in a fair state of health when deprived of a just proportion of any one of them. Health is the faculty of performing all actions proper to a human body in the most perfect manner. Voltaire defined a physician to be an unfortunate gentleman who was constantly required to perform a miracle, viz: "to reconcile health with intemperance." The good may die young, but the prudent live longest.

Americans are growing longer-lived as is shown by the vital statictics of the United States census of 1900. It is shown that there has been a decrease in the death rate for the country in the past ten years of about 10 per cent and in cities of the first and second class some curious facts are shown.

Among the large cities, Chicago shows the smallest death rate per one thousand of the population: 16.2 for 1900, as against 19.1 in 1890; St. Louis, 17.9 against 17.4 in 1890, a slight increase in rate during ten years. Boston is third, with a higher rate, that of 20.1, although it is reduced from 23.4 in 1890. New York City comes fourth, with 20.4 as against 25.3, showing a great decrease in the ten years. Baltimore comes fifth, with 21 as against 22.9. Philadelphia comes next, 21.2 as against 21.3 in 1890. Buffalo shows a better death rate, 14.8 as against 18.4 ten years ago. Milwaukee 15.9 as against 18.8; Detroit 17.1 as against 18.7; Cleveland 17.1 as against 20.2 in 1890. Cincinnati comes next with 19.1 as against 21; San Francisco 20.5 as against 22.5 in 1890.

Some of the southern cities show a decided increase in the death rate. New Orleans the enormous rate of 28.9, while in 1890 it was 36.3; Mobile 25.9; San Antonio 23.6; Atlanta 26.6; Savannah 34.3, and Charleston 37.5, which is about twice the rate of other cities of the same class.

These figures show definitely that more care is taken in sanitation, in the science of living, the introduction of better methods of life, advances in practice and surgery, etc.

I will give the death rate among the Boer prisoners confined in the camp in South Africa, where there was an absence of sanitation, hygiene and the science and art of living. Nostalgia was in all probability an important factor in the awful increase in the death rate of adults, but this could not have been the case in children and infants. I will give the figures as an exhibit of the results of want of hygiene and sanitation. The figures will "stagger humanity." Children's death rate in September, 1901, in camps maintained by England in South Africa, 433 per thousand, per annum; death rate in September, 1901, of all occupants of camps, 264 per thousand per annum. The death rate of all occupants of

camps during June, 1901, was 190 per thousand per annum. Death rate of all occupants of camps during July, 1901, was 200 per thousand per annum. Death rate of all occupants of camps during August, 1901, was 211 per thousand per annum. Death rate of England and Wales, 18 per thousand per annum. "Comparison is odious."

The hellishness of war is visited usually upon the innocent and the childhood of the countries involved. During the Mexican War, our armies lost from 10 to 12 per cent by disease; the allies in the Crimea lost 25 per cent from the same cause. The Federal army during the Civil War lost about 6 per cent by disease. It would be no exaggeration to say that the number of lives saved was greater than the whole number lost by disease and battle. This result was a signal triumph of the excellent hygienic system adopted.

The Medical News says that Guatemala, with a mortality of forty-one in 1,000, is said to be the least healthful country in the world; while New Zealand has the lowest death rate, eleven in 1,000. A recent communication to the state department by Mr. Squires, United States Minister to Cuba, states that since January 1, 1899, the beginning of the American occupation of the island there has been a continued decline in the death rate, and that the rate, 21.19 per thousand for the year just ended is the lowest in the history of the island, between 1870 and the present time. The highest death rate was 91.03 per thousand. This occurred in the year 1898, the year of the Spanish war, when the reconcentration camps were in operation and many people starved. The lowest rate under Spanish rule was 29.30 per thousand in 1885, and the average rate for the thirty years ending with 1900 was 41.05 per thousand. It is believed that if the present good sanitary conditions prevail, the present low rate will be maintained.

Cleanliness will preserve towns and cities from epidemics; to prevent such visitations, there must be cleanliness of the streets, cleanliness of the courts, and of the alleys, cleanliness of the apartments, cleanliness of the person, and, it may be proper to add, cleanliness of the mind. Freedom from remorse, freedom from the straits of poverty, freedom from vicious habits are also conducive to longevity.

New Orleans and Havana, Cuba, are striking examples of the value of civic cleanliness, the vigor of military rule being in each instance the prime factor in inaugurating the sanitary condition which brought about the truce which held yellow fever in abeyance.

"The degree of public health of a town or city is measured by its cleanliness, and its capacity for health depends upon its capacity for cleanliness." The death rate from inevitable causes, as old age, casualties and forms of disease that are not preventable, is seventeen in 1,000. The twentieth annual report of the Registrar General of Englandsays: "Any deaths in a people exceeding seventeen in 1,000 annually, are unnatural deaths. If the people were shot, drowned, burnt, poisoned by strychnine, their deaths would not be more unnatural than the deaths wrought clandestinely by diseases in excess of the quota of natural death, that is in excess of seventeen in 1,000 living,

Unripe fruit, stale spoiled fruit, spoiled meat or fish. and vegetables, impure milk, impure water, food inadequate in supply, and intemperance are notable causes of mortality. After we die, and die we must, what shall be the method of disposal of the mortal remains? "Dust to dust, ashes to ashes." Cremation is sanitary. It is all that will prevent the globe from becoming one vast cemetery. There is at the present time, about 1,600,000,000 inhabitants of the globe. Taking the death rate at seventeen per 1,000, the number of deaths annually will reach 35,000,000, one-half of the population of these United States. Fifty million is probably the nearer approach to the annual death loss of the people of the present known world. Cremation is necessary. It is the only method that will be rational as well as sanitary.

> "This earth and ocean, all Are the tomb of man; And all the planetary host of heaven Are shining on the sad abodes of death, Through the still lapse of ages. All that tread the globe Are but a handful to the tribes That slumber in its bosom. -Millions, since first The flight of time began, have laid them down In their last sleep."

۱II

SOME NEEDS OF THE DEPARTMENT OF HEALTH*

Members of the meeting of the Iowa Health Officers and City Physicians:

The branch of science called the Department of Health like all branches of medical science is far from being complete. Its needs are many and varied. And as civilization advances the scope of department of health broadens. As required needs are supplied, others under different and advanced conditions spring up. But advancement in all phases of science and art continues, so that if we are to keep pace with the movement of education we must labor energetically and with extra force. There cannot be a nobler calling than the prevention of disease and the protection of general health.

The needs of the Department of Health are many. We cannot hope for complete perfection in this department, but we do hope for many changes for the better.

There is a lack of union in the performance of the various duties between different boards, in many cases, ignorance of the law, lack of support by the people toward the officials, etc.

A more united co-operation between the township trustees and city board of health is desirable, because it would prevent many contagious diseases from being carried from place to place. At the present time this lack of unison between the rural boards and those of the city is noticeable. This is caused partly by the failure on the part of the rural board to take proper steps in isolation and quarantine. Many bad exposures in scarlet fever and smallpox are not quarantined and the result is transmigration of the germ from one part of the country to another, principally from the country into the city. This failure often amounts to total neglect. In many instances the trustees take it unto themselves to make their own laws and rules contrary to those who are better qualified to know. The lack of proper observance of the rules of health is partly due no doubt to the ignorance of the proper steps, etc., and partly also to the complexity of the health laws. The office of a township trustee is not one of honor and gratitude but on the contrary one of trials and

*Read by J. A. Valenta, M. D., Iowa City, at the First Annual Meeting of the Iowa Realth Officers and City Physicians held at Drs Moines, June 16 and 17, 1908. tribulations with a poor financial support. Hence many good and intelligent men who would make model officers will not accept the same for the reason above stated. Therefore the advisability of taking the office of the Board of Health in the townships out of politics and selecting men who have the qualities and who are competent to protect the public health and pay them a sufficient salary to retain them. What do a few dollars amount to if the public health can be better protected and many lives saved?

Another drawback to the success of board of health in our rural districts and in our smaller cities also is the ever changing board. No member stays in the office long enough to make himself efficient. If the term of office was longer with a good salary these men could be retained and the efficiency of the board become better year by year.

Much of the success depends on our rural physicians. In the city most of the work is left to the health officer and city physician and he is greatly responsible for the carrying out of quarantine, fumigation, etc. But in the towns, villages and rural districts where no health officer is to oversee the work and advise in some matters, great deal of the responsibility falls on the attending physician. The board to a greater degree looks up to him for advice, and whether the advice of the physician is good and he is conscientious or whether the opposite is true, determines the proper or lack of enforcement of the public rules of health. Therefore the physicians of the state should all become familiar with the health laws and I would advise the teaching of this branch in the medical school under the department of medical jurisprudence. The state Board of Health ought to supply each physician with a copy of all the laws pertaining to public health and additional leaflets as changes are made. We need a general enlightenment and education of the public. It is surprising how little the laity and even some of the practitioners know about the subject. In this age of ansepsis and antisepsis where lives are saved that otherwise would be lost, is it not of as great importance to prevent disease? The laity must be educated. Old fashioned ideas and fogvism routed out. Many times the health officer or attending physician is met with so much opposition that he becomes discouraged and disgusted and lets the law go to fate. We must educate the general public that all these rules of health are for the protection of the public and not. a money-making scheme. This phrase "money-making scheme" has often been uttered or hinted at and many of you have probably become familiar with it. The way to accomplish this is through the medium of the newspapers. The newspapers have become a general educator. Let men of ability and integrity (without their authorship being known, if they so desire as physicians are very modest as a rule), write articles in the leading papers and these be copied in minor ones giving the reasons for quarantine, fumigation, contagiousness of disease, etc. Let them see that prophylaxis is better than cure, also that if they do not observe the rules, that they are trespassing on the rights of others just as much as if they were living on other men's premises contrary to law or were hunting on forbidden grounds; also that if they impart the disease to someone else and the case ends fatally they are to a great extent responsible for his death.

One of the worst drawbacks in stamping out smallpox is the failure to employ a physician but conceal the case altogether for fear the physician would pronounce it smallpox and quarantine follow. This can only be remedied by the above treatment and a vigorous enforcement of the law for failure to report. I think the latter would probably have the desired effect more speedily than the former for when people think they would be fined or imprisoned they would be more apt to comply with the laws.

But sometimes the fault to report cases of contagious and infectious diseases lies not with the laity but with the physician. That such a state of affairs should exist is indeed pitiful. The physisian should have the general public's welfare so at heart, that friendship and local ties would not prevent him from doing his duty. By this I mean those cases where doctors being the patients' personal friend or for some other personal reason does not report the case in order to save the patient and rest of the household from quarantine. In others, and this is sometimes true of old physicians who began their practice before strict quarantine regulations were required, we find this carelessness. They can't adjust themselves to the new conditions or do not care to; considering older methods better than "new fangled ideas." Such cases are almost hopeless for it is hard to teach an old physician anything if his receptive faculties are not open.

The paper on the wall of the infected house is supposed to be removed in every case of smallpox and scarlet fever. More trouble arises over the enforcement of this law than over any other. There seems to be no definited idea as to whose duty it is to pay for the paper and putting it on. Sometimes the owner gracefully accedes to stand the financial loss, but more frequently he gets stubborn, especially where he has a renter in the property and the house has been newly papered. So it seems to me that the clause about wall paper should be left to the discretion of the health officer in the city. Where very light cases occur and it is not deemed necessary, leave the paper on. It could be washed with bichloride solution, after fumigation with formaldehyde, and all germs would be killed.

All cities and townships need a detention hospital with proper accommodations and nurses. If this was the case all paper bills, etc., would be done away with and a good competent nurse could take care of several patients at once while members of families would not have to be quarantined so long and kept by the city. Many cities have temporary hospitals or pest houses for men but none for women. A township could have a hospital just the same as a city only on a smaller scale, where any cases of the township could be treated to better advantage than several scattered cases.

Vaccination should be urged more vigorously for it is an assured fact that vaccination helps to eliminate smallpox. If the general public could be made to see the benefits of vaccination instead of sore arms, smallpox would be a thing of the past. Very few severe cases are on record where good vaccination took place. In many instances it seems there ought to be a law where vaccination should be compulsory just the same

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as quarantime. A general compulsion seems hardly advisable in this free and independent country. But it seems to me this subject of vaccination is treated too lightly by the laity and physicians also, the former considering it again one of those money making schemes. In an epidemic of smallpox the physicians ought to be paid by the county for vaccinations thus partly eliminating that money scheme.

We need a good organization of the Iowa health officers and city physicians where every city of any importance would be represented. We need a good membership of physicians who have this subject at heart. These meetings ought to be well attended and be mutual benefit to all so that when we depart to our respective homes we may be better prepared to take up our work. This is an era of conventions and to organize a good society for these conventions will be to supply a long felt need in the department of health. A committee should be appointed on legislation and it should be the duty of this committee to lead in the movement for changes in the legislation next winter. The work should not be left to the committee altogether but each member should lend his helping hand.

Municipal Sanitation .- We hear a great deal about municipal sanitation. But it seems to me there can be no such a state as perfect sanitation in the cities as long as the garbage question is not s tiled. How many cities of any size have a garbage system that is a success? If there are any I wish they would make it known so far and wide that we could all benefit from it. As long as no attempt is made to dispose of garbage so long will the alleys and back streets be a dumping place for refuse matter. Surely some practical way ought to be found to dispose of this matter. The health officer, marshal and senior alderman make their annual rounds, order the alleys cleaned, but how long do they remain so? The people must have some place to dispose of the garbage and the alley is the place. During the hot summer months it is any wonder if disease germs lurk in the back yard waiting for their victim? The health of the city could be greatly improved if municipal cleanliness would be the rule. I think a good plan would be for the ladies' improvement league which so many cities have nowadays and whose business partly is to stir up city officials to improve the parks, dispose of garbage question, etc., is to get as large a membership as possible of the ladies of the town and then make a rule (which all must obey) that each member is to keep her own premises clean including the back yard and alley. If this was done the work of cleanliness would be greatly facilitated. Their motto should be, "practice what you preach."

Water Supply.—Every town and city ought to have its water that is used for drinking and cooking purposes tested at least once a month. It ought to be tested by an expert and if found unfit for use condemned. Water companies should be bound by contracts to furnish sanitary water and if the water is unfit for drinking, from any cause (except some unavoidable excuse) they ought to be compelled to make better provisions. Typhoid epidemics in some of our cities this year were traced to the water supply. Where a majority of the inhabitants of the city are left to the mercy of city water, the purity of such should be a vital question for our city fathers to deal with. The question of municipal or private ownership does not solve the problem.

Consumption .- This disease causes more young lives being sacrificed than any other disease and still very little has been done to prevent it. We seem to be helpless. That something ought to be done is apparent. The state ought to have a sanitarium where these consumptives could be taken care of. To allow the patients perfect freedom in which to expectorate bacilli broadcast for others to inhale seems no more just than to allow a smallpox patient the liberty to move wherever he pleases. I don't think it is doubted that the disease is communicated. Of course we cannot prevent a predisposition but we can isolate these consumptives. They should at least be isolated at home as much as possible and antisensis observed in regard to the expectoration. If they are allowed in public places they ought to be provided with an antiseptic expectorating cup. A law should be passed to that effect by our State Board of Health and the violation of the same treated with a fine. An anti-expectoration ordinance should be found on the statute books and strictly enforced, but we have not become educated to that as yet. The physicians must begin at home first and practice anti-expectoration. Why a man of ordinary intelligence would want to sit and spit his strength away is a wonder, but we Americans do some foolish things.

Vital Statistics.—Some better system should be adopted for reporting births and deaths, but no system can become a success unless the physicians make it so. Two methods have been adopted. I think the first one, leaving it to the physician, was a failure and the present one, where doctors' responsibility ceases is not very satisfactory. The health officer must try all resources to keep account of deaths for his semi-annual report and then it is not complete and accurate. How can statistics be of any value? Where cemetery trustees or boards require no written permit for burial and no physician was employed (or if one is employed he is not compelled to report deaths), deaths and burials occur that the city clerk never hears of. No burial should be permitted until proper permit stating the cause of disease has been deposited with the clerk, and no remove' «f bodies from the city, without the same permit should be allowed. In this way a complete record could be kept and become of some value.

The Health Officer and City Physician must be just to his fellow physicians. In no place can the physician show his colleagues professional etiquette more than in the health officership. Many families after they have found a contagious disease or the attending physician has pronounced it smallpox, think they ought to drop their physician and employ the city physician. Or they do not feel satisfied with the attending physician's diagnosis and send for the health officer. In almost every instance the health officer could hold the case and do his brother colleague all kinds of harm. Where such a thing has happened the health officer regarded by the medical fraternity as their enemy. There is not the friendly feeling that is so necessary between the physicians and the health officer. This official must be very careful and judicious not to tramp on other's rights. There seems to be a little trouble to tell how far the health officer is justified in going and not provoke his fellow practitioner. This is especially true where all the physicians take care of smallpox. Where all cases of this kind are relegated to the city physician the matter is a much easier one. The question often arises, should the health officer investigate a case of contagious disease when requested to do so by the people and not by the attending physician. For instance the attending physician calls a certain case chicken-pox. The neighbors all think it is a case of smallpox and that the attending physician does not know his business. They complain to the mayor and the health officer. Now is it the duty of the health officer to investigate that case, even if the attending physician and the people of the household do not desire it? I think it has been customary not to attend such cases and trust to the judgment of the attending physician. Are we always justified in doing so? We hear from many health officers that we are not. There are still few physicians left who side with the laity and think we have no smallpox in the State. To those, it seems the severe cases of the past year ought to be proof enough.

STATE BOARD OF HEALTH

As there should be no doubt left in the minds of the medical profession this year about these contagious diseases being smallpox, we should all unite and call every case of smallpox by its right name and inist on it being recognized so. One of the reasons smallpox cannot be stamped out is the diversity of opinions among the medical men. Can we blame the laity if we cannot agree among ourselves? Now this should be done away with and a united effort made to stamp out this disease which has been pestering our State for the past few years. If we could form an information bureau or system where we could communicate with each other and look out for certain contagious diseases it would be of great help. We should notify our neighboring cities of an epidemic if it is raging in our town. It is not necessary to advertise it in the papers but just notify the health officer privately.

Health Officers' and City Physicians' Journal. We need an official publication which treats exclusively of matters of interest to us, and where reports, papers, etc., written by the different health officers and city physicians could be printed. A monthly would be sufficient in the start. If that would be impractical and impossible why not communi-Late with the State Board of Health and have them enlarge the Iowa Health Bulletin to suit our needs. The editorial staff could be enlarged with no limit of communicants. The work could be divided and a general superintendent, the Secretary of the Board, could look after the different divisions. There could be several departments-Bacteriological, Medical, Sanitary, Legislative, etc., with chief editor for each department. If the publication was paid out of the state treasury it could be scattered broadcast and much good result. Many of our valuable papers read at this session could thus be published and a far reaching and permanent good result. If we succeed in establishing a State bacteriological laboratory and a sanitarium for tubercular patients these two departments could publish these reports monthly. The present Iowa Health Bulletin is all right, but as it is now it is a publication by the State Board of Health. If we could add to it the publication of Iowa health officers and city physicians, our needs would be provided for. A committee ought to be appointed at this session to communicate with the State Board of Health or devise some other means whereby this object could be carried out if it meets with the approval of the members.

Association of American Health Officers and City Physicians. If, after we perfect a good organization of our State, we can attract enough attention from our sister states and stimulate them for similar work; with state organization, a national or American organization could be effected. It would be necessary to unite a few states at a time, separately, as their interests would show and the grand finale be a society comprising the health officers and city physicians of the United States. This may sound a little previous and more like a fairy tale, but it is not an impossibility. That such a gathering would be of untold benefit is apparent when the different methods used by different states could be compared.

NOW TO RECAPITULATE OUR NEEDS

1. A more united co-operation between the township trustees and the city board of health.

2. Uniformity in the regulation of quarantine and the management of the same in the State.

3. Repeal of the regulation by the Board of Health compelling the removal of wall paper in cases of smallpox and scarlet fever, and leaving the question to the judgment of the health officer.

4. Taking the health officership out of politics and substituting qualifications irrespective of partisanship.

5. More compliance to the rules of health by the health officers and city physician himself.

6. Enlightenment and education of the rural districts in the regulations and rules of the Board of Health.

7. Election of a board of health in a township for a period of three or five years.

8. A better and united means of reporting deaths, births, contagious diseases, etc.

9. Better appreciation by the public of the work of the Health Department.

10. A detention hospital for every city and township with proper accommodations and nurses.

11. A good organization of Iowa health officers and city physicians, whose members will work for the good of the cause.

12. A practical way ought to be devised for disposing of garbage, etc.

13. Water supply should be pure and companies should be held responsible for the same

14. A State sanitarium for consumptives.

15. An anti-expectoration ordinance with strict enforcement.

16. Guard our fellow practitioners interests in assuming control of cases we are called upon to investigate.

17. A more united effort to stamp out smallpox by calling and insisting on its right name.

18. An information bureau or system to communicate between health officers notifying each other of epidemics.

19. An official publication of the Iowa health officers and city physicians, with a chief editor and subordinate staff with several departments.

20. A national union or association of American health officers and city physicians.

Now there are many other needs in the Department of Health, but I have endeavored to bring the most important to your consideration. That these needs, if supplied, would prove a blessing, few of you will probably doubt, but as to the best way and means to accomplish the end we may differ. But if each one of us will strive to pick out the method which has been shown to be the best, as accepted by the majority, and work out that method, regardless of our own personal opinion, success will crown our efforts. May we radiate outward our labors from this center city, the capital of Iowa, into every nook and corner of this commonwealth, and before another year passes by reap the fruits of labor performed by the faithful few for the perfect happiness of humanity.

VIII

THE STATUS OF THE HEALTH DEPARTMENT IN MUNICIPAL AFFAIRS

BY LOUIS A. THOMAS, M. D., HEALTH OFFICER, RED OAK *

The welfare of the State demands that the health and life of its citizens shall be paramount to all other interests, and in order to emphasize this fact our legislature has enacted laws creating State and local boards of health, investing them with almost unlimited authority and responsibility pertaining to the preservation of health and the enjoyment of life and happiness by its citizens.

This meeting, composed of the health officers of the various local boards of health throughout the State, may very properly contemplate the successors and failures of the past, endeavoring by judicious consideration of the various subjects to more fully perform the duties imposed upon them, by promoting uniform methods and proficiency of service among the local boards.

The statute provides that the mayor and members of the council of each city or town, or the trustees of a township, shall constitute the local board of health, and that each board shall appoint a competent physician as its health officer. It is the intent of the statutes that these local boards shall have supervision of and responsibility for the hygienic conditions of their respective territory, and in addition to enforcing the regulations of the State Board of Health, shall adopt such rules and regulations as are necessary to guard the well-being of the people within their jurisdiction.

The duty of the local board is not confined to the suppression of infectious discases, although this is an important feature; they are required to safeguard the public in every avenue from which there is any danger to human life or health; the inspection of milk, water and food, prevention and abatement of nuisances, prevention of accidents, inspection of schools, inspection of plumbing, lighting, heating and

*Read before the Iowa Association of Health Officers at Des Moines, Iowa, June 16, 1908.

ventilation; to require that all buildings where people congregate are properly cleaned and provided with adequate exits and fire escapes; to maintain an accurate registration of births, deaths and burial permits, all of these properly belong to the department of public health. In some of the larger cities special inspectors are appointed to perform these duties, but in the smaller towns and townships either these functions are entirely neglected or devolve upon the marshal or some equally incompetent person.

The health officer is not a member of the Board; he is simply its medical adviser; he has no vote, and no authority except as provided by regulations adopted by the Board by which he is appointed.

Each board may determine the duties of its health officer, and should adopt a standing regulation for that purpose.

In towns and cities the mayor should be chosen chairman of the board, but in neither position has he any authority, except in one instance (the placing of a quarantine is specifically imposed by the statute upon the mayor).

The individual members of the Board have no authority whatever, and can only perform the duties of a board of health when assembled in session as such.

Each board should adopt verbatim the regulations of the State Board of Health, and in addition thereto such other regulations as are adapted to their own territory; these should designate the mayor and health officer the executive officers of the board and empower them severally and conjointly to enforce the rules and regulations of both the state and local boards. In the case of townships the executive officers should be the clerk and health officer. There should also be adopted a regulation authorizing the mayor of a city (or clerk of a township) to investigate the requirements of all persons under quarantine, and when necessary provide supplies, nurses and medical attendance, reporting the same to the board at its next meeting, when it may take such action as deemed necessary in each individual case.

When the board own a quarantine hospital the health officer should be made superintendent, and responsible only to the board. All matters pertaining to the public health should be entirely under the control of the health department, not jumbled with affairs of the council. The responsible head should be the health officer; the statutes require that he be a competent physician, and therefore the presumption is that he be the most competent physician available for the position. To fulfill the requirements he should not only possess adequate scientific knowledge, but be a man endowed with a large amount of executive ability. coupled with moral courage and keen judgment. When such a man is appointed he should receive the encouragement and support of the whole community; his salary should be large enough to enable him to devote the greater part or the whole of his time to the duties of the office, and place him in position to be independent of private patronage; for in many cases the public fail to appreciate enforcement of the health laws; especially in the matter of quarantine and disinfection. They are any,

ious that their neighbors affected with or exposed to an infectious disease should be guarantined, but if they themselves happen to be infected the law at once becomes oppressive and unreasonable; they demand special privileges not contemplated by law, and the executive officer who is charged with enforcing the regulations becomes an object for all manner of abuse and incurs their permanent enmity. The health officer should be under a form of civil service, and retained in office indefittely unless removed for cause. In some of the larger cities special inspectors are appointed to inspect meat and dairy products, plumbing, etc.-this is doubtless a good method, provided they are competent and under the direction of the health officer. In the smaller towns and townships sufficient funds could not be provided to pay the salaries of a number of competent inspectors, nor would there be enough work to keep them employed; therefore the health officer should be qualified to perform all of these duties himself, and compensated accordingly. One competent man well paid will always prove more efficient and economical than several who are under qualified and under paid.

Few township boards have knowledge of their duties and responsibilities; in many instances they are not even organized, and when necessity arises they are like a ship at sea without a rudder, blundering along in a most amazing and ludicrous manner; through carelessness or lack of knowledge infection is allowed to spread to other localities, causing financial loss, suffering and death, much of which would be prevented if there were some competent person with authority to supervise and guide their actions. Under present conditions many of the townships are a constant menace to the larger towns, owing to the inefficient manner in which they enforce quarantine and disinfection.

It would be well if all the local boards of a county could meet together once each year, at the county seat; they should then be properly organized and instructed in their duties. The publication of the *Iowa Health Bulletin*, and the distribution of circulars by the State Board, are not the most effective means of giving the instruction so much needed, though both are to be commended as useful aids; an hour's verbal instruction by a competent person will acomplish more and better results and perhaps encourage the members of local boards to read and digest the contents of these circulars, which now are often consigned to the waste basket unread.

A system of food inspection should be instituted and rigidly enforced by all local boards; especially in the case of meat and dairy products; all animals from which such products are derived should be proved to be free from tuberculosis and likewise the persons who milk the cows or in any way handle these products should be required to show that they are free from any disease. What can be more repulsive to the senses and detrimental to health than for persons affected with syphilis or tuberculosis to handle articles of food in any form, and yet this is not an uncommon occurrence today. Many serious outbreaks of typhoid fever in this as well as other states have originated in careless methods of handling dairy products, and the calamities resulting from such care-

lessness and ignorance demand stringent regulations and thorough inspection not only of the animals from which the products are derived and the persons handling them, but of the premises from which they come, together with the water supply used for cleansing the receptacles. No milk or butter should be sold unless the vender has a permit from the local board showing that the article is wholesome and free from contamination or adulteration. Where possible the services of a competent veterinarian should be obtained as inspector.

The public schools should receive especial attention from the board of health, for although the enforcement of certain health regulations devolve upon teachers and school boards many are negligent; the local board of health, having superior jurisdiction, should inspect the schools within their territory and insist that the buildings be maintained in a proper sanitary and hygenic condition, that all persons attending are cleanly, free from communicable diseases and protected by vaccination. Many children attending the schools are almost entirely neglected by their parents, and it is not an uncommon thing to find odoriferous cherubs who have not experienced a complete bath for months, mixed indiscriminately with children of refined habits; they are not only obnoxious to the senses but deleterious to the health of their classmates. The necessity of cleanliness should be impressed upon them, and each school house should be provided with bath and toilet rooms under the supervision of a matron, each child being required to bathe at stated intervals.

When disinfecting after infectious diseases every care should be taken to insure perfect disinfection of the persons and premises, and every article likely to have been contaminated; especial attention should be given to pet animals and the destruction of vermin of all kinds. To obtain uniform, thorough and economical methods the disinfecting should be done by some competent person under the direction of the health officer and the expenses defrayed from the general fund of the city or township; the public receive more benefit from disinfection than those just affected, and therefore all should share in the expense rather than impose a possible hardship upon an individual.

Regarding the methods of disinfection there is much material for discussion, but on this occasion time will not admit of an exhaustive treatise; however, before closing, I wish to express my entire satisfaction with results obtained from the use of Formaldehyde, both in the gasseous form and in solution. It is without doubt the most effective agent known to science, convenient to use, not injurious to the most delicate fabrics and thorough in its disinfecting properties. We have used formaldehyde by means of the Rex method entirely during the past four and one half years, and have yet to record a single case of secondary infection or destruction of property, added to which a valuable amount of property has been saved that under other conditions would have been destroyed.

This association should be organized with serious deliberation; it has long been needed, and its influence should be such as to command the attention and respect of the public; coming into intimate contact with the people and their conditions in every section of the State, the need of means to obtain satisfactory enforcement of the sanitary laws is forced upon us. As recognized sanitarians the public will look to us to guide future legislation along these lines, and we should be unfaltering in our determination to wield our influence for the good of the whole state. As Iowa leads in most good things, see to it that she shall lead in all matters pertaining to sanitary science.

IX

DIRT, DISEASE AND THE HEALTH OFFICER*

BY DR. CHARLES V. CHAPIN, SUPERINTENDENT OF HEALTH, PROVIDENCE, R. I

When our honored and lamented Reed went to Havana and discovered that yellow fever was transmitted by the bite of a mosquito, and Gorgas, by the most brilliant sanitary experiment ever made, put an end to this disease in its very stronghold, they drove the last nail in the coffin of the filth theory of disease. But it is to be feared that the devotees of this theory are loath to bury it, thus violating one of their cardinal principles. It seems to me that it is the duty of the health officers of this country to see that this ceremony is properly performed. the filth theory erroneously assumed that the infectious diseases were caused by emanations, gaseous or otherwise, from decaying matter. Everything decaying, and everything offensive to the sense of smell, was dangerous. Everything dirty, everything nauseous, possibly, nay, probably would cause sickness. It was boldly taught that by removing all decaying matter the infectious diseases could be stamped out. For many years this idea dominated sanitary practice, the communicability of these diseases being almost entirely neglected. The English, who carried this notion of the danger of filth to the extreme, were assumed to be the leaders in public health work, and we blindly followed the leaders. Little stress was laid on personal cleanliness. It was believed that the municipality was chiefly responsible for infectious diseases. Pure air, pure water and a pure soil was the cry. Sanitary, reform was engaged principally in protecting drinking water from organic contamination, in building sewers, in developing plumbing to a complicated and expensive art, in cleaning streets, in removing dead animals, in collecting garbage and removing household rubbish, in whitewashing and repairing tenements, in the regulation of offensive trades and the general suppression of all nuisances affecting the sense of smell. Of course there is some truth in the idea that dirt may be the cause of sickness. Some diseases are fecal borne and the danger from this source is sufficient to warrant.

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our treating all fecal matter as suspicious. The protection of water supplies and the construction and utilization of sewers prevents disease and is worth all it costs. The secretions of nose and mouth are so often the carriers of infection that the personal cleanliness which avoids danger from this source is a potent factor in hygiene. But with minor exceptions municipal cleanliness does little to prevent infection or decrease the death rate. Municipal cleanliness is no panacea. There is no more a royal road to health than to learning. It will make no demonstrable difference in a city's mortality whether its streets are clean or not, whether the garbage is removed promptly or allowed to accumulate, or whether it has a plumbing law.

There is no single proceedure by which we can exterminate infection and prolong life. We have learned the true nature of infection and we have learned that the parasites which are its essence rarely propagate in filth and are seldom air-borne. We have, in the language of a distinguished American hygienist, been to a large extent. "barking up the wrong tree." Instead of an indiscriminate attack on dirt we must learn the nature and mode of transmission of each infection, and must discover its most vulnerable point of attack. We have learned that to fight typhoid fever and cholera we must keep human feces out of food and drink; in yellow fever and malaria we must destroy the *Stegomyia* and the *Anopheles*; in smallpox we must vaccinate, and in plague we must kill the rats. It is only along the line of patient investigation of each disease and practical deductions from ascertained facts that public health work can succeed.

There is nothing novel in all this and few will be found to dissent from the above. Rather, I fear, the criticism will be that I am threshing over old straw, and that the filth theory is buried as well as dead. I wish this were so, but I fear it is not,and I am sure that in my own city the outgrown traditions of the middle of the last century are still virile enough to decidedly interfere with real sanitary progress. Some of the most recent works on sanitation still reiterate the time-worn phrase about dirt and disease. The daily press and even the medical press speaks as if street cleaning, scavenging, modern plumbing and tenement house reform were the mainstay in fighting infection and reducing the death rate. The majority of even intelligent people today believe that Havana was made healthy by municipal engineering, while it was really accomplished by scientific effort specifically directed against certain infections. Our medical schools are also doubtless at fault, for many of even our younger physicians look for the source of malaria, typhoid and diphtheria in "unsanitary conditions." by which they usually mean defective plumbing, decaying vegetation, heaps of stable manure, or general yard rubbish. The great problem of sanitation today is how to deal with mild or unrecognized cases of contagious disease and with those persons who, though well, are yet infected. This problem is not likely to be solved so long as physicians trace infection to the class of things mentioned, instead of to persons. There is also no question that we health officials, even against our better judgment, cling to discredited methods. An entirely disproportionate amount of time and money is

devoted to plumbing regulations and the abatement of minor nuisances which have no direct relation to public health. We have far more sanitary inspectors than medical inspectors, and bacteriologists are not much in evidence except in the largest cities. Popular misconception as to the relation of dirt and disease is illustrated by the advertising cartoons of "Spotless Town." which is supposed to be "o clean that the poor old doctor is dying of starvation. But we can rest assured that however spick and span may be the streets, and however the policeman's badge may be polished, that so long as there is found the bore so careless with his expectoration, and the doctor who cannot tell a case of sapolio from one of diptheria, the latter disease as well as tubærculosis will continue to claim their victims.

Let me not be misunderstood. I am no lover of filth. I believe that personal cleanliness is the most important factor in the prevention of the infectious diseases. I as heartily believe in municipal cleanliness. It is one of the better phases of our modern urban life. The municipality ought to do much more than it ever has done to protect its citizens against nuisances of all kinds. Again, there is no question that municipal cleanliness does some good in the way of directly preventing disease, and also much in an indirect manner, by encouraging personal cleanliness. But there are many other factors in modern life which tend to promote health far more than the one in question. But the health department, when it interferes with property rights as it does, and expends so much time and money in nuisance abatement, should have some stronger warrant than that it tends indirectly to promote good health.

I would plead with health officers for a more rational perspective in directing their efforts and to devote more attention to the isolation of infectious diseases, medical inspection, disinfection, vaccination and the control of milk supplies, and less to the abatement of nuisances; and in the latter more attention to those nuisances which clearly and directly menace health, and less attention, or none at all, to those which do not. Do not claim more for municipal house cleaning than the facts warrant. Teach, on all occasions, the true relation of dirt to disease. And lastly, pay a little less attention to finical defects in plumbing, to stable manure and garbage buckets, and more to the solution of those problems of infection which are so urgently pressing upon us. To attempt to solve these problems is not so easy as abating nuisances, but it will pay better in the end, and every health officer should do his part in the advancement of sanitary science

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FACTS VS. FALLACIES OF SANITARY SCIENCE*

BY JOHN L. LEAL, M. D., PATTERSON, N J.

If asked what one thing has accomplished the greatest results in the material betterment of mankind during the last half century, the sociologist would probably answer, "Public sanitation," and such answer would challenge successful denial.

To the student of the subject, looking over what has been accomplished under the head of sanitary science, public sanitation, or hygiene (indifferently called), such results cannot fail to be both impressive and surprising.

They are impressive because his eyes show him greater engineering works constructed under these names, better houses, streets and surrounding conditions. He finds that people eat better food and drink purer water; he learns that preventable diseases are prevented, or at least their spread limited, that epidemics have become much less frequent and virulent; while statistics teach him that the expectation of life has increased by years, and infant mortality decreased by a percentage astonishing. They are surprising, not alone for their vastness and importance, but still more that such good could come out of ignorance and error.

For such student is conscious that the most, if not quite all, of these good things are the results, not of the proper application of the principles of a science, but are the results of the carrying out of a theoretical empiricism based upon wrong premises.

Certainly no such successful outcome of error is known in the whole history of science.

To within but a comparatively few years the class of diseases called preventable, contagious or infectious, the prevention and limitation of which is the chief aim of public sanitation, was attributed by so-called sanitary science to, first, filth (composed of decomposing or decaying organic matter in more or less solid form and certain wastes); second, water (including that used for potable and domestic purposes containing decomposing or decaying organic matter, stagnant water, swamp or

• From The Christian Advocate, New York, August 21, 1902. By the kindness of the publishers. 9 (129) marsh water, ground water, etc.); third, air (including the gases of decomposition and other extraneous gases, odors, excess of animal matter, carbonic acid and moisture or dampness, ground air, miasm, etc.); fourth, the earth (meaning certain vague telluric conditions).

When we discovered the true causes of these diseases, and that filth, bad water and air, and telluric conditions could not directly cause them, as it was hard to break away abruptly from the ideas and mental attitude induced by long belief and training, we conjured up certain vague, indefinite bodily conditions, which we attributed to the same as causes, and held that such conditions, through weakening the natural resisting powers of the body to disease, tended to make infection more probable in the event of exposure.

This position was based upon the principle that whatever weakens or lowers the tone of the bodily organism also diminishes the power of resistance to disease, with which power such bodily organism is endowed by nature. There is no reason to believe today that our last attitude had any firmer foundation than the first. Practical experience, as well as theory based upon our present knowledge, teaches us that exposure to filth, filthy water and filthy air does not in itself necessarily lower the tone of such bodily organism. And even if it did our present knowledge gives to vital resistance a firmer foundation than the general tone of the organism.

The causes, then, of the class of diseases which it has been the aim of sanitary science to limit and prevent being known,—what, then, are those causes, and what are the relations borne to them by filth, water, air and telluric conditions?

Preventable diseases, we know today, are caused by minute microscopic organisms belonging to either the vegetable or animal kingdom, and which bear a specific relation to the diseases caused by them. These organisms or disease germs form but a small proportion of the myriads of organisms otherwise similar to them, which perform most important functions, and without which, indeed, the world could not support vegetable anl animal life.

To these beneficent organisms are due the processes of decomposition, putrefaction, fermentation, etc., and the results of their activities are the splitting into simpler compounds—carbonic acid, water and ammonia—of dead organic matter. It is through the carbonic acid, water and ammonia thus produced that the higher vegetation obtains the carbon and nitrogen necessary for its growth, and without which such growth would cease. As animal life is dependent upon vegetable life, its development would also cease. So we thus find in these little bodies, so minute as to be seen only by the aid of the most powerful microscope, not only our worst enemies, but also our best friends.

On the other hand, our enemies, the disease germs, instead of being engaged in building up and supporting life, devote their energies to its destruction or loss. They are true parasites, living at the expense of their living host by taking from it what is necessary to its own growth and development, and harming and destroying it through the products of their existence. All of these various organisms or germs descend from like parents; and their existence, of necessity, presupposes a line of ancestors stretching back until lost in the shadow of the same mystery which overhangs the origin of man.

Each preventable disease is caused by one of these separate and distinct families of germs and can arise in no other way.

In order that a germ should cause a disease three conditions are necessary: First, that the germ should obtain access to the organism; second, that the germ should be in an active or virulent condition—for, owing to attention, unfavorable environments, etc., such germs may exist in the organism in a dormant or harmless state; third, that such activity or virulence should be sufficient to break down the power of resistance to such attacks, with which power every bodily organism is endowed by nature.

Such, then, being the known causes of these diseases, let us consider the relations borne to them and their causes by, first.

FILTH

The conception of what constitutes filth is largely a relative one, training and the personal equation entering largely into the individual definition.

What appears to be filth to the uninstructed may appear in an entirely different light to one who knows its constitution, origin and purpose; while, on the other hand, that which may seem the most disgusting form of filth to the more intelligent and the better educated, to the ignorant (who are accustomed to it, who have toward it neither an inherited nor acquired repugnance) it may not seem to be filth at all.

From a general point of view anything dirty—any matter which fouls, soils, defiles or pollutes, waste matter, nastiness—is filth. From a sanitary point of view filth is decomposing or decaying vegetable or animal matter and other matter involved with it.

Yet as that animal or vegetable matter in its original condition would not be considered as filth, the condition in which it exists at the time must make it so.

But that condition is simply a step in the chemical processes by which nature changes the matter from its original forms to others, which may again be useful in the great scheme of life.

These latter forms which appear when nature has finished her work certainly cannot be classified as filth.

The theory that the preventable diseases originated in filth never seemed logical, even before we knew the true causes of them. Now, as has been stated, we know that, directly at least, it has no relations to those causes.

It has also been stated that there is no proof of the claim that in some vague, indefinite way the presence of filth lowers the tone of the bodily organism and thus dimishes the vital resistance.

Now, there is only one way left in which even any indirect relation between filth and these diseases can be established.

We know that the disease germs require for their development and life heat, moisture and organic matter. Now, these conditions are usu-

ally attained in the presence of accumulated filth. It is, then, as the pabulum, or food, of these germs that filth bears the most important relation to this class of disease.

But even this relation is not such a vital one as may appear at first sight. The little germ, so to speak, has its own notions as to what is clean and unclean, and thrives better upon organic matter which is clean. and pure than upon that which is unclean and impure.

Every accumulated mass of filth, of whatever bulk, is a teeming mass of bacterial or germ life. These bacteria are working under conditions favorable to them; they are performing the functions for which they were created in breaking up organic matter into simpler chemical compounds, which shall be again of use in nature's laboratory. Under these conditions, and among these busy toilers at their natural work, the disease germs are at a disadvantage. For they are naturally parasites and live upon and in connection with living, instead of dead, organic matter.

In the struggle for existence which ensues they go to the wall, and we find a good illustration of the doctrine of the "survival of the fittest." It follows, then, that if filth becomes infected with these disease germs it is a danger for a time, but nature has minimized such danger by providing—except under exceptional circumstances—for its destruction. Filth while infected is dangerous in various ways: By being washed over the surface or by percolation through the ground the germs may reach water used for drinking or other domestic purposes, and cause their respective diseases; or infection may result through handling, accidental or otherwise; they may be carried by soiled boots, clothing or animals; may be deposited on food or in drink by flies; may be conveyed by the bite of the mosquito; when dry may be distributed through the air in dust, etc.

WATER

Water has probably been more blamed as a cause of disease than has fifth, and probably with more reason.

Until of recent years, however, wrong reasons for this blame have been given. It was believed that the organic impurities in polluted waters were in themselves the causes of these diseases, and even today the chemist gives his opinion as to the healthfulness of water based upon the amount of organic matter which has been and is in such water.

In the light of our present knowledge such an opinion, based upon that alone, with no knowledge of the source of such organic matter and of the sanitary environment of such water. is utterly worthless. It is now known that the class of diseases in which we are interested are not caused by water because it contains large amounts of organic matter, because it is dirty or polluted, but because there have been introduced into it in some way certain germs which are specific of certain diseases of this class. And without the presence of these specific germs in the water, no matter how dirty or foul it might be, it could not give origin to the corresponding specific diseases.

It is admitted that water may be so foul, that it may contain so much vegetable or animal matter, or both, in such condition, that the drinking of it may cause certain disorders, for the most part reflex or functional in type, in the same manner that similar disorders may be caused by the eating of had or improper animal or vegetable foods.

It is possible, too, for such results to be most serious, and even fatal, if in either case ptomaines (poisons generated by certain forms of decomposition of organic matter) should be developed.

It is also admitted that the continual use of filthy water for potable purposes may interfere with the general health in another way and lead to future organic disease.

Water is the great solvent within the body, and one of its most important functions is the carrying away of effete and waste material.

If before using it already holds in solution an excess of organic or inorganic matter this function is interfered with, and waste matters accumulate in the body which in time are likely to give rise to certain organic diseases and states of auto-intoxication. It can be said, however, that filthy water is so disagreeable to the eye, to the taste, to the smell, or to all of them, and the effects of its use are so immediately unpleasant, that such use is not likely to be continued, except in cases of absolute necessity; whereas the infected, and therefore far more dangerous, water may be most pleasing to the senses, and in no way give warning of the peril contained. Still under these conditions alone we do not find origianting cases of typhoid fever and cholera, which are the water-borne diseases of this class in which we are interested.

These diseases caused by water mean access to and presence in said water of the bacillus of Eberth and the cholera spirillum, and that these organisms have come down from other cases of the same disease.

Their presence in the water is accidental or incidental, and in no way dependent upon the condition of said water as to the amount of organic matter, dirt, pollution contained.

Indeed, the results of their presence in so-called pure water are much more immediate, fatal and lasting than in so-called filthy water. This fact may be explained in about the same manner as the behavior of the disease germs in relation to filth.

Stagnant water, swamp or marsh water, etc., is concerned in the development of two preventable diseases—malaria and yellow fever.

Malaria has always been attributed to such water, but for improper reasons. It is caused, as we now know, by a minute organism belonging to the animal kingdom, called the plasmodium malariæ, and in no other way.

In order to develop the disease it is necessary for said organism to reach the blood of the subject, and we know of no way in which this is accomplished except through the bite of a certain variety of mosquito. This method of infection has been established by most interesting and convincing experiments.

Experimenters have lived for long periods of time in notoriously malarial regions, in which it was almost certain for visitors to contract the disease in its worst forms, with no infection resulting.

They lived the same kind of lives, inhabited the same kind of houses, ate the same kind of food and drank the same water as the natives.

The only precaution adopted was to protect themselves from the bites of the mosquitoes.

Experiment has been carried still further by transporting infected mosquitoes to regions where malaria has been unknown, and there allowing them to bite persons who have never suffered with the disease, with the result of the development of the disease in such prsons, and the finding of the plasmodium in their blood.

The very recent developments with regard to the origin of yellow fever is very similar.

This disease was long attributed to emanations from stagnant water, TWENtY-four-Iowa-Health

swamps, to miasm, etc., but these recent investigations seem to prove that this disease also is only conveyed through the bite of another variety of mosquito. Now, these malaria and yellow fever bearing mosquitoes breed in pools or collections of stagnant water, and it is necessary to empty, to drain, to fill such places, in order to get rid of them.

As to high or low ground water, the only relations borne to diseases of this class is to typhoid fever and cholera, and only relation to them through the possible infection of drinking water.

Both unusually high or low ground water may convey to drinking water, especially that drawn from wells, the germs of these diseases which, at ordinary levels of the ground water, would not reach it.

AIR

Air is principally composed of oxygen, nitrogen and carbonic acid. Oxygen is the important constituent for the animal world, and must be present in certain proportion to support life. Carbonic acid is required for vegetable life, and is of no direct use to the animal. Nitrogen is mainly a dilutent and modifies the action of oxygen, though certain plants by the aid of bacteria are able to take it directly from the air and store up for animal use.

Besides these main constituents air contains aqueous vapor, argon, ozone, ammonia, organic matter, salts, etc., besides at different times varying amounts of almost every known substance-gaseous, semi-gaseous, organic, inorganic, etc.

Formerly it was believed that the preventable diseases were caused by bad air—that is, air containing too little oxygen, too much carbonic acid, aqueous vapor and organic matter—by the various gases contaminating the air, especially those arising from decomposition processes of organic matter, by ground air, odors, miasm, etc. We know now that these diseases can be caused through the air only by their specific germs carried in such air. These germs are in the air in connection with other suspended matters, such as dust, sand, soot, pollen of various plants and particles of almost every conceivable thing.

With such sand, dust, etc., they may be blown into the mouth and infect through the digestive tract, may be breathed in and infect through the respiratory tract, may be deposited upon the food or in the drink and infect in that way, may be deposited upon articles or objects which may be handled or used in such ways as to cause infection. Only in some such way, though, can the infection of these diseases be caused through the air.

Of course, too little oxygen may interfere with health, and even cause death; various gases, some arising from decomposition of organic matter, present in great excess, may have an actually poisonous effect upon the system to a greater or lesser degree; but it can be only very exceptionally when these conditions will be serious enough to be important.

Except under those conditions ordinarily efficient ventilation will prevent any ill effects of consequences.

The body has power to accommodate itself to varying amounts of aqueous vapor in the atmosphere, without any interference with its health.

The trace of organic matter practically always found in air, unless infected, is harmless.

Ground air, especially in populated districts, is what may be called "bad" air, and simply requires dilution to make it fit for use.

Bad odors, smells, etc., have no relations whatever with the preventable diseases, and can have but the most transient effects upon the general health. Odors may be unpleasant, and, indeed, may be bad enough to cause some slight and temporary physical disturbances, through reflex action of the nervous system, but they do not and cannot cause disease.

Belief otherwise has been one of the greatest as well as most expensive of our sanitary errors, for though some good has been accomplished indirectly through it, yet that same amount of good could have been accomplished at much less cost had we known the truth.

Hardly a city today but has in its sanitary code a law or ordinance regulating the trade of plumbing.

In this ordinance will be found the strictest provisions as to details of quality and strength of pipe, location, trapping and venting of pipes and fixtures, etc.; its object being, as has been stated, "to prevent illness and death entering a house through the sewer pipe."

Some cities even require a strict examination of all persons desiring to enter upon the trade of plumbing, on the ground that their functions have such vital relations to the public health that only those who have been specially trained and educated should be allowed to do such work. The existence of such laws is simply a survival of the old idea of the preventable diseases originating from filth, filthy water and filthy air. When sanitarians originated and put in force such legislation they meant well, and were only acting up to their lights of that time; but its existence today is entirely unjustifiable, and only inflicts upon the householder an unnecessary hardship and expense.

All such legislation is out of place in the ordinances of health departments. Sufficient provision should be made in the building laws to provide for the proper carrying off of the sewage from houses and for the prevention of the ingress of unpleasant odors from sewers; anything further is superfluous.

The truth is that life and health in our homes are in far more danger from illuminating gas and its piping than from sewer air and plumbing. as sanitarians were responsible, in the first place, in teaching the casual

relations between discase and these different forms of filth, it is incumbent upon them, now that they know better, to disassociate them in the public mind.

The task will not be an easy one, however, for it is an error which has taken deep root.

How far it may carry otherwise intelligent people may be seen by the following illustration:

SPECIMEN ILLUSTRATIVE FACTS

The writer has personal knowledge of a certain sewage disposal plant which has recently been a matter of controversy. Such plant was of the intermittent sand filtration type, was well located upon a suitable soil. and yielded an effluent made by nature's own process, clear, pure and sparkling, better chemically and bacteriologically than the waters into which it flowed.

As a potable water such effluent would have been acceptable upon any table had its source been unknown.

Yet, forsooth, because persons passing along a road, and possibly two or three neighbors, under certain conditions were able to smell certain odors, which they probably could have found quite as often in their own kitchens—that is, the odors of dishwater and boiling cabbage—therefore it must be a menace to the health of the neighborhood and was so presented to the intelligent grand jury of the county in which it is located.

A certain river which has been under much discussion for the last ten years was once as lovely as its name.

Its pure limpid waters, its sloping banks and beauties too many to mention, made it an invaluable possession for any section or community.

It should have been cherished and protected as its most valuable asset. Yet, on account of the growth of towns, the building of factories and the general practice of the accursed doctrine that rivers are natural sewers, and that man, therefore, has the right to cast his filth into them, that river is now an open sewer, its contents a mixture of sewage, manufacturing waste, and a goodly proportion of everything that is vile.

It is discolored and filthy, disgusting to the sight and foul to the smell—a public nuisance if there ever was one, and of far-reaching extent. During these years most laudable efforts have been made to abate this nuisance and to restore, in so far as possible, the river to its pristine condition. Enlisted in this cause have been some of the most intelligent, the most public-spirited, the best citizens of the valley. Governors have written messages, commissions have been appointed and reported, legislative and other hearings and meetings have been held, columns have filled the newspapers, and discussion has never ceased all in the cause. The chief argument advanced, however, whether in writing or speech, why the river should be purified, has ever been its danger to the public health as a possible and even likely cause of an epidemic or pestilence. Now, it would be most interesting to have some of these gentlemen explain just how that might come about. The modus operandi of the conversion of the threat the river has been so long holding over our heads into a real, actual epidemic or pestilence, would be of the most intense scientific interest. Its discoverer would leave a name which would live in history. The writer is, however, obliged to confess with regret inability to win such a prize.

It is true that the river is filthy, but filth does not cause pestilence. Its waters are foul, polluted and infected with typhoid fever at least, but the water-borne diseases—typhoid fever and cholera—could only become epidemic from such a cause through the use of said waters for potable purposes, and no one drinks them.

Even the malaria bearing mosquito is too dainty a bird to breed in such waters, which accounts for the fact that less malaria exists now along said river than was the case thirty years ago, when no such condition of affairs existed. The odors arising from it are not those of "Araby, the Blest." but odors do not cause pestilence.

It is true, of course, that an individual or two by falling into the river and swallowing some of the water, or in some such way, might develop typhoid fever, but an isolated case or two does not constitute an epidemic. Disgusting appearance and smell may, in those unaccustomed, excite certain transitory reflex and psychological disturbances, but TWENty-five—Iowa—Health

habit overcomes these. People live and enjoy the best of health in slaughter houses, rendering establishments, sewers, on sewage farms, etc.; then why not upon the banks of this river?

The writer himself is a living evidence of its possibility, having lived thereon during the last four summers, with no more serious result than a rather excessive expenditure for perfumery.

But perhaps the aforesaid gentlemen are apprehensive of a miracle, or the development of some brand new disease, of which none of us have ever heard before, or possibly they are disciples of that "science" which is founded upon the "principle" that "whatever is believed to be will be."

In all soberness, the condition of the river is such as to call for the application of the proper remedy, but let those engaged in such praiseworthy undertaking base their arguments upon logical grounds, and not appeal to the ignorant in the name of a mistaken and misunderstood science. Their cause can better be advanced by basing it upon grounds of public decency, public morality and public economy than upon what in this day and age can only make such cause ridiculous.

THE EABTH AND CERTAIN TELLURIC CONDITIONS

Upon this point there is hardly space or necessity for speaking, as practically all the theories based upon it were due to superstition or ignorance.

Now, if filth, filthy water, filthy air and telluric conditions have such slight relations to true sanitary science, and if the preventable diseases, the limitation of which is the chief aim of public sanitation, are due entirely to certain specific organisms, the presence of which are necessary for their development, what then are the most important means by which it is possible to so limit such diseases?

Briefly these means are as follows (these diseases will be spoken of as a class, and the chief general means given first; special means pertaining to individual diseases later);

1. A health department, with the necessary powers granted it by law, properly organized and equipped, and with a personnel properly educated and trained in scientific sanitary work.

As sanitation is now a more exact science, and as its methods and means of use have become and are becoming more exact and scientific, it is but reasonable to require of those engaged in its work not only a thorough understanding of those means, but also a scientific application of those means and methods.

2. Notification. In order to put into effect the measures necessary the health authorities must be promptly notified of the existence of preventable disease.

 Every case of preventable disease is a focus for the development and distribution of the specific germs of that disease.

As long as such distribution is allowed to continue such case is a danger to the public health by making is possible for the development of new cases through infection from it, which in turn become new foci of development and distribution.

In order to prevent this danger, therefore, it is necessary to isolate such case so that just as few persons as possible shall be exposed to infection from it. This is best done by removal to a properly constructed and conducted isolation hospital. If this is impossible, then the best attempt possible must be made to isolate in the patient's own home. But true sanitary science, however, can allow no excuse for the lack of such an essential as the hospital.

4. Disinfection. When the patient is removed and isolated properly practically all direct danger to the public health from, such patient ceases. An indirect danger, however, remains in the infected premises from which the patient has been removed.

Disinfection, then, is the process of destroying such infection by the destruction of the disease germs there existing.

This is accomplished by the proper use of certain chemical substances—gaseous and otherwise—by properly trained officers, by heat and by sunlight, nature's own disinfectant. Any intelligent person can understand how important a link in the chain of prevention this process must be, and how vitally important its proper administration. Too often, however, it is intrusted to one whose training possibly has made capable of distinguishing a pile of filth or an unpleasant odor, but who has no true conception of the cause of the disease, how it is possible to destroy it, and the means to be employed. In such hands it is more a ceremony of incantation than a scientific process.

5. Observation. After disinfecting the next step is to keep under trained observation those persons who have been exposed to infection,

either through patient or premises. The object of this is to isolate any such person who shall show symptoms of the development of such infection promptly, and with the minimum of exposure to others.

SPECIAL MEANS PERTAINING TO INDIVIDUAL DISEASES

 Smallpox In this disease we have a special means of protection and prevention, which is practically perfect—vaccination.

No person efficiently protected by vaccination will contract smallpox, and even if such protection be not efficient enough to prevent the disease entirely, it will at least modify it to a greater or less extent, according to the degree of efficiency existing.

All that is necessary, then, to extirpate this disease from the world is the efficient vaccination of its population.

As this has so far been found impracticable, then in every case of the disease at least, besides the general measurs above alluded to, it is essential to protect by vaccination all those exposed or likely to become so.

2. Typhoid fever and cholera The chief danger of infection in these diseases is from the discharges of the bowels, and of the kidneys in typhoid fever.

The germs of these diseases must be swallowed in order to produce the diseases. If these discharges are not properly cared for the germs may obtain access to the drinking water through sewage or drainage, or by domestic use of such water, or by carriage by flies, or by deposition when dried, in connection with dust, may infect other drink or food.

The two important measures, then, in the protection of the public health with reference to these diseases are the proper disinfection of the discharges of all patients suffering from them and the safeguarding of the water supply. Probably at least ninety-five per cent of all cases of these diseases come directly or indirectly from infected water used for drinking or domestic purposes. It thus appears how vitally important it is that water so used should not be infected.

The source of supply should either be such as cannot be so infected or if already infected or likely to become so its waters should be subjected to some process of purification which would remove or destroy the germs of these diseases, if present.

3. Tuberculosis The danger of infection in this disease is contained chiefly in the sputum of those afflicted. If this is distributed around promiscuously it becomes dry, and the germs which cause the disease, and which, unlike many others, are not destroyed by desiccation, become associated with the dust and other suspended matters in the air, and are breathed in through the respiratory tract, or taken in through the digestive tract, or deposited in food or drink, or deposited upon articles which are handled, etc.

The only special measure of protection necessary in this disease is the proper disinfection or destruction of the sputum; the only general measure the prevention of dust.

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4. Malaria and yellow fever The only source of infection in these diseases known to us being the mosquito, all our preventive measures should be directed against him. The most effective are the destruction of the mosquito, the removal of his breeding places by drainage or filling, and the prevention of his infection by making his access to patients suffering with these diseases impossible.

SUMMARY

1. Sanitary science is based upon, and its results are due to, attempts to suppress or to limit the spread of preventable disease.

2. It was formerly generally believed, and is still believed by many, that these diseases were directly or indirectly caused by filth, filthy water, filthy air and certain telluric conditions.

 It is known today that they are caused by certain minute organisms belonging to either the vegetable or animal kingdoms, and in no other way.

4. The relations between these disease organisms and filth, filthy water and filthy air are no closer than to organic matter, which is not and cannot be regarded as filth, and to what is considered to be pure water and pure air. Between them and the vague telluric conditions alluded to we know of no relations whatever.

5. Warfare waged against filth, filthy water and filthy air is not sufficient to protect the public health from preventable diseases, and is only incidentally of any benefit.

6. The suppression and limitation of spread of these diseases require the scientific application of certain definite procedures to each case and its cause.

In conclusion, it is the hope of the writer that nothing said above may seem in any way to disparage warfare against filth or to minimize its importance. Cleanliness, public and private, is demanded for moral, mental and physical reasons, which are strong enough in themselves not to require any false aid. Its cause cannot be injured by the truth being known and falsehood dispelled.

On the other hand, the truth will greatly benefit and strengthen sanitary science. Its cause has always been weakened in the minds of the more intelligent and has failed to secure all the support it should have, because its theories so disagreed with the teachings of experience.

Now, with knowledge of the facts pertaining to each, let both causes advance, each striving in its own sphere for the betterment of mankind.

XI

PUBLIC WATER AND ICE SUPPLIES AND DISPOSAL OF SEWAGE*

BY DR. L. H. PAMMEL, IOWA STATE COLLEGE

Mr. President and Gentlemen of the Iowa Engineering Society:--When Prof. Marston asked me to prepare a paper for your society I consented to do so because it is a pleasure to address a body who next to the physicians and veterinarians are more deeply interested in problems of sanitary science than men of any other profession or business. You are called upon to deal with those municipal problems that are of vital importance to every community. Many of our State Boards of Health have on more than one occasion called attention to the bad water supplied to many of our cities and villages. Attention has been called, and by our own board of health, to the almost entire lack of sewage disposal in the hundreds of small towns in our own State.

Let us review briefly some of the leading facts on the subject of bacteriology and its relation to our subject. Thirty-five years ago there was a wide-spread belief that fermentation was a purely chemical process, that organic substances undergoing decay could cause the decomposition of other organic matter. It was on this theory that Liebig explained the fermentation of sugar into alcohol; it was not the living yeast cells that produced or set in motion the process of fermentation: it was the dead yeast undergoing decomposition. It was due largely to the brilliant researches of Pasteur that this theory was exploded and fermentation shown to be due to living organisms. The modern chemical conception of fermentation has resolved itself into some of the most complicated of chemical problems. Researches along the lines of chemicobacteriology have shown that as a matter of fact the various organisms produce complicated chemical substances classified as enzymes, ptomaines and tox-albumins, while the living animal cells produce leucomaines. Not only are these products given off, but they are contained in the living cell.

•This paper was presented in part at the annual meeting of the Iowa Engineering Society at their meeting in Ames, January, 1903.

The subject of bacteriology has become so important in modern medicine that no physician can claim recognition as an authority on zymotic diseases unless he treats it from the standpoint of the modern advancement in this, one of the newest of the sciences; nor can the sanitarian or engineer claim to be an authority on questions of this kind unless he considers the facts of bacteriology with reference to the profession of sanitary engineering. The author who ignores the facts of bacteriology can no longer find place as an authority in the library of a physician or an engineer. Facts are being established so rapidly, however, that even the best of works soon become obsolete. The whole subject of chemico-bacteriology in recent years has put an entirely new aspect on questions relating to disease. Facts that were supposed to be established ten years ago are interpreted very differently today. Says Prof. Conn, in his book on "Agricultural Bacteriology:" "The great host of chemical changes which occur in organic material under the action of bacteria must be left for the future to describe and explain." The chemical changes may be grouped under two heads: I. Synthetical process Anabolism. These consist in the building of complex bodies out of simpler ones. II. Analytical processes, Katabolism-reducing to simpler compounds the organic matter. The substances produced by decomposition are indefinite in number. The ptomaines are in the nature of excretions. Vaughn and Novy, in their excellent treatise, "Ptomaines and Leucomaines," have discussed quite fully the newest chemical phases of this subject.

But let us go back a moment to the relations of bacteria to disease. Dr. Baumgarten, the famous German pathologist, says: "In a study of diseases the actiology must not be considered by itself, when in this case we are dealing with organic beings—bacteria and animal life, which bear certain relations to each other. The success in treatment cannot be controlled by a single factor."

Patrick Goddes, in that most charming of books, "Chapters in Modern Botany, says:

"Most important, however, is the fact expressed in the germ theory that bacteria are constantly and intimately associated with some of the most fatal of human diseases, such as consumption, diphtheria, smallpox, or typhoid, malaria or leprosy. Bacteria, in fact, will kill most of us." DeBary says:

"It is not necessary to enlarge upon the manifold interest attached to these organisms at a time when the statement urged daily on the educated public does not fall short of saying that a large part of all health and disease in the world is dependent on bacteria."

WHOLESOME AND PURE WATER

Says John C. Thresh, in the preface to "Water and Water Supplies:" "It is now fully recognized that an abundant supply of pure water is an absolute necessity for the preservation of health, and that one of

*Lehrbuch der Pathologischen Mykologie Vorlesungen für Aerzte und Studirende. pp. 973, with 108 fig. Harald Brauhm. Braunuschweig 1890, see p. VII. the chief duties of all sanitary authorities is to see that all the inhabitants of their districts have, within a reasonable distance, an available supply of wholesome water wherever such can be obtained at a reasonable cost."

So long as the old ways of looking at the nature of contagious diseases was in vogue little could be expected, since it was before the invention of the cotton air filter by Schroeder and Von Dusch (1854) methods of sterilization, used by Schwann and others of his time and perfected by Pasteur, Koch and modern investigators, the use of analine dyes to stain bacteria, the introduction of culture media by Cohn. Pasteur, Brefeld, Schroeter and the plate method of separating germs first used by Koch; these landmarks have, in a large measure, helped to give us a clear understanding and knowledge of the contagious nature of diseases.

ANTHRAX AND OTHER GERMS CARRIED BY WATER

We have seen that several authors believed that diseases like anthrax and cholera were supposed to be carried by specific organisms. In some cases, as in anthrax. Davaine had observed in 1850 that the blood of anthrax animals contained stiff rods of the anthrax bacillus. Pollender observed the same rods in 1849. In 1863 and 1864 Davaine presented to the French Academy the results of his inoculation experiments with the blood of diseased animals. It was also shown as early as 1865 that sputum taken from tubercular patients would produce tuberculosis. As yet, however, the evidence was not conclusive. In 1877 Koch published the results of his work on this disease, in which he showed conclusively that this special bacillus, which he had isolated from diseased animals and cultivated outside of the animal body, produced typical anthrax: that in the animal only the vegetative condition occurred, but when the animal dies these rods produce spores; that infection in cattle and sheep commonly results from the taking up of spores while grazing in an infected pasture. The organism thus leads a dual life, one in the animal and one in the soil.

In pure cultures spores are readily formed and these retain their vitality for a long time. The writer has found that these, when kept in silk threads, retain their vitality for at least six years. We mention this disease in particular, as it shows what rules must be followed in bacteriological research. The classic canons of Koch must ever be observed, and these are, first, the constant presence of the germ with the disease; second, isolation and cultivation of the germ; third, successful inoculation with the germ isolated and followed by the same disease; fourth, this germ must be the same as in the original diseased animals.

We shall in a moment discuss the chief organisms that occur in water, and the diseases they produce. Water may be responsible for carrying more diseases than typhoid fever, Asiatic cholera, hog cholera and others of that class. Incidentally 't may convey other diseases. Glanders, a well known disease in horses, and also occurring in man, is known to have been conveyed through a trough, very much in the same way


as diphtheria has been spread by the use of drinking vessels containing the organism. Tuberculosis and other diseases of that character are distributed in the same way. It has also been suggested that Actinomycosis, or lumpy jaw, may be communicated in the same manner by means of pools of water. It is a well known fact that the intestinal disease, hog cholera, is caused by lrinking contaminated water. It is stated by some authorities that the organism of hog cholera may live in water, and even multiply. Hence it is that polluted streams have conveyed the disease to farms along the water courses. Even should the germs themselves not be conveyed there can be no doubt that the products of bacteria conveyed in water may be injurious to animals and even man. I shall treat of this subject a little later.

During the past season the following interesting fact bearing on this question came to my notice. An epidemic of anthrax occurred in the vicinity of LaCrosse, Wisconsin, which threatened the cattle of an entire valley, wherever they came in proximity to the water from a polluted stream. Dr. Russell, of the University of Wisconsin, who investigated the outbreak in question, found that some four years ago an animal died rather mysteriously, and from the evidence at hand he concluded that it had died of anthrax. A veterinarian was not called to diagnose the case. The animal was buried several feet under ground in close proximity to a small run. The heavy rains of the last season washed the earth from the remains, and the spores formed in the carcass of the animal floated off, down the stream and infected the entire valley, causing a very serious outbreak among the cattle and endangering the lives of the inhabitants of the valley.

Mr. Thresh, in "Water Supplies," makes the following statement:

"In America, where a considerable amount of attention has been paid to the dissemination of diseases amongst cattle by impure drinking water, many outbreaks of anthrax, hog cholera, glanders and other diseases have been recorded which competent observers attributed to this cause. On one station the carcass of an animal which had died of anthrax was cast into a tank or pond from which about one thousand head of cattle were supplied with water. Within a very short time ten per cent of these died of anthrax. Some years ago, when wool sorters disease appeared amongst the operatives at a woollen factory in Yorkshire, a number of cattle grazing in a meadow through which flowed a stream receiving the waste water from the mill were also attacked. In 1893 many cattle on a farm in South Russia died of anthrax, and the bacilli were found in the water used, coming from a well. Professor P. Frankland has shown that under certain conditions the anthrax bacillus forms spores in water, and that these spores retain their vitality for a considerable period, under such conditions."

Asiatic cholera is a disease which for centuries has carried away thousands of human lives every year, and is certainly worthy of the deepest and most profound studies of physicians and bacteriologists. That the disease is contagious in its nature has long been recognized. The distinguished investigator, von Pettenkofer, long worked in vain for the specific cause. His work on the spread and distribution of the disease is a most important contribution to the literature on the subject, especially his researches on the relation of ground water and the "drying zone" to cholera epidemics. The splendid achievements of Robert Koch, who was sent by the German government to study cholera in Egypt and India have made his name famous. On this mission he demonstrated a specific micro-organism which he called the comma bacillus, but which belongs to the spiral forms and is known as the Spirillum choleraasiaticae. This germ was found in the dejecta of patients suffering from this disease, in cess pools and water which received the dejecta, in milk etc. It was not as easy to convince scientists and physicians that the germ found by Koch was the cause of Asiatic cholera, since Finkler and Pryor found a germ in cholera nostras which appeared to be identical, and Deneke found apparently the same germ in old cheese.

Miller found a comma bacillus in the human mouth: moreover, Klein, an eminent English authority, claimed that Koch's material germ was entirely harmless. The evidence of a specific germ in this disease is conclusive. This has been shown in the laboratory and by the accidental innoculation of a young physician in Koch's laboratory in Berlin with this germ, who became sick and had the symptoms of genuine cholera. The experiments of Ferran, Koch, Gamalea and others with Guinea pigs leave no doubt as to the casual connection of the organism and Asiatic cholera. It is generally recognized now as the cause of the disease. There are many apparent anomalies, as shown in the distribution of cholera, and Pettenkofer's theory of "ground water," which are fully set forth in Dr. Shakespeare's splendid monograph on cholera. If the contagious nature of the disease and the biological questions are taken into account, these conditions can be accounted for. The history and spread of this disease all show how important it is to take heed of sanitary conditions. It shows that the disease spreads most rapidly where effluvia and excreta contaminate the water; food, too, may be an important item in its spread. That old habit of using the sewage to sprinkle over vegetables in some countries, or the use of night soil for growing vegetables is an extremely dangerous thing.

HOW WATER SHOULD BE EXAMINED

There are two ways in which water may be examined: First, microscopically; second, cultures. The former was the method chiefly in vogue before the Koch system of cultivating germs was used. This method was employed by Cohn and Radelkofer in making examinations in Breslau and Munich. The bacterial examination of water requires cultures, and this is a very important part of the work. But I do not believe that cultural examination is sufficient for this work. The Massachusetts State Board of Health employed Dr. Sedgewick, a well known authority on biological research, to make a biological study of the sewage and drinking water of Massachusetts. A new method was introduced as the combined work of Kean, Sedgewick and Rafter, which makes it a comparatively easy matter to determine approximately the microscopic organism.

A study of the microscopical organisms of water dates back to the beginning of the study of bacteria by Leeuuenhoek, who in 1675 was a devoted student of the micr-organisms in water, although George Chandler Whipple, in his "Microscopy of Drinking Water," states that Hook in 1665 was pioneer in the study of these microscopic organisms. He was followed by such investigators as Ray, 1725. Hudson, 1762, Muel-



Bacteria found in one-tenth cubic centimeter of well water.

ler, 1773, Dillwin, 1809, Kuetzing, 1834, Ehrenberg, 1836, DuJardin, 1841. and Stein, 1849. Hulwa in 1879 emphasized the importance of making a microscopical examination of water. Nor can I omit in this connection the important researches of Dr. W. G. Farlow*on Boston water supply. and those of Dr. Wm. Trelease on the organisms found in the lakes at Madison, Wisconsin, and the work by Arthuit on the organisms found in the water of this State and Minnesota, but for a more extended account of the literature I must refer to the book by Whipple.

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A complete sanitary examination of the water in a laboratory consists of a biological, physical and chemical. In the biological examination we determine under the head of microscopical, the number of organ isms per c. c., and also the amount of inorganic amorphous matter, under the head of bacteria the number to the c. c. noting especially the presence of intestinal or pathogenic bacteria. In a microscopic study of water we are dealing with both plants and animals but I am not concerned in this paper with the subject of animals. The different plants found may be grouped as follows: Diatoms, Green Algae, Blue Green Algae and Fungi. In regard to the plants it may be of interest here to state that there is a seasonable distribution. Mr. Whipple, who has given the subject a great deal of attention, states in reference to the seasonal variation in the species of these organisms in lakes.

"If the lake is a typical one the water during the winter will contain comparatively few organisms; in the spring various diatoms will appear; these will disappear in a few weeks and in their place will come the green algae; at the same time the blue green algae may be found; in the fall both of these will vanish and the diatoms will develop again; as the lake freezes these in turn will disappear." Those who are interested in this subject will find the facts brought together in excellent shape by this author.

ORGANISMS OF WATER

The subject of bacteriological analysis of water has been investigated by a large number of different persons. It is worthy, however, of all the consideration that has been given it. The subject is discussed very fully in an admirable work by the Franklands, "Micro-organisms in Water," and a large number of text-books dealing with the subject of bacteriology give more or less prominence to this question. A knowledge of the bacteria present in water is therefore of prime importance. While it is true that the common putrefactive species may in themselves be dangerous only as they give off the products of decomposition, yet there are certain species, while commonly not disease producers in man, like B. Coli communis, are nevertheless pathogenic under some conditions. Moreover, they are found in human and lower animal dejecta. The presence of such a species is a sign of sewage contamination. It is a well known fact that there are several common species in the soil that are closely allied to the B. coli communis, the bacillus common in the intestinal tract of man, so that the subject of bacteriological analysis of water is confronted with great difficulties.

BACTERIA OF THE SOIL

And right here, before I take up the question of organism in the water, it is proper to refer to those that are common in the soil. Miquel, the celebrated French investigator, states that there exists in a gram of ordinary soil at Mantsouris 750,000 bacteria, in the Rue de Rennes 1,300,000, and in the Rue de

^{*}Bull. Bussey Inst. 1877, on Some Impurities of Drinking Water Caused by Vegetable

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Monge 2,100,000. These soil bacteria are of the greatest importance in the economy of nature. It has been well said that while bacteria cause much misery in the world they are our great benefactors. Without them there would hardly be any rot or decay. Our beautiful landscapes could not exist. The earth garnished with the bloom of flowers, the green herbs, its magnificent forests, our cereals and food plants would not have the material from which to build up their fabric, except for these tiny plants. The nitrogen so essential for all living plants is only made ready for the use of plants by these wonderful micro-organisms.

NITEIFICATION

In the disposition of sewage the question of nitrification is a most important one. Suffice it to say in this connection that there are two distinctive processes concerned in nitrification. On the one hand the complex nitrogeneous substances are converted into ammonia, and on the other the ammonia is converted into nitric acid. Each of these processes is brought about by the action of specific micro-organisms. In addition to the process of nitrification we know from experimental research that denitrification may also occur. That is, the nitrates may be reduced to nitrites. We have found in our laboratory that a half dozen common putrefactive species are capable of reducing nitric acid. The whole subject is so important that is can only be discussed by going into the subject exhaustively. We must therefore be content with the skeleton outline of the subject given here. For a more extended account we must refer you to the admirable researches of Warrington and to the copious literature on the subject that has been issued during the last few years in bacteriological journals. To return again to the subject of water, a few facts may be given, more especially such facts as pertain to our own water.

NUMBER OF BACTERIA IN WATER

We would have you observe at the outset that there is a wide difference in the bacterial contents of waters. Dr. Gruber sets the maximum number of bacteria to be found in spring water from forty to fifty, in well water from 300 to 500 per c. c. Fraenkel states that good drinking water should not have more than fifty germs per c. c. Many bacteriologists place the limit at 1,000 germs per c. c. It is stated that the water taken from the Croton reservoir, New York, contained from 5,000 to 15,000 germs per c. c. Water taken from the Munich supply contained from 305 to 12,606 germs per c. c. Fraenkel estimated the number of germs in the water supply of Berlin at 6,140, while below the city there was a great increase, the number being 243,000 per c. c. The Kiel water supply, according to Breuning, has from 62 to 1,712 germs per c. c., the number of liquefying species varying from 4 to 188. Wells in the same city had more than 26,000. The following instructive table, given by Rosenberg, shows the condition of the water above and below the city of Wurzburg:

Above	5																					E	Below	
520.		8	e		4	*		•			ĸ	N	÷	•	-			r,	ŝ	ir.			15,500	
720.		÷			3 8 02		×	N				 •		- 45	×	s	(k)	×	×		1953	.1	18,000	
680.			×	×		÷	4		3	e.		÷	×		12	ų.	12		v	n a	12	1	22,000	

Percy Frankland has given the germ content of the rivers Ure and Ouse as follows:

Upper	portion	of	the	Ure	.1,800
Sixteen	miles	abc	ve	York	33,400
Opposi	te York				. 31,200

The Massachusetts State Board of Health gives the following facts in regard to the change in the bacterial content of the water at various points between the cities of Lowell and Lawrence, on the Merrimack river. The number varied from 24,300 to 1,600 in one test, and in another from 42,000 to 1,300. In a run of nine miles above the pumping station of Lawrence the bacterial content decreased from 39,200 to 1,400.

RIVER WATERS

Dr. J. H. Long reports the number of bacteria in the waters of the Illinois river at different points, and as affected by the drainage canal. These results were obtained in the latter part of August, 1899:

Joliet	Canal		an e la lar e			199,200
Morris						55,800
LaSalle					6 (600) 6 (600) 6 (6 (60)	1,400
Ottawa				ومدلاء بدو		3,200
Henry	8					2;700
Peoria					2 12 ¹² 2 4 14 14 14 14 14 14 14 14 14 14 14 14 1	3,960
Lower	Peoria					43,200
Pekin'.		lation e as				52,500
Havan	1		*****		n in n Na sang sistema a	1,800
Grafton	, Illinois	s Rive	r			6,500
Graftor	i, Missis	sippi	River			10,450

You will notice here the continued decrease from the Joliet canal to LaSalle, the increase at Peoria and decrease to the Mississippi river.

In our own State there has not been a great deal of this kind of work done. Following are some of the results. First, an examination of the water of the Mississippi river near La Crosse, Wisconsin, showed the presence of about 3,000 bacteria per c. c., May 10, 1893. D. W. Day investigated the bacterial content of the waters of Squaw Creek during the floods of the past summer. The estimates were made during the first two weeks in July, 1902. The number varied at different stages of the flood from 600 to

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nearly 30,000, during the first week, and from 40,000 to 5,000 during the second week

F. W. Faurot in 1904 recorded the number of bacteria present in the waters of Squaw Creek and Skunk River as follows;

Skunk River	Squaw Creek
April 30	May 19
May (July 2
May 19	Aug. 8
May 13	Aug. 8
outy 0.1.1.1.1.1.1.1.1.1.1.27,000	Oct. 4 2.400

Our own tests of the water of the Iowa River at Marshalltown, Iowa, just above the first sewer outlet, shows the bacteriological content of the water to be 93,960 per c. c., and just above the main sewage outlet 666,000. Evidently the water is highly charged with bacteria,

BACTERIA OF WELL WATERS

There is a very wide difference in the number of bacteria in different well waters. Pure spring water should contain relatively few bacteria, since the chances for contamination are so small. Libbertz found no germs in the water from springs of Frankfort-on-Main, while in other cases from the same spring he obtained from fifty to sixty bacteria per c. c. Furbinger found from thirty-two to 156 in a c. c. from Jena, and in Zurich Cramer found from nine to 3,425. In the Uintah mountains of Utah a number of springs were tested by a member of our botanical party. In one case there were no bacteria present, in the other only fifty per c. c. Our own college spring has been investigated at different times. In 1892 Messrs. McCall and Patton found from fifty-six to 320 germs per c. c. Tests in 1891 showed from fifty to 300. Dr. W. T. Sedgwick investigated the bacterial contents of a number of springs in Southern New Hampshire. The results were very constant, running from seventy-two to 218.

Naturally we find great variation in the bacterial content of wells. It will not be necessary in this connection to refer to studies of European wells, but it may be of interest to quote a few figures from the data furnished by Dr. Sedgwick and Mr. Prescott. Various wells yielded results varying from 140 to 602. They also record results from a number of deep tubular wells. The number was very small, varying from fifty in one case up to about 300, average number about 250. The water from the deep well here at the college has a bacterial content that varies from about fifty to 250, though a few times a little higher.

The average of six samples is about 276.

A number of analyses of the bacterial content of the various wells near the college have been made. Some of the results are as follows. They were made in 1901. Averages are given of several tests:

Owing to the large amount of surface water present in the wells this last season, many of the wells were again investigated, and almost invariably the number of bacteria was very much larger. Following are the results:

Paxton w	ell	
Jas. Robb	well	
Pammel	well	

One of the most important of pending questions in the state today is the supply of good water and the proper disposal of sewage for the farmer and for the small villages. For the small towns some such disposal system as is in operation here at the college, or the one planned by Professor



Marston for the town of Grinnell. We urge upon every community the necessity of taking steps to inaugurate a sewage disposal system and a common deep well supply of water.

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During the spring two suspicious cases of typhoid fever were found in one of the college club houses and I was requested by Dr. Harriman, the college physician, to make a bacteriological examination, to detect if possible the presence of intestinal bacteria. Under my direction Miss Elva Barton, doing special work in bacteriology, made an examination of the well with the following results:-

LABORATORY RESULTS

The water collected for analysis was taken directly from the well, in most instances, into sterile test tubes. Two sets of plates were poured from water taken from tap in like manner. Three samples were used each time.

No. 1 directly from well. No. 2 after pumping ten minutes. No. 3 after pumping twenty minutes. Agar plates were poured February 2.

		First	count	Feb. 4.	Second count Feb. 9	Third count Feb. 14.
No.	1	75	germs	per cc	6,950 germs per cc.	11,700 germs per cc.
No.	2	720	germs	per cc.	8,750 germs per cc.	9,300 germs per cc.
No.	3	1,000	germs	per cc.	2,750 germs per cc.	5,700 germs per cc.

Fermentation tubes containing 5 per cent solution of glucose bullion were inoculated with 1 c. c. and when gas formation was complete it was measured by method given in Moore's Laboratory Guide—with following results:

- No. 1 produced 4.3 cc gas.
- No. 2 Produced 9.5 cc gas.
- No. 3 produced 3.3 cc gas.
- The percentage of CO2 determined was:
- No. 1 28.6 per cent.
- No. 2 23.3 per cent.
- No. 3 43.8 per cent.

The remainder of the gas was H.

As percentages varied so greatly no definite conclusions could be

drawn as to possibility of presence of B. Coli Communis, the proportion given for that germ being 40 per cent.

Plates poured March 4.

Counted after three days. No. 13,600 germs per cc. No. 21,460 germs per cc. No. 31.170 germs per cc.

Counted after serven days. No. 1.....10,500 germs per cc. No. 2..... 4,500 germs per cc. No. 3..... 2,700 germs per cc.

Plates poured March 17 (after four days.)

Plates poured March 27. Counted third day.

No. 1750 germs per cc. No. 2430 germs per cc. No. 3320 germs per cc. Counted eighth day. No. 12,400 germs per cc. No. 21,700 germs per cc. No. 3 920 germs per cc. April 2. Samples were collected as usual, but stood in a warm place for 48 hours before plates were poured. The colonies were too numerous to estimate—showing very rapid increase, especially of nonchromogenic species.

Plates poured April 8th. These samples were taken from the tap instead of directly from pump—and poured immediately.

First count April 12. Second count April 15. Third count April 20No. 1......1,540 germs per cc5,300 germs per cc19,300 germs per ccNo. 2.....1,480 germs per cc3,100 germs per cc15,400 germs per ccNo. 3.....1,100 germs per cc2,700 germs per cc

Large whitish colonies developed the second day—by fifth day they were quite numerous.

Plate No. 2 (containing one-tenth cc of the water), 208 chromogenic colonies of one species.

Fifty-nine non-chromogenic remainder very small chromogenes of probably not more than four species.

Plate No. 1 (.1 cc water used) 270 non-chromegenic colonies remainder chromogenes of few varieties—small orange-colored colonies predominating.

Plates poured May 5th. Samples taken dirctly from pump. Count after 12 days.

No. 1 18,700 germs per cc.

No. 2 15,900 germs per cc.

No. 3 9,500 germs per cc.

Plate No. 1 contained 140 non-chromogenic bacteria; No. 2, 210 nonchromogenes; No. 3, 110 non-chromogenes.

Small colonies the prevailing type.

These colonies in depth are spherical or oblong—on the surface they are flattened—some quite large— $\frac{1}{8}$ inch in diameter, the older growths showing white fringed edges.

Morphologically—a bacillus from 1.5 to 1.8 u long—and two or three times as thick, occurs singly or in twos and are not motile.

Stab culture on agar develops large, irregular surface growth, old cultures shading in deep reddish orange. Looks like a mixed culture, but is found to be quite a constant characteristic. Growth along needle track not market. On gelatine the growth is not so profuse, but pigment extends along the needle track. Does not liquify. Corresponds very closely to Bacillus aurantiacus, except that motility was not observed. May be identical with the Orange-red water Bacillus. Bacillus liquefaciens—fluor escens and Sarcina lutea were quite positively determined, also pink yeast, Saccharmyces glutinosa.

While some germs found have many characteristics of B. Coli communis and B. Cloacea neither were positively identified. In conclusion, while the number of germs found to be present in the water would argue great impurity, the species identified are those common to water, and not pathogenic. Quantitatively the number of germs per c. c. exceeds greatly the number given by any bacteriologists that may be present in No. 21



drinking water. Quantitatively the gas producing germ indicates possibility of presence of harmful organisms—though many bacteria of soil produce gas.

BACTERIA IN FILTERED AND UNFILTERED WATER

Mr. DeLa Sheldon, another special student in bacteriology, has made an investigation of the number of bacteria found in filtered and unfiltered water. This is a question of direct value to the creamerymen in the state. The results of his work are here appended.

"As a matter of interest the writer determined the efficiency of a water-filter designed by the dairy department and placed in their plant for trial. At first this filter proved unsatisfactory, but after allowing the water to run for one week it worked admirably. Out of the last ten plates which have been set the resulting number of bacteria found per c. c. ranges from one to twenty.

"A curious fact about the filter is that the water must run constantly if efficient work is done. If the flow of water be allowed to cease for a time the bacterial content of the water (when the flow is started) is greater than the original content of the water. "However, it is apparent that from 300 to 400 bacteria per c, c can be removed by this process,—and in some cases the entire bacterial content of the water was removed. Since this can and has been done it is probable such filters can be used to advantage in filtering water taken from lakes and springs for the public supply.

"In conclusion, would say that the results of these investigations make manifest the need of great care being exercised in so far as the public water supply is concerned. Further, the bacteriologist and sanitarian should proceed to inaugurate movements which will speedily result in the proper precautionary measures being taken to guard safely the public health."

THE BACTERIA OF ICE

Several complaints were made the present spring with reference to the bacterial contents of ice. We therefore undertook, with the co-operation of the senior students in bacteriology, an investigation of the various forms of bacteria found in ice taken from some inland waters of the state.

Quite a number of investigations have been carried on in this country, as well as in Europe. The most elaborate of the early investigations were those carried on by Frankel. Frankel examined the ice supplied by one of the ice companies of Berlin and derived from one of the lakes situated above Berlin. this lake forming an expansion of the river Spree. Examinations were made from February, 1886, until the middle of April. The bacteria found present varied from twenty-one to as many as 8,800. Later Heyroth made an extensive investigation of ice supplied to various places in Berlin. His table is quite instructive.

Zeit. f. Hygiene. 1: 302. Franklands Micro-organisms of Water. 8^e. 158

Bacteria Contents of Ice (Heyroth)

Day of	Investigation Origin of Ice Number of Bacteria
	in 1 c. c.
19, 9.85	Plotzen Lake
5.10.85	Plotzen Lake 4,900
12,10,85	Plotzen Lake 121
19. 9.85	Rummelsburger Lake and waters near Kopernick 425
5,10.85	Rummelsburger Lake and waters near Kopernick 210
12.10.85	Rummelsburger Lake and waters near Kopernick 1,150
12.10.85	Kaiser-bassin at the Navigation Canal. Spandan 634
12.10.85	Pond at Reinickendorf
15. 5.86	Plotzen Lake 1,835
17. 5.86	River Spree at Treptow 171
17. 5.86	River Spree at Treptow
17. 5.86	River Spree at Treptow 1.780
18. 5.86	Peaty pond-water from Lichtenberg Meadow
26. 5.86	Peaty pond-water from Lichtenberg Meadow
15. 6.86	Flaken Lake at Erkner 448
15. 6.86	Peaty pond-water at Rummelsburg
15. 6.86	Pond-water at Temperhof 1.510
15. 6.86	Peat-meadows at Rixdorf 2.040
15. 6.86	Lichtenberg Meadow and Lichtenberg Lake
29. 6.86	Lake Reinickendorf
29. 6.86	Weissen Lake
29. 6.86	Rummelsburg Lake and waters near Kopernick. 765
29. 6.86	Pond-water (situation not specified)

The Tourin ice, according to Bordoni Uffreduzzi, varied considerably, the river water contained innumerable micro-organisms, while the ice derived from the same water contained on an average 580 germs per c. c., and the ice generally contains 90 per cent less organisms than the river water.

Dr. Sedgwick, who has given considerable attention to the subject of the bacteria of ice and the micro-organisms found in ice, says as follows:

"From these various considerations we may conclude that the answer to the question, 'Does water purify itself in freezing?' depends largely upon the conditions under which it is frozen. If ice is formed upon a quiet lake or pond of considerable depth the water of the pond probably does purify itself to a marked degree in freezing. But if, on the other hand, the freezing takes place in such a way that sedimentation has little influence, or if an entire mass of water is frozen solid, purification may be much less marked or even largely wanting.

"In spite of the fact that ice may contain very considerable numbers of bacteria, and that it has hitherto been regarded as a dangerous vehicle of disease, only a surprisingly small number of epidemics have been

Die biologische Untersuchung des Eelses. Centralblatt fur Bakteriologie. 2. 489. Principles of Sanitary Science and Public Health. 253-5. See Annual Report Massachusetts State Board of Health. 1900. 32: 510 and 21: 145.

charged to infected ice; and a careful examination of the reports of these leaves upon the student the impression that the dangers of polluted ice have probably been exaggerated.

"The first epidemic attributed to infected ice, and carefully investigated, occurred at a summer resort known as Rye Beach, New Hampshire, in 1875. The illness in question a severe intestinal disorderwas confined to the guests of one of the large hotels. The milk supply, the water supply and the drainage appeared to be above suspicion; but the ice supply had been derived from a small pond, the waters of which were rendered foul by a mass of putrescent matter composed of a mixture of marsh mud and decomposing sawdust. Chemical analysis of the water from the pond and of the ice showed the presence of high total organic matter and high ammonias, both free and albuminoid. The inference was that the disease had somehow come from the ice. In 1878 Dr. Charles Smart, surgeon United States Army, attributed certain cases of 'malarial remittent' fever in a Rocky Mountain army post to the contamination of mountain streams by melting snow."

Dr. Prudden, the eminent New York bacteriologist, has likewise investigated the subject of ice and infection from typhoid fever. The ice supply of New York City in 1888 was largely derived from the Hudson river, a stream highly polluted by sewage from Albany, Troy and other places. "Yet a study of the vital statistics of New York City," says Sedgwick, "does not support the idea that much typhoid fever is conveyed by ice, because, while ice is almost universally used in that city, its death rate for typhoid fever has always been, and is now, exceptionally low for an American city."

Yet it cannot be denied that there are well known cases of the carrying of typhoid fever by the ice supply and the almost universal custom in America of using ice should call for the best possible supply. It should be clean and should always be from a running stream. Many of our smaller streams are in imminent danger of obtaining an ice supply, while it may directly convey typhoid fever, does contain a large amount of material brought down from the small runs that are likely to contain products that are inimical to public health.

A CONTAMINATED ICF SUPPLY

The following work carried on in the laboratory by Miss King and Miss Brown shows the conditions occurring for an ice supply found in the vicinity of Ames.

The recent epidemics of typhoid fever in Chicago and elsewhere have given rise to some very interesting discussions concerning the relation of the drinking water and the ice supply to the outbreaks. All authorities seem united in holding that the great majority of typhoid epidemics -and many other diseases, especially of the intestinal tract-are directly traceable to an infected water supply. Of 650 separate outbreaks of typhoid, concerning the etiology of which Schuder has recently collected information, 462 were outbreaks caused by water. And it is probable

that if accurate information could be collected of the persons infected with typhoid by polluted water, in different epidemics, that the percentage would be considerably higher. Sedgwick, in his "Principles of Sanitary Science and the Public Health." cites several instances of typhoid traced to an infected water supply, in which localities in the same neighborhood, with the same conditions of atmosphere, the same drainage (and presumably), with the same sources of food supply, but with an independent water supply, were entirely free from the disease.

Edwin Oakes Jordan, in his paper on "Typhoid Fever and Water Supply in Chicago," says "The marked and constant excess of typhoid fever in Chicago has been generally attributed to the pollution of the city water supply. Since a very early period in the history of the city the extraordinary practice has prevailed of allowing a portion of the sewage to flow into Lake Michigan, which has been at once the recipient of the city refuse and the source of the city water supply. A large number of the city sewers have for some time emptied into the small stream known as the Chicago river, which on this account has achieved a widespread and unenviable notoriety." He continues: "It is probably true that typhoid fever is sometimes spread by means of infected dust. It is unquestionably correct to recognize the danger of spread by secondary infection, by the agency of flies and by infected raw food stuffs, but these factors, important though they are, play a subordinate role as compared to water infection."

The importance of a pure public water supply is clearly shown, and there is probably no more important question before the sanitarian of today than that connected with this phase of community life. Costly and destructive epidemics can only be avoided by having a pure water supply and by constant care to see that it remains so. Water and ice which is only a branch of the water supply, especially when used in water and food—should conform to certain chemical and bacteriological tests, if the public health is to be maintained. And the presence of dangerous pathogenic organisms should not be necessary to condemn the supply; but if mild pathogenic organisms (as *B. coli communis*) are present it should be regarded as unsafe. The reason for this is apparent when the difficulties of isolating and identifying certain bacteria notably the typhoid bacillus—is known, and when the fact that these virulent organisms usually occur in connection with the mild pathogenic bacteria is given due consideration.

The above is generally acknowledged in the case of water supply, and considerable care is exercised to see that the supply is kept pure; but very little is taken to ascertain whether or not the ice sold is fit for consumption. And this becomes a subject of considerable importance in this country, especially, during the summer months. The use of ice in drinks and in food is characteristic of the nation and the ice supply is likely to become a serious problem. Care is taken to see that the water supply is pure; but ice is gathered from any and all sources—from sewage polluted ponds and streams, from waters into which drains the surface water from towns and cities, from every infected source. And this is put into our water to cool it and used in various ways in food. Or, if the ice be manufactured, no care is taken to see that the water is pure. Indeed, the river or pond ice is preferable to the manufactured article, unless the water from which the latter is made is of known purity; for freezing tends to kill all organisms, especially if long continued, and the pond or river ice is necessarily stored for a number of months before using. It is probable that the long freezing kills large numbers of bacteria, or at least diminishes their strength and power of reproduction; and that ice which has been stored for some time is purer from a bacteriological standpoint than the water from which it was taken. But the fact still remains that large numbers of bacteria are able to stand long continued freezing and that some of these are pathogenic in their nature. B. Coli communis has been repeatedly identified in ice that had been frozen for months. Hence such ice should be regarded with great suspicion and not allowed to be sold for use in food.

Under the direction of Dr. L. H. Pammel, the writers conducted an investigation of the ice in use at the college creamery. This ice was taken from a body of water known as Briley's Pond. This pond is situated so that it receives with every rain the washing from several barns and club-houses situated near. It is, moreover, reported that a sewer empties into it, but as to the truth of this last the writer cannot say. However, the situation of the pond, where it constantly receives the drainage from barns and dwellings, is sufficient cause for grave doubts as to the healthfulness of the ice taken from it; and the results of the investigation show that such doubts are not without foundation.

Samples of the ice were obtained from the creamery ice-house and also from Mr. Briley's ice-house in six different weeks, that different layers of the ice might be tested. These samples were broken open and ice taken from the interior with sterilized instruments. The ice was carefully melted in sterilized tubes and one-tenth c. c. was poured over the surface of an agar plate just before it solidified. A fermentation tube of boullion was also inoculated with the same quantity. Practically all of the fermentation tubes developed gas, which was shown in one sample to be *B. coli communis* by isolation and culture. The first week the plates were very; warm when inoculated, and but comparatively few bacteria developed; but after that the results were fairly constant. On April 17th part of the sample had the appearance of snow ice, and extraplates were poured of that. The results fully demonstrated the supposition that snow ice was not as pure as other. The results are givenin the accompanying table.

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Data obtained	No, bacteria per c. c.	No. species	No. molds per c. c.
Feb 28	50	3	0
April 4	150	3	0
April 4	100	1	30
April 10	8400	4	0
April 10	12000	4	0
April 17	10000	4	0
April 17	16100	3	0
April 17	50000	4	0
April 94	17400	5	0
April 24	14000	• 5	0
May 1	13000	3	10
May 1	14100	4	10

BRILEY'S ICE HOUSE

Date obtained	No. bacteria per c. c.	No. species	No. molds per c. c.
March 28	30	1	10
April 4	440	5	10
April 4-30	430	5	20
April 10	10500	3	0
April 10	14000	3	0
April 17	18200	3	0
April 17	10000	3	0
April 17	42700		
April 24	18400	4	0
April 24	21700	5	0
May 1	11400	5	90
May 1	9000	3	0

The following organisms were isolated and identified:

Micrococcus candicans. Micrococcus aurantiacus. Micrococcus cereus flavus. Micrococcus flavus liquefans. Micrococcus cereus allbus. Bacillus coli communis (occurs in large quantities). Sarcina /ut.a (also occurs in numbers of instances). Micrococcus violaceus. Cladothrix.

Of these, B. coli communis, Sarcina lutea and M. cereus flavus appear to be most abundant; and it appears extremely probable that B. coli communis is present in sufficient quantities to render the use of the ice in food unsafe. Coli communis has also been identified by another investigator of the same ice, and found to be present in considerable quantities.



Altogether, the situation of the pond, the number of bacteria present, and their character, renders the propriety of using the ice for anything but storage purposes extremely doubtful.

The Foster ice examined was obtained from Read and Read, and comes from the pond which is north and east of Ames and east of the Skunk river. This water comes not only from springs but rises in small valleys adjacent to the hills. The source of the water is in part from springs that occur in the low grounds along the small brooks. The water flows through the level flood plain of the Skunk river for a little over a quarter of a mile, emptying into a depression of the flood plain, thus forming a small lake. Owing to the high water of 1902, the water was running out of this pond, emptying into Skunk river. The border of this lake is surrounded by semi-aquatic plants, chief among which may be noted calamus (Acorus Calamus).

This analysis shows the importance of collecting ice only in such places where there is a possible chance for it to have an overflow.

CLINTON ICE SUPPLY

Mr. J. O. Shaff in the writer's laboratory made an examination of the ice obtained from Clinton and Lyons. The Clinton sewage empties into the Mississippi river at the foot of Seventh Ave., marked "C," and comes from the central part of the city. The sewer coming from the south side of the city empties into Beaver Slough at the foot of Fourth Street.

The Lyons sewage empties into the river at the foot of Main street and is the discharge from the main part of the town.

The ice in Lyons is generally cut about four blocks above the sewer. The ice of the first samples was obtained from the common city ice supply. This ice comes from a place where the sewer empties into the river, at the point marked "A." From the several plates poured there were 40,600 bacteria per cubic centimeter. Of the bacteria present some of it resemble 'B. coli communis. It seems, however, to correspond with the 'Bacillus subtilis similis. The second sample of ice from Clinton came from above the point where the sewage empties into the river at the point "B."

The bacteria present in this sample was 1,000 per cubic centimeter. The third sample was poured a week later; this was also obtained at the north end of the city, with results similar to the second sample. The average being nearly one thousand germs per cubic centimeter.

Bever slough is a branch of the Mississippi, below Clinton, and has some running water. It is very likely to contain some of the sewage bacteria of Clinton.

XII

SOME SUGGESTIONS AS TO THE PROPER DISPOSAL OF THE DOMESTIC WASTES OF ISOLATED COUNTRY RESIDENCES

BY CHARLES FRANCIS, C. E., DAVENPORT, MEMBER IOWA STATE BOARD OF HEALTH

The study of hygiene and the application of the hygienic arts so long neglected (in fact since the time of Moses), have recently come to be recognized as very important factors in the health, happiness and prosperity of the civilized portion of humanity.

Hygiene looks to the maintenance of good health, and the hygienic arts have their application in the preservation of health by the prevention of disease. Now we know that a large number of very grave diseases are caused by drinking water that is polluted by sewage. Typhoid fever, cholera, diphtheria, scarlet fever and all the enteric fevers are directly traceable to sewage-contaminated drinking water, and the most common and prolific cause of pollution is the careless, not to say criminal, way in which the sewage of most communities is disposed of.

It is not proposed to discuss in this paper the methods of sewage disposal in communities where there is a sewage system, but to suggest some simple and efficient plans and devices by which the domestic waste of country houses, which can have no connection with a general system of sewerage or drainage, may be safely and thoroughly disposed of.

It may be necessary to state here that by the word *sewerage* is meant the system of pipes by which the *sewage* of a house or community is carried away. *Sewage*, which includes everything that should go into the sewer—the kitchen waste, the laundry waste and the discharge from the water closets—is all carried away from the house by the sewer; and the serious problem that confronts us is what should be done with it. As stated before, drinking water which is contaminated by sewage is the direct and immediate cause of a large number of very serious diseases; that is to say the water has been poisoned, and this poisoned water taken into the stomach has caused sickness.

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Let us then consider this sewage as a specific poison and handle it and treat it as such. This means that the sewer or drain pipe, which conveys this poison away from the house, must be laid with tight joints —that is, made as far as possible a continuous pipe, and the cess pool or tank into which the sewage is finally discharged must be water tight, doing away entirely with that abomination. the leaking cess pool. As Wm. Paul Gerhard so forcibly says in his "Disposal of Sewage of Isolated Country Houses," published by the Iowa State Board of Health, 1892:

"In the leaching cess pool we have the worst possible example of stagnation and of accumulation of putrefying filth on our premises. The great objection to a leaching cess pool is not only that it constitutes in itself an abominable nuisance comparable to a powder magazine which merely needs a simple spark to create destruction, but that it unavoidably and invariably pollutes the subsoil in the neighborhood of dwellings, contaminates the water supply and renders the air we breathe obnoxious by its exhalations. * * * It is indeed of the utmost importance that the local water supply of isolated dwellings be kept as clear and pure from contamination as possible; but even supposing that water is introduced from a street or public supply, the enormous evils of soil pollution and air contamination remain."

The case against the leaching cess pool is much strengthened if we accept our hypothesis that *sewage is a specific poison*.

Somebody has said that criticism is but half complete when an alternative or remedy is not suggested, in view of which a discussion of the value of the anaerobic or septic tank as an effective and safe method of sewage disposal is here presented.

The meaning of *safe* method is that the effluent or final discharge, after the sewage has been treated, shall be harmless.

The anaerobic tank is so called because the sewage in the tank is subjected to the action of anaerobic bacteria which break down all the solid matter in a most remarkable manner, thus putting the sewage into a much better condition for filtering. One of the most valuable functions of the tank is the hydrolysis and transformation into gases of cellulose in sewage, such as paper, rags, vegetable matter, etc. As an illustration of this, on October 4, 1900, a considerable quantity of newspaper and cotton and woolen cloth was placed in the experimental septic tank at Andover, Mass., in wire baskets. On December 31st the cloth and paper were still intact, but so rotten that they fell to pieces when touched. The same substances upon the surface of a filter where oxidation is the principal action would have probably remained without much change for a much longer period.

What has some to be the generally accepted article of faith in the great problem of sewage disposal is very clearly stated in the second annual report of the Com. sewage commission, 1901, as follows:

"The cleansing of sewage by bacterial action is the only method which seems at present to give promise of widely successful application; no other known method actually destroys the putrescible matter in sewage, making the effluent clear, not poisonous to fish and incapable of putrefaction. No other known method can, therefore, perfectly satisfy reasonable requirements in those cases where the effluent must be discharged into streams or shallow harbors."

In fact, this treatment of sewage is neither more nor less than the attempt to imitate nature's own methods of effecting the decomposition and finally the purification of the effecte matters of the animal and vege-table kingdoms. In the words of a celebrated sanitarian:

"Whenever and wherever there is a decomposition of organic matter, whether it be the case of an herb or an oak, of a worm or a whale, the work is done by infinitely small organisms. They are the important, if not the only agents of universal hygiene; they clear away more quickly than the dogs of Constantinople or the wild beasts of the desert the remains of all that has had life; they protect the living against the dead. They do more: if there are still living beings, if since the hundreds of centuries the world has been inhabited life continues, it is to them we owe it." Or, as Prof. Kinnicutt put it, "The bacterial treatment of sewage is the endeavor to obtain under control and supervision results which are everywhere being produced in nature by agents which have been at work ever since life first appeared in the world. It is an attempt to carry on under the best possible conditions these processes of nature by which the dead vegetable and animal matter is continually being changed into mineral substances. We know that it is neither plant life in the one case nor chemicals in the other that removes soluble putrefying substances, but that the purification is caused by those minute forms of vegetable life which we call bacteria."

The septic tank furnishes all the conditions which are favorable to the effective working of the anaerobic bacteria.





TRANSVERSE SECTION



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The tank should be built of brick or concrete and should be perfectly water tight. The influent and effluent should be below the surface of the liquid in the tank, and the construction should be such that the surface of the liquid would be maintained at a uniform level. An absolutely essential factor in this system of sewage disposal without which the purification is but partially completed is the intermittent filter.

These are shown in figures 1, 3 and 4. These filters supplement the work of the anaerobics and oxidize and purify the effluent of the tank to a remarkable degree. Filters are commonly known as strainers, and the generally accepted idea is that the action of a filter is simply mechanical. This primitive idea does not, however, apply to intermittent filters, which we are now considering. A field of sandy soil may be a very effective strainer, but if worked intermittently it is much more than this. A mere strainer soon chokes and must be cleaned, but an intermittent filter does not choke and is self-cleaning.

When the application of sewage to the several tanks outside the experimental station at Lawrence, Mass., was begun, even the most intelligent workman predicted that these would quickly choke and become a nuisance, but after two years of actual operation nothing more objectionable could be seen upon them than upon other fertile land; and analysis clearly disproved the mechanical theory by a comparison of the chemical character of the sewage as applied with that of the effluent from the filters.

There may be a period at the beginning of the work of an intermittent filter when there is but little if anything more than a mechanical cleansing, but under proper conditions there speedily begins a change of the profoundest significance. The dissolved organic matters no longer pass out as they come in. The suspended matters for the most part cease to accumulate, and both appear in the effluent under other forms. Obviously mechanical processes alone could not effect such changes as these. There can be no question that the action of an intermittent filter is primarily chemical, and the ability of such filter to effect chemical changes is abundantly proved. Another factor has come to be recognized. Dr. Frankland, in the River Pollution Reports, says: "From all of these experiments it appears that the action of the filter must not be considered as merely mechanical."

The process carried on in it is also chemical. A field of porous soil, irrigated intermittently virtually performs an act of respiration. It has been definitely established, moreover, that micro-organisms (bacteria) are an indispensable element in the constitution of a successful intermittent filter, so that the essential chemical theory has given place to one essentially vital or biological. An intermittent filter is no longer regarded as a mechanical strainer, nor is it a chemical furnace; it resembles a *living organism*.

In fact, the upper layers of the earth, especially in fertile regions, filled as they are by the myriads of bacteria, constitute a great intermittent filter. When the farmer dresses his field with manure consist-

ing largely of the wastes of animal life we are not surprised to find that after a time these wastes have disappeared, while the soil upon which they were placed has grown soft and rich. The rain that falls upon the ground, in general more or less polluted, is attacked by these millions of bacteria, and is nitrified and oxidized and purified, giving forth as an effluent the pure spring water.

So that we have every reason to believe that this method of sewage disposal (intermittent filtration), which is in successful operation all over the world, is at the same time one of the primitive, one of the most practical and one of the most perfect systems hitherto employed by man.

The use of the septic tank is, as has been stated, to prepare the sewage for filtration, while the filter alone will do the work thoroughly and almost perfectly, yet a much larger filtration area is required than when the septic tank is used.

The organic matter found in sewage is partly in suspension and partly in solution, and sewage contains in itself the necessary living germs for the destruction of both these forms of organic matter. The aim and object of the biological treatment, which is accomplished in the septic tank, is to render soluble by microbic agencies the solid matters and to split up by the action of living bacteria both the matter thus dissolved and the organic compounds which were organically in solution, into their simpler elements.

In the final process of purification, which is done by the intermittent filter, these substances should undergo oxidation in connection with the oxygen of the air, and an effluent should be produced which is free from putrescible matter and contains only inorganic or mineral substances. Thus we see that the so-called biological treatment of sewage is nature's own method of purification of the mineral and vegetable wastes.

The preceding has been written to prove, it is hoped, clearly and conclusively, that the combination of the septic tank and intermittent filters forms a very complete and effective method of disposing of the sewage of an isolated country house. It has been assumed that the plumbing has been properly done in the house; that all the drain pipes from the various fixtures, bath tub and toilet bowls, sinks, etc., have been carefully trapped, and that all the plumbing is exposed, so as to be easily accessible at all times, and that the sewage is concentrated to the main sewer or drain leading from the house.

The object of this paper is to suggest what shall be done with the sewage after it leaves the house. It must be remembered that we are dealing with a specific poison, and all the work on the piping and connections must be made tight and secure so that none of this poison shall escape into the ground or house.

The site for the disposal plant should be selected with due regard to its bottom level in relation to the level of the cellar floor. Lay the main drain or connecting pipe between the house and the tank about four and one-half feet below the surface of the ground and make the gradient as nearly as possible straight. Fig. 2 is recommended as being the best model of the tank: the circular tank built of brick laid in cement mortar absolutely water tight. The influent pipe, that is the main drain from the house, has a bend in the tank as shown on Fig. 2. placed so that the sewage shall enter the tank about half way between the surface of the liquid and the bottom of the tank. Set the effluent pipe also so that the liquid may be drawn from the center (vertically), Have a man hole so that the tank may be examined from time to time. The cover of the man hole should have a half-inch hole in the center of it for the escape of the gases that may be generated in the tank. As to the size of the tank, this will depend on the quantity of sewage discharged into it daily. For an ordinary country residence using, say 250 gallons of water a day-and turning it into sewage in the using-a tank four feet in diameter inside, and holding four-foot depth of liquid. would be about right. Such a tank would hold 377 gallons, and the daily discharge from the house-250 gallons-would remain in the tank about twenty-seven hours.

The sewage is now ready for the filters, which are to be made as shown in the figures. For a discharge of 250 gallons per day these filters should have an area of 25 square feet, say five by five, with five feet depth of sand. Two hundred and fifty gallons daily upon twenyfive square feet is equivalent to 435,600 gallons daily upon one acre, figures that are well suited to this kind of sewage. The filters should follow as closely as possible the sketches shown in their construction. Paved with stone, say six inches general diameter, furnished with threeinch drain tile as shown, and filled up with five feet of ordinary mortar, or building sand, nothing more is required of it than it be *clean*.

The effluent from the filters may be run off anywhere, as it will be clean, safe water that will do no harm to anything or anybody. A prosperous, progressive farmer would put in a man hole on the line of final discharge tiling, not far from the filters, so that he could occasionally get a sample of the effluent and send it to a chemist to be analyzed and thus keep himself informed as to the working of the disposal plant.

The intermittent filters, as their name implies, should be worked intermittently. Thus, this morning place the trough so as to lead the effluent on to filter No. 1; tomorrow morning, at the same hour, take the trough away and allow the effluent to flow on to filter No. 2. The next day, again at the same hour, lead the effluent to filter No. 3, and so continue, thus giving each filter one day's work and two days' rest. This intermittance is a most important factor in the working of the filters and must be very carefully attended to. As to the cost of this disposal plant, if built according to Fig. 2, the circular tank, to discharge 250 gallons a day, the cost would be approximately \$125.00. It would add very much to the value of the plant if it were covered in by a small house, which would increase the original first cost somewhat.

XIII

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THE LABORATORY IN PUBLIC HEALTH WORK*

I wish, first of all, to express my appreciation of the honor done to Minnesota and to me by your invitation to present before this society some of the phases of laboratory work in relation to the public health.

There seems to be little need to argue the desirability of the establishment, equipment and proper maintenance of laboratories for the study of the cause and as an aid in the prevention of transmissible discases of men and animals. Many of the state and provincial boards of health of the United States and Canada, as also in Mexico, have had laboratories in operation for a number of years. It is quite compatible with modesty to assert that America, the eminently practical, is not behind the older countries in the application of scientific methods to the location and elimination of dangers to the public health. Of necessity, owing to geographical, climatic, financial and other conditions, such as relative density of population and the laws under which the state boards of health are constituted, the state laboratory work undertaken throughout America varies within rather wide limits, and it would appear proper to consider shortly the scope of the laboratory work of a state board of health.

SCOPE OF STATE BOARD OF HEALTH LABORATORIES

The establishment, by many large cities, of laboratories in connection with their municipal boards of health has made a provision for a large amount of investigation, but there still remains a much larger field, which must fall primarily to the state boards of health at least for many years.

In some of the larger states, where the distances are great, the difficulties of operation and increased but are not insuperable. In general, the work of a state board of health laboratory may be subdivided into two classes.

First-Routine work whose aim should be to assist, when necessary, local health boards throughout the state in the exact determina-

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tion of foci of known infectious diseases, and thus attempt to prevent the spread of such diseases. This should include not only the examination of materials from human beings, but suspected water, milk, food and even domestic and other animals where the infection may be spread from them to man. The testing on new methods of bacteriological diagnosis; of the values of various commercial antitoxins and disinfectants; together with the investigation of other problems for which methods have been formulated, should constitute a part of the routine work of such laboratories.

Second—Research work should be undertaken so that the etiology of obscure infectious diseases and their methods of transmission may be determined, new methods formulated and old ones adapted for the conditions which obtain in the particular locality; whilst in general all problems concerning which exact knowledge may benefit the state and protect its health should be studied.

It is impossible in all cases to draw any sharp line of demarcation between what constitutes routine work and what may be properly considered research.

Routine work should be done by highly trained men. Methods should be most exact. Careful records of the methods employed and the results obtained should be faithfully preserved. In this way what appears at first to be simply dull routine may often be found to yield new scientific facts of the utmost value not only to the particular locality but to the world in general,

So far as can possibly be done, individual members of a State Board of Health laboratory staff should be assigned definite pieces of work for a given period of time. It frequently happens that problems of doubtful value are thrust upon State institutions. Opportunities for investigation must, of course, be seized at the time when they present themselves, and it is necessary to guard against the interruption of any particular piece of work which has been begun and which promises well. This requires careful adjustment of the work to the workers and the possession of some reserve force and reserve funds.

The position of a laboratory worker seems ill-defined. Up to the present time he has not been fully admitted as a consultant in medicine, although his training along all lines should have been equivalent to that of the general practitioner in addition to his special knowledge pertaining to laboratory methods and the interpretation of results obtained.

The installation of state laboratories should be made along very definite lines so that the position of this branch of scientific medicine be not jeopardized.

Examinations of tissues, tumors, pus, sputum, urine and other materials which are of direct benefit only to the medical man in the prognosis and treatment of disease, should not be conducted at the expense of the State. They constitute a part of the work of a consultant. State boards of health should only make investigations which are of especial use in the location and control of disease. Therefore, only in the case of infectious diseases over which the state board of health has control or in the investigation of the unknown cause of disease should examinations be done by them. It is unfortunate that some state boards of health have established laboratories in which diagnostic examinations of all descriptions are made. This means that by the unnecessary assumption of the cost of such examinations the state readers it impossible for private consultants in this legitimate line of readers are a livelihood and thus discourages a branch of scientific medicine.

The consideration of the exact scope of a laboratory in any given state depends so much upon local conditions that it would appear best to consider briefly some of the specific branches of work which have been undertaken by laboratories already established.

Certain state boards of health undertake the manufacture of various antitoxins which are supplied gratuitously to local health officers for use throughout their state. Amongst the states in which this is done may be mentioned Massachusetts and New York. Experience has shown that reliable antitoxins may be supplied at a very much lower cost than those obtained from commercial houses. This is a matter, however, for each state to decide for itself. As a business proposition where free antitoxins are supplied by the state, it would appear to be a good one, although the question of whether all antitoxins in the country should be inspected, standardized and passed or condemned, as the case might be, by a central government bureau, is a matter for consideration.

The establishment of institutions for the protection and cure of human beings who have been bitten by rabid animals, and provision for their maintenance, should be considered by state boards of health. By a mutual arrangement with some educational institution, such as a large university or hospital, this may be found feasible, although "a priori" it would appear that the state boards of health should have oversight over such institutions and they might well be established in connection with board of health laboratories.

The duties of health officers are such as to require very special training in matters pertaining to their legal responsibilities, the machinery of quarantine, inspection of water, milk, meat and other foods, and in these and other lines of activity some knowledge of laboratory methods is imperative. The necessity for the provision of special courses of instruction is becoming daily more apparent, and the state boards of health should be the prime movers in this direction. By collaboration with universities, or by other means, state boards of health must be prepared to institute or cause to be instituted under their supervision, special schools of instruction for those who are to become health officers. It is not too much to expect that in a short time some special diploma, as indicating the possession of special qualifications for such a post as that of health officer, may be demanded. State board of health laboratories, particularly if connected with state universities, should establish special courses, then, for teaching prospective health officers enough of laboratory technique to insure successful collaboration of the state and local officers.

ESTABLISHMENT AND LOCATION OF LABORATORIES

Nearly all public health laboratories established in America are either connected with universities or have at their heads men with university affiliations.

These include the laboratories of Massachusetts, Minnesota, Vermont, New York State, Quebec, Ontario, Manitoba, as representing state and provincial boards of health, and New York City, Philadelphia and Chicago as representative of municipal laboratories.

In states provided with state universities it would appear to be economical and in every way satisfactory to establish a relationshipbetween the medical laboratories of the two state institutions, i. e., the university and state board of health.

In Minnesota, where there is an efficient state university and an active and progressive state board of health, the importance of maintaining this relationship established some years ago is evidenced by the fact that the omnibus appropriation bill of the legislature at present in session makes provision for a building to be erected on the university campus, of which one-third is to be used for State Board of Health laboratory purposes and two-thirds for the Depatment of Pathology and Bacteriology of the Medical Department of the university. The cost of this building is estimated at \$100,000, and for the equipment required by these two laboratory departments, in addition to that already available in the present laboratories, \$25,000 was requested, although only a part of this latter sum has been provided for in the bill. The balance will be made available it is expected, by the next legislature.

Two distinct staffs are provided for these two phases of work by the state and their salaries and equipment and running expenses comefrom two separate funds, one under the control of the State Board of Health and one under the medical department of the university. The State Board of Health has had \$10,000 per annum for the maintenance of its laboratory for he past two years, although this has been found quite insufficient. The Board has already erected and equipped on the university campus a Laboratory of Animal Research.

The following reasons for the continuance of the present arrangement in Minnesota have been very apparent:

1. For the university there is available through the State Board of Health much valuable material for the teaching of bacteriology and sanitary science which could not be obtained in any other way.

2. Universify students have an opportunity of seeing the actual laboratory work done for health officers throughout this state and of learning more of the practical duties of health officers than would be possible in any other way. Their proper instruction in matters of public health is of very decided benefit to the state at large on account of their influence as they go out into different portions of the state, and is particularly apparent when they become, as many of them do, health officers for the localities into which they go. Animal tissues examined in the veterinary work of the State Board of Health are found very useful in the university laboratories for demonstrating to medical students the relationship and similarity between diseases of men and animals.

3. The opportunities for research work along the lines of preventive medicine which are brought to light during the operations of the State Board of Health are very numerous, and this board has shown itself fully alive to its opportunities and fostered in every way possible the work of investigation along a number of lines. The influence of this work upon the university and upon the students who are taking the work in pathology, bacteriology and hygiene is of the best.

4. There is a mutual stimulation to the workers in the laboratories of the university and State Board of Health in their, present close association. The teachers and researchers in the university have much the same kind of problems confronting them as have to be met and elucidated in the State Board of Health laboratories.

5. As an illustration of economy, in the matter of books it has been found possible through these two departments to acquire for the use of the state the nucleus of a good working library. Works of referencepertaining to bacteriology and hygiene are to be found largely in the laboratory library of the State Board of Health, whilst those dealing with pathology and experimental medicine are to be found in the library of the pepartment of Pathology and Bacteriology. It is true, too, that where a method is evolved in the one laboratory it is very quickly applied and utilized in the other, and many other illustrations of the utility of this association might be given.

The laboratories of state boards of health should be easily accessible from all parts of the state so that specimens can be forwarded without unnecessary delay, although not all investigations, by any means, can be brought to a satisfactory conclusion where materials are forwarded to the laboratory. There is a very general misapprehension in: this regard, probably due to the fact that specimens, such as those from throats of diphtheria patients, blood for Widal's test and portions of thespinal cord or brain of supposedly rabid animals, may be forwarded considerable distances for examination and upon such examination reports of very great practical value may be given.

Many problems, such as investigations of water supplies and milk, and all unknown and new diseases of men and animals, require the presence of the laboratory man in the field where he can begin the necessary investigation with the materials before they have been disturbed and before putrefaction and other processes have begun. All available data must be collected and at times it seems as if the only way this can be procured satisfactorily is by the laboratory man himself. The importance of these two matters, *i. e.*, the actual presence of the laboratory man at the original site of the inquiry and the acquirement of data essential for the proper interpretation of laboratory findings must neverbe lost sight of and proper division must be made for them. It is no unusual occurrence in laboratories to receive tissues or fluids in all stages of decomposition and unaccompanied by any data whatever, sometimes even the name of the sender being omitted. Still the senders of such "miscellaneity" sometimes expect to be told the complete etiology, pathology, prognosis and treatment of the condition.

Many amusing instances could be cited which would tend to show the omniscience with which some people credit the laboratory man. Whilst this may be initially flattering it is unsatisfactory and must in most instances lead to disappointment and even unjust criticism of men and methods.

Being necessarily more familiar with the work done in Minnesota, I shall, as has been requested, consider some of the problems which have had to be met in that state and to comment shortly upon similar work by other state and provincial boards of health, in order that a somewhat general view of what is being undertaken and accomplished throughout America may be presented.

DIPHTHERIA

The examination of specimens derived from the throats or noses of suspected diphtheria patients has been undertaken by many boards of health, particularly city boards of health, for many years. New York city, Philadelphia and Boston have set an example to the rest of the world of which they may well be proud.

Minnesota was, I believe, the first to establish a state board of health laboratory and to undertake examinations for health officers and physiclans of the state at large. The work begun in October, 1894, was further systematized by the permanent official establishment of the laboratory in January, 1896. The health officers throughout the state are provided with the necessary materials for forwarding serum cultures, inoculated at the bedside, to the laboratory in Minneapolis, where specimens are examined and reports forwarded by telegraph or mail within eighteen to twenty-four hours after the receipt of the specimens. Quarantine is largely regulated on the laboratory findings, and when two successive negative cultures have demonstrated the absence of diphtheria bacilli in cultures from the patient, he is released from quarantine after proper precautions have been taken in the matter of disinfction.

In Minnesota during the last two years nearly \$,000 diphtheria examinations were made, and reports which served as a basis for the regulation of the quarantine forwarded to different parts of the state by mail, telegraph and telephone.

By careful record of laboratory findings and the co-relation of clinical observation, when possible, with types of diphtheria bacilli present, etc., much interest has been added to this work, and a classification of the types of diphtheria bacilli formulated which has been employed in collaboration with other laboratories throughout America in the investigation undertaken by the Massachusetts Association of Boards of Health. This association reported upon the distribution of diphtheria bacilli in the throats and noses of the apparently healthy and the work is familiar to all.

During the course of the routine investigations, the length of time during which B. diphtheriae persists in the throats of clinical cases has been studied and for the state of Minnesota it has been demonstrated that quarantine regulated by laboratory findings rarely exceed three to four weeks, twenty per cent of the patients being released in less than two weeks from the beginning of symptoms.

In the light of such results obtained in Minnesota, as they had been elsewhere, one might reasonably expect the laboratory regulation of quarantine to be unanimously adopted, although as yet local health boards are given an option of four weeks' quarantine where the laboratory is not utilized.

Other matters of very great interest and importance have arisen in connection with these examinations, such as infection with diphtheria and diphtheria-like bacilli in public institutions where children or adults are housed together in large numbers. In one of these investigations-that at the State Public School for Dependent and Neglected Children at Owatonna, Minn .- attempt was made to eradicate diphtheria bacillus from the respiratory passages of those in whom it was found, it having been ascertained that there was very widespread infection with this micro-organism. Individual isolation was tried, together with local treatment and general precautions, but it was found impossible to permanently eradicate the bacillus even though freedom of the throats and noses from B. diphtheriae had been demonstrated by three successive negative examinations. Upon allowing these children to mix together again, the bacilli were soon found almost as widespread as before. It would seem, therefore, that in state institutions the study and treatment of diphtheria constitutes a problem by itself. Similar conditions have since been found in other states.

In one town, containing over 300 day school children, where diphtheria had been widespread during the preceding winter and persistent during the summer vacation, by exclusion of all children who showed the typical forms of diphtheria bacillus from attendance at school until they were shown to be free from them, the disease was wiped out. Officers of the State Board of Health made a local inspection and it is needless to say that during the examinations mentioned there came to light many conditions which had not been known to exist. Attention to these with laboratory guidance stamped out the disease and school opened at the regular time.

A study is at present in progress to determine the influence of large doses of anti-toxin upon the types of bacilli present in clinical cases of diphtheria.

Many other problems and interesting incidents have occurred, such as the regulation of quarantine in large hotels which were infected. The accuracy of the method was well shown in one instance in which material was obtained from the resiratory passages of a body which had been buried for some days. The cause of death was given as "acute laryngitis,' and the body shipped to another locality in the state. The casket had been opened and a public funeral held. The coroner exhumed the body and from the fluids escaping from the nose and in material from the trachea, typical bacillus diphtheriae was demonstrated in almost pure culture by the laboratory.

In nearly every state and province in America diagnostic work is done either by provision of state or provincial laboratories or by arrangement with certain municipal or college laboratories. Amongst the state laboratories in which this work is very well systematized may be mentioned Maryland, Massachusetts, Minnesota. New York, Rhode Island, Vermont, Manitoba, Ontario and Quebec, whilst all the large cities are provided with facilities for carrying on the work.

TYPHOID FEVER

Since the application of the method of the late Wyatt Johnston (Montreal) for utilizing dried blood for the determination of the presence or absence of the Widal reaction, it has been found possible for state laboratories to undertake this work for physicians and health officers.

Owing to the occurrence of an epidemic in Minneapolis in 1897, the Minnesota State Board of Health was placed in a position to be amongst the first in the wide application of this method. A method of quantitative determination was elaborated which very greatly increased the reliability of the test. To the end of 1902, 6,896 examinations have been made and reports furnished.

In certain laboratories, particularly that in New York City, examinations of urine and faeces for the presence of B. typhosus are made. These have not been found practicable, however, in many localities, as the value of the examinations does not seem to be commensurate with the amount of labor involved.

In Minnesota opportunity has arisen for the investigation of a number of interesting conditions. B. typhosus and organisms very nearly allied to it have been isolated from a number of rather unusual sources, such as the Minneapolis water supply, chronic sinuses and acute abscesses, the meningeal exudate in a case of cerebro-spinal meningitis following typhoid in the Fifteenth Minnesota, U. S. V., types of bacteria were obtained which resembled in almost every particular B. typhosus.

Most, if not all, of the states and provinces mentioned as doing diphtheritic diagnostic work afford also opportunities for examination as to the presence of the Widal reaction.

TUBERCULOSIS

In many laboratories the sputum of persons in whom pulmonary tuberculosis is suspected, is examined gratuitously. The Minnesota State Board of Health in 1898 took the position that since tuberculosis was not at that time a disease in which notification to the health officer was compulsory, examinations of sputum should not be undertaken excepting under certain conditions. A number of consultants in the state objected to the State Board of Health making gratuitous investigations unless the results of those investigations were utilized directly in the preservation of the public health and not simply as an aid to diagnosis, prognosis and treatment.

It seems highly desirable, however, that in all states, so far as it is possible, the example set by New York City be followed and an educational crusade undertaken. Should it be possible to obtain definite information concerning all patients suffering with pulmonary tuberculosis, the conditions under which they live, the opportunity afforded for the infection of others, and additional clinical and hygienic data upon which definite records can be built, it will become possible to prepare reliable statistics as to the distribution and spread of tuberculosis and efforts can be intelligently made for the stamping out of this disease by the education of the patients and those who are brought in contact with them. Of prime importance in this connection are the provision of sanatoria and the dissemination of the knowledge that tuberculosis is a curable disease.

Under these conditions, state board of health laboratories should undoubtedly make gratuitous examinations and report to local health officers and physicians where the conditions which must be made by the state authorities are complied with.

RABIES

The work of the laboratory has shown the prevalence of this disease in Minnesota where its existence was denied until comparatively recent years. Frequently the first information concerning the occurrence of this disease comes through the forwarding to the laboratory of material for examination. Immediately inquiries are instituted, directions given and the laboratory investigation begun. During 1901-1902, thirty-three examinations and reports have been made. They vary in interest and importance. To show the distribution of the disease it may be mentioned that rabies has been diagnosticated by the laboratory in man. horses, cattle, sheep, swine, dogs and a wolf. In one instance a history was given that one mad dog was responsible for the death by rabies of sixty-five cattle. On one farm in Minnesota, the farm bith, supposedly infected from the bite of a skunk, was responsible for the development of rables and death therefrom in her two pups, the cat, one pig and eight cows, whilst the owner, owing to exposure to infection from a scratch from the tooth of one of his cows, received the Pasteur treatment and remained in good health. Examinations were made and a positive diagnosis of rabies given after the development of rabies in rabbits inoculated from a number of the above animals. In one instance, the presence of rabies virus was demonstrated in milk which came from a cow five days before, i. e., twenty-four hours before she succumbed to the disease.

WATER

The investigation of the public water supplies of a state is a matter which requires the most careful consideration. In the more thickly populated districts where habitations are very close together, and through household sewage and commercial enterprises the streams, lakes and other natural water supplies are in danger of being rendered useless, the necessity for the protection of public supplies is very apparent, although it should be just as obvious in all localities. As a rule, however, it is not until conditions have arisen which have no right to exist in any civilized community that any interest is betrayed in this matter.

The work of Massachusetts in connection with water supplies and sewage disposal is a model to the world. During 1902, this state spent nearly \$34,000, and has in its employ a staff consisting of twenty-five members, including engineers, chemists, biologists, bacteriologists, clerical and other assistants. Not only does the Massachusetts State Board of Health examine at frequent and fixed intervals water supplies from various portions of the state, but when a new water supply is to be instituted or change made in the existing supply in any locality, special study is given to the conditions which have to be met in that locality. The engineers and laboratory men are sent to or stationed on the ground for the necessary length of time to determine the best methods of dealing with the particular local problems presented. The experimental plant at Lawrence, Mass., need not be mentioned since its work is known all over the world. Ohio, Connecticut and other states are following along somewhat the same lines. In Minnesota it was impossible to undertake this work upon the scale demanded but a beginning has been made in a modest way by an attempt to make a chlorine survey and map of the state and by examining chemically, samples of water forwarded by different localities and where epidemics arose or where, after careful investigation by the local authorities, there seemed a reasonable ground for suspecting the water supply, a chemist or a bacteriologist or both have gone into the field to undertake examinations and collect data. Employment of competent engineers has been urged upon all local boards of health where a change in existing or the installation of a new water supply was contemplated, since the Minnesota State Board of Health has the authority to condemn water supplies. It is hoped that ample provision will be made for the carrying on and extension of this work in Minnesota.

A chemical and baceriological survey of certain of the rivers and lakes is contemplated. In fact, a beginning has been made upon this work.

There is nothing more important than the proper supervision of public water supplies, and concerning the capacity of laboratories in this connection there is a good deal of misconception. The forwarding of miscellaneous samples by people unskilled in the work, especially where data is not available, usually leads to disappointment and may be positively harmful if definite action is to be based upon reports thereon. In no work is the presence of the laboratory man in the field more demanded than in the investigation of water, if he is to make an intelligent report. Such report is to be interpreted and acted upon by a competent engineer where public water supplies are in question. Too often this matter is left to a laboratory man, the local health officers or a board of aldermen; whereas, it demands the collaboration of engineer, chemist and bacteriologist.

OTHER LINES OF ROUTINE AND RESEARCH INVESTIGATION

The problems which have to be met in any locality necessarily vary, and during the history of the Minnesota State Board of Health laboratory it has been found necessary to undertake a great many different kinds of work which cannot be given within the limits of this communication. A better idea may perhaps be obtained by a few specific illustrations.

1 Meat—The examinations of meat have usually been satisfactory owing to the paucity of that data and the method of collection and transmission. In one instance, living hog cholera bacilli were demonstrated in salted pork, of which a specimen was forwarded by the health officer because it had caused illness in his own family. It later transpired that in a herd of hogs which had been fed in the vicinity of the slaughter house, a disease had broken out and that suddenly the hogs disappeared, and it was presumed that these animals had been disposed of by pickling.

An illustration of the utility of the laboratory in matters of this kind, particularly in relation to animal disease, is afforded by the result of one investigation. The health officer (a physician) in one of the towns in Minnesota, observed in a butcher shop a small portion of tissue adherent to the ribs of a beef carcass. This was removed and sent to the laboratory. The piece of tissue was apparently a calcified lymphatic gland. Decomposition was so far advanced that nothing could be determined from a microscopical examination. Inoculation of two guinea pigs demonstrated the presence of B. tuberculosis which produced the disease in these animals and in their tissues the bacilli were demonstrated microscopically. The health officer made inquiry regarding the origin of the meat and found that it came from a farm where twentytwo cattle were kept, and the owner being desirous of knowing exactly the condition of his herd submitted them to the tuberculin test, whereupon twenty-seven reacted. These were killed under inspection and found to be badly diseased.

2 Milk—Relatively little work in the laboratory examination of milk has been done, though it is hoped that the State Board of Health may be able to encourage the establishment of dairies from which "certified" milk can be sold. Under these conditions, occasional laboratory examinations will be made of the milk which comes from such dairies. In addition to the laboratory examinations, veterinary inspection of the herd and general supervision of the hygienic surroundings of the dairy will be undertaken so that any departure from ideal conditions with respect to the milk, the animals or their surroundings, will result in the cancellation of their certificate. 3 In connection with the Minnesota State Funeral Directors' Association, the State Board of Health has undertaken the investigation of what constitutes satisfactory embalming. The two aspects investigated have been: (1) the undertakers' point of view—the aesthetic side—and (2) the public health point of view, *i. e.*, whether embalming as done under certain conditions results in the destruction of all micro-organisms within the body. It would seem that many of the methods employed and certain of the solutions used are not reliable. This work is not yet complete. As an illustration of the unreliability of methods of embalming, the case of a boy who had died of rabies and whose body was embalmed shortly after death, may be mentioned. The method employed was the injection into the viscera and into the cavities of formaldehyde solution, but several hours after embalming material was removed from the brain and medulla and upon subdural inoculation into rabies, rabies virus was demonstrated.

4 Research work which has been accomplished by members of the laboratory staff includes the investigation of the etiology and pathology o. "spotted fever," undertaken by Drs. Wilson and Chowning in connection with the State Board of Health of Montana. The hitherto unknown cause of the disease has been shown to be a micro-parasite somewhat akin to malaria and more nearly resembling the haematozoan of Texas fever in cattle. There seems to be good evidence to show that this is transmitted to man by tick bites.

The study of obscure septicaemias, tetanus, cerebro-spinal meningitis and other diseases in man has been undertaken as opportunity arose.

5 The care of infectious diseases of animals has been in the hands of the State Board of Health in Minnesota and a very great proportion of the time and energy of the laboratory staff has been spent in their study. This has afforded in many instances a better understanding of the processes in human disease, and has rendered possible the control and the study of those diseases which are common to both men and animals.

It is not fitting at this time to discuss in detail the study of animal diseases except in so far as they relate to analogous processes in man.

In Minnesota a number of opportunities for studying hitherto undescribed diseases of animals, or those in which little was known of the etiology, have arisen. The study of a large number of outbreaks of what seemed at first an unknown acutely infectious disease revealed the fact that haemorrhagic septicaemia has been demonstrated. The disease known as swamp fever in horses is at present under investigation and it would appear that this is an infectious process due to specific micro-oragnisms which have been isolated from many animals and which are being used in an endeavor to produce artificial infection and immunity. Some interesting observations upon infection with tuberculosis and glanders have been made during the last year, and three cases of human glanders have been studied. In such diseases as tuberculosis, glanders, actinomycosis and anthrax, it has been possible by collaboration on the part of the executive, veterinary and laboratory departments, to demonstrate more than once the occurrence of these diseases in both men and animals. The possible infection of men from animal sources renders it very desirable that the State Board of Health have control of the infectious diseases of both men and animals, since the problems relating to etiology and hygiene are to be solved along the same lines by the same means.

The presence here today of the leading medical men of Iowa, and the interest evinced in the protection of public health, is a sufficient comment on the unselfishness of physicians who show themselves ever ready and eager to aid in the prevention of disease.

In lowa there are many laboratories at the present time in which most excellent work is being done, and I have inferred from the remarks of the previous speakers and from the invitation extended to me to be present today that the State Medical Society wishes in every way to aid in the establishment of a state laboratory for the investigation and suppression of disease and unsanitary conditions.

In the establishment of a laboratory, I feel quite sure that Iowa will remember that such work cannot be carried on without adequate appropriation. Laboratory work in medicine to be of value must be done by reliable men of thorough training. The value of a state laboratory can be enhanced many times by the provision of some means whereby health officers and others interested in sanitary measures may be educated along certain lines which are of comparatively recent development.

Routine and investigaion work are both expensive and it is very frequently necessary in order to secure the best results, in fact, sometimes in order to secure results at all, that the laboratory workers go into the field or that temporary laboratories be established during the investigation of any particular problem. If this work is to be carried forward on the very best possible lines and attempts are to be made to aid local health officers and to provide special training in sanitary lines for them, a considerable sum of money must be appropriated. It is difficult, indeed, to estimate the value of such work in commercial terms, but the value is not less because of inability to state it in dollars and cents.

I sincerely hope that it will be found possible to meet all the needs of this state and I feel quite sure if suitable financial provision be afforded, the medical fraternity of Iowa will see to it that the state gets the very possible return for the money invested.

XIV

THE OBLIGATIONNS OF THE STATE TO PROVIDE SANA-TORIA FOR THE CARE OF ITS CONSUMPTIVES

BY A. M. LINN, M. D., DES MOINES, MEMBER STATE BOARD OF HEALTH

The medical and scientific world is devoting much time to the study of tuberculosis. It is attracting more discussion than any other medical question. Aside from its communicability, the erection of sanatoria for its treatment, is demanding the most consideration. A disease which carries off every eighth or ninth inhabitant should have thorough consideration of medical men. No greater boon could come to men than the discovery of means whereby the ravages of this disease can be stayed and he is a benefactor to his race who can evolve a theory whereby it may be done. Theoretically, typhoid fever is a preventable disease, but for lack of knowledge, tuberculosis is an avoidable disease, but for lack of instruction as to the means whereby it may be prevented, the ravages of tuberculosis still continue.

Our own state affords many advantages toward an intelligent effort to eradicate tuberculosis. Her population is intelligent and her people are well housed against the rigors of our climate. Her physicians are as skillful as any state can boast of and it is a fair asumption that the state is willing to assist with a helping hand toward the consummation of so desirable an end. No fairer field could offer than this in which to demonstrate the recent accepted teachings of medical science that consumption is largely amenable to treatment. An intelligent effort to combat tuberculosis necessitates a recognition of the following facts

First, consumption is an infectious disease. Second, consumption is a communicable disease. Third, consumption is a preventable disease. Fourth, consumption is a curable disease. These facts should be common knowledge. Every characteristic of an affection which proves fatal to 150,000 of the population of the United States annually, merits profound consideration by scientific men.

CONSUMPTION CURABLE

One prominent feature in the extensive discussion of congresses on tuberculosis, is the bright ray of hope which it holds out to those afflicted with this disease. It is amply demonstrated that consumption is curable. This is proven in sanatoria in many sections of the country. In its first stages the number of cures is surprisingly large, reaching as high as 75 to 85 per cent.

Upon the fact that consumption is a curable disease must be based the plea for appeal to the state for assistance. Iowa affords many advantages for the successful treatment of tuberculosis in sanatoria. It is evident that nature has endowed some sections with great climatic advantages for the cure of consumption. These advantages result largely from the fact that the patient may be much in the open air. Pure air is a prime essential and wherever this can be obtained, the cure of tuberculosis can be affected in the first stages in a very large proportion of cases. lowa is exempt from the misfortune of "congested centers of population." There are no large cities with densely populated tenement districts in which to breed the pestilence. The development of tuberculosis is favored by such surroundings with their accompanying want. Statistics of nine large American cities recently collected reveal an astonishing ratio of mortality from tuberculosis of .15 of one per cent. No such ratio of fatality obtains under the clear skies and among the intelligent, well fed, well housed population of our favored commonwealth. For this reason also, greater hope may be entertained for relief from curative efforts. Tuberculous patients need not be in a sanatorium alone to be treated. They need to be properly fed, properly trained, properly exercised, properly clothed and properly educated to care for themselves. Such care and training can be secured only in sanatoria constantly under the care of expert physicians. The average home provides few of the essentials required for the successful management of consumptives. In sanatoria each new symptom can be properly interpreted; every new condition more successfully combated and under hygienic surroundings more successfully cured than elsewhere.

A decade ago the physician held out little hope to his consumptive patient. Today a broader ray of hope spans his horizon. Formerly the consumptive when once the disease was firmly seated, was consigned to the hopeless list. Even at this present day when wanting the necessary means and surroundings for successfully coping with tuberculosis, the issue is very unpromising. The average physician when wanting the advantages of sanatoria, an essential need in successfully treating consumption, recognizes the gravity of the disease. Judging from his experience and observation, he concedes at once the practically hopeless condition of his patient. He advises change of climate trusting to nature and a sunny clime to do what he cannot. The large number of consumptives "with one lung entirely gone" who enjoy good health under the genial skies of California and Colorado, are living testimonials to the value of fresh air in the cure of tuberculosis. This advantage and also many others almost as essential can be obtained in properly conducted sanatoria without the added inconvenience of being "exiled a thousand miles from home."

CURABILITY ON CONSUMPTION DEMONSTRATED

It will be asking too much to expect the state to provide the proper sanatoria for the cure of tuberculosis without first demonstrating that it may be done. Sanatoria for the treatment of tuberculosis are being constructed and operated in many of the northern states. A numberof these have been in operation for a sufficient length of time to demonstrate their success. We have none in Iowa. Not another year should pass by until steps are taken toward supplying this want. The state would not be warranted in the expenditure of large sums of money without the contention is proven that tuberculosis may be cured in this elimate. Statistics are obtainable from many different sections sucsuccessfully operating sanatoria, some of these possessing less advantages than are afforded by the bracing atmosphere of our own state. A careful comparison of the results obtained from many different sources no more favored than our own, is that consumption is curable in this climate. The results speak for themselves.

The sanatoria have for their purpose this one end. The results are extremely gratifying. The conclusion inevitably reached from the information at hand is that pure air and a sunny clime, while essential, are not the only means required. Skillful treatment is imperative. The proper education of the consumptive is no less so. Proper exercise, proper training, proper nourishment, proper individual care, proper bathing, are each and all imperative. Possessing all these advantages which are afforded in sanatoria, more than three-fourths of the cases of tuberculosis taken in its primary stage, are cured.

The state expends annually more than \$486,000 for the maintenance of its hospitals for the insane, while \$3,564,837.15 are invested in lands and buildings for their use. Many of these insane are hopelessly incurable. No liberal-hearted citizen questions the wisdom of this expenditure. The unfortunates are well provided for, many of whom would be otherwise poorly housed and unable to obtain the necessary care and treatment to restore them to reason. The per cent of recovery is largely augmented because of the interest the state takes in these unfortunate wards. While this expenditure is made in the effort to restore to reason the demented or to mainain them where they may have reasonable comforts, the state is neglecting the opportunity to save annually many lives of value to their several communities. The expenditure for the insane is eminently right and proper, but while such an expenditure is made for the care of the insane how eminently just it would be to measure out of her abundant treasury, a small proportion of that amount for the establishment of homes for the saving of precious lives.

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SANATORIA ECONOMICAL

The victims of tuberculosis fall almost invariably in the prime of life. From 18 to 35 years of age is the usual period of fatality. It is at least a fair estimate, that each human life at the age when tuberculosis proves fatal, is worth to the commonwealth not less than \$3,000. It is also fair to assume that at this age, each day's labor is worth \$1.50. The state is not only robbed of his productiveness as a wage earner. but oftentimes is under the necessity of supporting him during a lingering illness at considerable expense. There are no means by which we may ascertain the number of consumptives within the borders of our own state. Every physician recognizes the fact that they number up into the thousands. Their unfortunate condition is not beyond remedy. Here is a great work for the philanthropist and a very large work also for the commonwealth. If the same ratio of cures can be obtained in the treatment of tuberculosis in sanatoria within our own state, it is capable of demonstration that within five years enough would be saved to the state through the cures it would effect, to pay for the construction and maintenance of a well established sanatorium.

Not all of our citizens are able to meet the expense required to go abroad for treatment. A very large majority even when life depends upon it, are unable to take the advantages offered by the genial climate of Colorado and other sections. Without the means of cure within our own borders, the tuberculous poor are oftentimes condemned to a consumptive grave. Dr. S. A. Knopf, an eminent authority on tuberculosis in an address before the New York Academy of Medicine, recently said: "Say to the statesman that every life lost from consumption represents an anual economic loss of \$850; tell him that every badly ventilated workshop or tenement constitutes a danger to the public health. Ask him to enact laws whereby ample ventilation and light shall be forever secured in public and private dwellings. There are in Manhattan over 200,000 and in Brooklyn over 125,000 dark, interior rooms without a window of any kind and having no means of light and ventilation. Tell the municipal legislator that every consumptive cured in the early stages (and 75 to 85 per cent can be cured) will never become a burden to the community, which, when poor, he will invariably become, and that he will then cost a great deal more than six or eight months' sojourn in a sanatorium at a dollar a day."

DANGER OF INFECTION LESSENED

One advantage obtainable in properly constructed sanatoria is an abundant supply of fresh air. This is one of the essentials and must be provided for in the construction. Proper temperatures must also be arranged for. Light and heat are necessary. Without these the institution would be little better than the average home. The site should be elevated, free from dust and the bustle of the city. Once in such a sanatorium the consumptive not only enhances his chances for recovery,

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but what is of prime importance, a center of infection is removed from his own home. In the home the tuberculous patient constantly endangers the lives of his loved ones. Without proper knowledge of its danger, the infected sputum may be carelessly cast upon the ground or floor and other members of the household are in constant danger of becoming infected. It is worthy of emphasis that too great importance cannot be attached to the removal of the tuberculous patient from the midst of the family circle. In an effort to stamp out this disease, it is of first consideration that the tuberculous patient shall not be permitted to remain surrounded by his own household. On the other hand it has been demonstrated that tuberculous is not spread by infection from the neighborhood of an established sanatorium. Here the patient not only learns to take care of himself, but he is taught to be scrupulously careful that he shall not be the means of infecting others.

IOWA'S OBLIGATION

The State can well afford in the present abundant prosperity to provide at least one comfortably constructed building of considerable capacity in which an intelligent treatment of her consumptive citizens may be initiated. When the success of such treatment shall be established beyond question and the advantage to the State is amply demonstrated. other sanatoria may then be established, with which to enlarge the opportunities for the cure of tuberculosis within our own borders. It is a duty of the State to protect her citizens from the law breaker and the murderer. The commonwealth does nobly in providing for the blind, the decrepit and the insane. These paternal interests of the State are immeasurably larger than they were one hundred years ago. Other avenues of usefulness and duty will continue to appear. Scientific research has within recent years established beyond question the curability of tuberculosis. An added sphere of usefulness and obligation is laid upon the legislator. Private philanthropy and public treasury will be taxed to meet the splendid opportunity to save life. In a cause of so great moment the initiative should be taken at once. The coming of springtime should witness the beginning of another great benevolence of the Statethe construction of a sanatorium for the cure of tuberculosis. The time is auspicious and the obligation is already upon us. The duty may not be denied. Within a decade there will be a number of these institutions within the borders of our favored State. in which will be found extended life and enlarged hope for our consumptive citizens.

Supplementary to the foregoing able and earnest plea of Dr. Linn, the Secretary, presents the following letter received from Dr. Knopf, of New York, referred to by Dr. Linn. Dr. Knopf is one of the most prominent and reliable writers upon the benefits of sanitoria in the treatment and care of consumptives that we have in this country. His writings have attracted great

attention and have been received with great favor abroad as well as at home. His letter, though personal and brief, is as follows:

New York, June 25 1903.

J. F. Kennedy, M. D. Secretary, State Board of Health, Des Moines, Iowa;

MY DEAR DOCTOR-Under separate cover I mailed you recently a number of my publications wherein I set forth the urgent need of state and municipal sanatoria in all the states of our Union as being among the most essential factors in the cembat of tuberculosis as a disease of the masses. I do not know that I can add anything to what I have said in these reprints and also in my prize essay "Tuberculosis as a Disease of the Masses and How to Combat it." It would seem to me that every statesman, physician and philanthropist who has the welfare of the people at heart should consider it his sacred duty to do his very best toward the creation of such institutions. Pulmonary tuberculosis is a preventable and curable disease, and it is a sad, and I might almost say, a humilitating and disgraceful fact that thousands of our fellow citizens must die every year, not because their disease is incurable, but because there are not enough places to cure it.

Modern phthisiotherapy has demonstrated that the sanatorium can accomplish most satisfactory results in nearly all climes, and surely the State of lowa can offer enough suitable sites for the establishment of a well-conducted State sanitorium for the treatment of its consumptive poor. Through the sanitorium, which, when properly conducted, is not a danger to the neighborhood but a blessing, people within and outside of the institution will become practically educated and familiar with the best means of preventing the disease. From fifty to seventy-five per cent of patients will be cured after a sojourn of eight or ten months in a sanitorium. They return to their respective communities not only as breadwinners but also as educators in the prevention of consumption and in hygiene in general. Instead of great economic loss which is now the result of the uncared for consumptive, the commonwealth will be the financial gainer. In short, a sanitorium established by a state for the treatment of its consumptive poor, if well equipped and well conducted. will prove an educational hygienic, moral and economic factor, adding to the health and prosperity of the community at large.

No state in this great country should be without such an important and much needed institution. Let me hope that the State of Iowa will not be behind in the work toward the solution of this important tuberculosis problem. To you personally I desire to express my best wishes. for the success of your noble endeavors, and remain.

> Very sincerely yours. S. A. KNOPF.

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BRITISH CONGRESS ON TUBERCULOSIS

The following concise and interesting report of this noted Congress, held in London, England, from July 22nd to 26th, 1901, inclusive, was made to the Surgeon General of the U.S. Marine Hospital Service by passed Assistant Surgeon A. R. Thomas, U. S. M. H. S., and reprinted by permission :

OPENING OF THE CONGRESS

The congress was opened by a general session on the afternoon of July 22d, the Duke of Cambridge occupying the chair on behalf of His Majesty the king. The delegates and members of the congress were welcomed by the various bodies of the city, and one delegate from each country responded. The further meetings of the congress were divided into four sections, to meet each morning as follows: Section 1, state and municipal; section 2, medical, including climatology and sanatoria; section 3, pathology, including bacteriology; section 4, veterinary. In addition, on each afternoon of the congress, a general meeting was held and an address delivered on some topic of common interest to the whole congress. Various forms of social diversion were provided during the week, including garden parties, receptions, and a dinner to the foreign delegates.

PROFESSOR KOCH'S ADDRESS ON TUBERCULOSIS

The first general meeting on July 23d was addressed by Professor Koch of Berlin, his subject being. "The fight against tuberculosis in the light of the experience that has been gained in the successful combat of other infectious diseases." He said that since the discovery of the bacillus of tuberculosis it was evident that tuberculosis was a preventable disease, and in combating it as such it would draw valuable lessons from our experience in other pestilences, for we had learned that every disease must be treated individually and measures adopted according to its spcial nature and etiology. An illustration of this principle is plague, where 13

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formerly the patient was considered in the highest degree a center of infection, but now only patients with plague pneumonia are so regarded, and we know that the chief source of contagion are the rats affected with plague, and effective work could be done in exterminating rats, otherwise the chief etiological factor is not touched. Cholera offers another example, for here the chief propagator of contagion is the water, and so the water is the first thing to be considered. Hydrophobia is also instructive, for while inoculations are curative, they are not preventive of infection, and the only real way of combating this pestilence is by compulsory muzzling. Lastly, leprosy is closely akin to tuberculosis, and like it only spreads from man to man by close contact, so to combat it it is necessary to prevent close communication of the well and sick, and so isolation is adopted.

In by far the majority of cases of tuberculosis the disease has its seat in the lungs, and has also begun there. From this it is justly concluded that the germs of the disease—that is, the tubercle bacilli must have got into the lungs by inhalation. As to the question where the inhaled tubercle bacilli have come from there is also no doubt; on the contrary, we know with certainty that they get into the air with the sputum of consumptive patients. This sputum, especially in advanced cases of the disease, almost always contains tubercle bacilli, sometimes in incredible quantities; by coughing and even speaking, it is flung into the air in Mittle drops—that is, in a moist condition, and can at once infect persons who happen to be near the coughers, but it may also be pulverized when dried in the linen or on the floor, for instance, and get into the air in the form of dust.

The bacilli may get into other organs in the same way, but rarely. Transmission by heredity is extremely rare.

It is generally assumed that another source of infection exists in the transmission of germs from animal to man, but investigations by him have led to a contrary conclusion. Experiments were conducted by feeding tubercular free young cattle and swine with tuberculosis material from bovine and human sources, with the result that from bovine sources the animals became infected, while from human sources they remained free, and the conclusion would seem to be that human tuberculosis differs from bovine and cannot be transmitted to cattle. But more important is the question as to whether bovine tuberculosis can be communicated to man, but this is impossible of absolute demonstration. As large quantities of butter and milk are consumed containing bacilli, it would seem that many cases of tuberculous affections should be caused, but from the examination of a large number of post-mortem reports, it was found that primary intestinal tuberculosis was extremely rare even in children in whom it ought to be most common.

"Though the important question whether man is susceptible to bovine tuberculosis at all is not yet absolutely decided, and will not admit of absolute decision today or tomorrow, one is nevertheless already at liberty to say that if such a susceptibility really exists the infection of human beings is but a very rare occurence. I should estimate the extent of the infection by the milk and flesh of tuberculous cattle and the butter made of their milk as hardly greater than that of hereditary transmission, and I, therefore, do not deem it advisable to take any measures against it."

The main source of infection in tuberculosis is, therefore, the sputum of patients, and to prevent this infection is our first object. Isolation is impracticable and also unnecessary. If proper precautions are taken no infection need occur, but this is difficult among the poor where there is overcrowding, bad ventilation, and often whole families are thus infected. Therefore, the first indication is to improve the social condition of the poor, and, secondly, to provide consumptive hospitals where patients in the later stages may obtain treatment gratis, and where the patient would be willing to go. England is the only country having any great number of such institutions, and the diminution of consumption in this country is probably due in a large measure to this reason. Another measure especially valuable is compulsory notification, which not only shows the number of tuberculous persons, but also where they reside, and, therefore, where disinfection and instruction are necessary. Disinfection is of the greatest importance, not only of rooms and houses, but also of infected bedding and clothing. Education of the public is of great benefit, for it has already done much to limit infection.

On the other hand, for treatment, are the sanatoria, which have lately come into vogue, and can cure a certain number in the early stages of the disease. This number is small, however, in comparison with the whole number of infected persons, and its value should not be over-estimated.

"And now, in conclusion, to glance back once more to what has been done hitherto for the combating of tuberculosis, and forward to what has still to be done, we are at liberty to declare, with a certain satisfaction, that very promising beginnings have already been made. Among these I reckon the consumption hospitals of England, the legal regulations regarding notification in Norway and Saxony, the organization created by Biggs in New York, the sanatoria, and the instruction of the people. All that is necessary is to go on developing these beginnings, to test and, if possible, to increase their influence on the diminution of tuberculosis, and wherever nothing has yet been done to pursue similar measures."

DISCUSSION OF PROFESSOR KOCH'S ADDRESS

It is needless to say that this address has given much ground for discussion throughout the congress. Lord Lister remarked that it would be a serious and grievous thing if it should lead to any relaxation of the efforts being made at present to provide a pure milk supply, and it should turn out that these views of Professor Koch were erroneous. He cited the instance of smallpox and cowpox and stated that while smallpox could not often be inoculated from man to cows, it was possible to inoculate monkeys from man and afterwards cows from the monkeys, and we now know that the two diseases are identical. He further said that he agreed with the speaker that further investigation was desirable.

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Professors Nocard, Bangs and Sims Woodhead all agreed with Lord Lister.

PROFESSOR BROUARDEL'S ADDRESS

The third general meeting was addressed by Professor Brouardel, of Paris, on "The measures adopted by different nations for the prevention of consumption." He pointed out the havoc that was caused by this disease and the slowness in recognizing its dangers until its infectiveness was proven by Willemin and Koch. Before this England had recognized the dangers arising from damp and dark dwellings and seventy years ago began the crusade for healthy dwellings. The grounds of prevention in all countries are identical-that is, that tuberculosis is preventable and curable. First comes legislation and the education of public opinion. Pamphlets are issued for the information of the public in England by the National Association for the Prevention of Consumption, and in Germany societies were founded for building sanatoria and popularizing sanitary ideas. Belgium has a national league against tuberculosis. Norway has voted money for the printing of a popular work on tuberculosis. In France they have collected together those who can teach, and popular lectures are given, and on every hand societies for the prevention of tuberculosis are springing up. This year 88 lectures on tuberculosis had been given to 12,000 pupils. Thus gradually in all countries the public are beginning to realize that personal care and cleanliness are necessary to obviate contagion, and are also realizing that other idea to my mind equally important, that a consumptive patient is only dangerous if the necessary precautions are not taken around him, and if he himself does not take them to protect his relatives, friends and fellow-workmen from contagion. The great danger is spitting, and once this disgusting habit has been suppressed, consumption will decrease rapidly. In the United States the habit is against the law, and in Sydney, New South Wales, a fine of £1 is imposed for spitting in the streets. The sputum is not dangerous if put in antiseptic receptacles, or if thrown in dry and well-lighted places it soon loses its dangerous properties; thus, more victims occur in dark and ill-ventilated houses, for here it retains its virulence a long time. Thus the importance of healthy dwellings becomes plain, and is recognized by various countries, notably England, which has several acts dealing with workmen's dwellings, and model dwellings are largely built. In Germany also an effort is being made in this direction. Belgium is also one of the most enthusiastic countries in taking up this subject, but in Denmark building societies have flourished best of all. In France also something has been done in this direction, and all authors agree that mortality is lower in these healthy houses and in the town in which they are built. Bad quarters exist in all towns, which are a hotbed of tuberculosis, and these must be found and demolished. Alcohol is another potent cause of tuberculosis, and it has been shown that the death rate is higher from this disease in the different classes of society in proportion to the amount of alcohol consumed. In scrofulous children and those reared in unhealthy dwellings the duty is to build up the body. For this purpose there are established in France

and Italy and other countries, sanatoria at the seaside for such children, with good results. France has 14 such institutions that accommodate more than 2,000 children a year.

Prevention also follows the line of food, and the inspection of meat is in this direction. However, the great danger here is in the private slaughterhouses where no inspection occurs. In milk the danger is in tuberculosis mastitis and here the danger can only be recognized by examination of the udders. In England it is a noticeable fact that while the deaths from tuberculosis have decreased 45 per cent in the last fifty years the deaths in children have increased 47 per cent, which is attributed to the increase of abdominal tuberculosis due to milk. Strict inspection measures are adopted in Norway. Sweden and Denmark.

Coming to the curability of tuberculosis, we know it is curable in all stages, but especially in early stages, as is abundantly shown by postmortem examination and the finding of cicatrices of all sizes in the lungs. For this object come dispensaries where the patient can obtain treatment in the earlier stages and receive instruction regarding measures of hygiene and feeding, and if necessary be sent later to a sanatorium. In Germany there are polyclinics for tuberculosis, in the large towns, where the patient can be treated throughout the illness or till sent to a sanatorium, and a committee connected with it looks after the patient at home, tells his wife what to do, and sees that the house is kept clean and as far as possible, relieves the poverty caused by the breadwinner's illness by means of a bank kept for such purposes.

The same idea was first carried out in France by Chalmette but he went further in going and seeking out the consumptive and inviting him to come to the dispensary, and he has established a dispensary of these lines at Lille, and several others have been founded on similar lines in various parts of France.

Some patients must be sent to sanatoria, and here the principles are rest, moral and physical, stuffing, and the open air treatment. In Germany this system is carried out most enthusiastically, and there are 83 satatoria opened already or ready to open which can accommodate 12,000 patients each year. They have been built by local insurance, by sickness banks, by the manufacturers who have combined to found sanatoria for their workpeople, by parishes which have united for the purpose. There are more of the latter. In some parts a tax of from 1d. a head has been exacted. The state has also founded several sanatoria for its servants. Patients remain three months, and it is thought advisable that they return for a month's treatment the next year. The results seen satisfactory, for from 46 to 60 per cent of those who leave were able to work. Germany's example has been followed by England, Scotland, Australia, Canada, Austria and America, also in Russia, Sweden, Denmark, Norway, Italy and the Netherlands sanatoria are building, and in France several sanatoria have been opened. In the United States, also, wards are assigned in hospitals for the exclusive use of consumptives. From an international standpoint, it would seem that consumption cannot be treated as plague and the other pestilences, but much can be done by dis-

infection of railroad carriages, steamboats and hotels. In the United States hotel keepers are obliged to notify the authorities if they receive a consumptive patient, and disinfection of the room so occupied is compulsory. The minister of the interior in Germany has brought in even more stringent measures. Every doctor who attends a case of pulmonary or laryngeal tuberculosis is bound to report it in writing to the police as soon as he has made his diagnosis. After death from tuberculosis the room in which the patient has died has to be disinfected and also his belongings. Hotel proprietors, furnished housekeepers, asylums and other public institutions are compelled to notify at once every case of tuberculous disease which arrives in their establishments.

PROFESSOR MCFADYEAN'S ADDRESS

The fourth general meeting was addressed by Prof. John McFadyean, of the Royal Veterinary College, his subject being "Tubercle bacilli in cow's milk as a possible source of tuberculous disease in man." He said that until a few days before he had not thought he would have to argue the question as to the identity of human and bovine tuberculosis, but Professor Koch's address made this necessary. He thought Professor Koch's train of reasoning appeared to be the following:

First. That the bacilli found in cases of bovine tuberculosis were much more virulent for cattle and other domestic quadrupeds than the bacilli found in cases of human tuberculosis.

Second. That this difference was so marked and so constant that it might be relied on as a means of distinguishing bacilli of bovine tuberculosis from those of the human disease, even assuming that the former might occasionally be found as a cause of the disease in man.

Third. That if bovine bacilli were capable of causing the disease in man, there were abundant opportunities for the transference of bacilli from the one species to the other, and cases of primary intestinal tuberculosis from the consumption of tuberculous milk ought to be of common occurrence, but post-mortem examination of human beings proved that cases of primary intestinal tuberculosis were extremely rare in man, and, therefore, it must be concluded that the human subject was immune against infection with the bovine bacilli, or was so slightly susceptible that it was not necessary to take any steps to counteract the risk of infection in this way.

He thought one of these premises was ill founded and the others had little or no bearing on the subject, and that reasonable ground remained for regarding tuberculous milk as distinctly dangerous to man. He argued that even if bovine bacilli were more virulent to cattle, and that human bacillus had little virulence, the opposite did not follow, and the probability was all the other way, for it was known that those bacteria that were common to all the domesticated animals were also pathogenic to man. As for infection from cattle to man, he quoted the post-mortem records from the hospital for sick children in London and the Royal Hospital for sick children in Edinburgh. Out of 547 cases of tuberculosis the proportion of primary infection through the intestine was found at the former institution to be 29.1 and the latter 28.1 per cent. He hence submitted that there was strong prima facie evidence that animals were a possible source of human tuberculosis. He thought the diseased cows were only dangerous when the udders were affected, for it was estimated that 30 per cent of the milk cows in England were tuberculous, and only about 2.2 per cent had the udder affected. In the latter class, the milk often contained large quantities of the bacilli and the danger was greater because in the early stage such udders were quite painless and no change showed in the character of the milk. Another source of contamination of milk that could not be lost sight of was dust and dirt. As a remedy, he thought the tuberculin test impracticable, because too expensive and too disturbing to the cattle industries. He, therefore, recommended periodical inspections at brief intervals by competent inspectors. He supported also the compulsory notification of udder disease and of symptoms of tuberculosis in milked cows and the interdiction of the sale of milk from any animal suffering from tuberculous disease of the udder, or exhibiting clinical signs of tuberculosis.

DR. BIGGS ON "THE NOTIFICATION OF TUBERCULOSISE

In the section of state and municipal Dr. Biggs of New York presented a paper on "The notification of tubercolosis." dealing mainly with New York City, but he also mentioned that notification was also compulsory in Michigan, Buffalo and Philadelphia. New York was the first to pass such a law in 1893, but the compulsory notification was not complete, physicians in private practice only being invited to notify. Sputum was examined free of charge and at the end of the third year 8,000 specimens per year were examined. Efforts were made to disinfect premises in which death from tuberculosis had occurred. In 1897 it was resolved by the board of health of New York that tuberculosis being a dangerous and contagious disease, every physician should report in writing as to patients suffering from that disease within one week of being called in, and a sum was appropriated for the care of poor tuberculous patients. This resolution was not strictly enforced as regards private patients, but public opinion was gradually decreasing the number of cases not notified. In consequence of these measures and the better treatment of consumptives, there has been a decrease of 30 per cent in mortality arising from tuberculosis.

ALDERMAN MACDOUGALL'S PAPER ON VOLUNTABY NOTIFICATION

Alderman Macdougall of Manchester read a paper on the working of the voluntary system of notification in that city. At first it was restricted to institutions, but later, in 1900, private physicians were invited to notify, in order that—first, the assistant medical officers might visit the homes of patients and instruct the household in the precautionary measures to be adopted, leaving with them printed instructions. Second, that the nature of measures of disinfection required might be determined. Third, that they should make inquiries into the exposure to infection of individual cases from relatives, work mates, friends, etc., and into their occupations and places of work, the various houses which they had in-

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habited, their physique, personal habits, etc Fourth, that supervision might be maintained over infected households, change of address ascertained, personal precautions and household cleanliness maintained, and necessary measures of disinfection carried out from time to time. Fifth, that it might be ascertained if the required measures of disinfection were being executed. Sixth, that assistance might be given in getting bacteriological examination of sputum in suitable cases. Seventh, that information regarding households might be obtained to serve as a basis for hospital provision.

The number of cases notified from September, 1899, to March 31, 1901, had been 2,338, and of these 1,701 had been in institutions and 638 In private practice. In addition to disinfection and cleansings, notes were made of centers of infection.

Dr. M. Holmboe said that in Norway notification was limited to pulmonary tuberculosis and tuberculosis of the skin and urinary organs that could be positively diagnosed. Deaths from tuberculosis must be reported and the premises be disinfected. He thought compulsory notification was necessary to give authorities power to enforce sanitary orders. Various other members expressed their opinion, all being in favor of some form of notification, and the following resolution was passed: "That the voluntary notification of cases of phthisis attended with tuberculosis expectoration and the increased preventive action which it has rendered practicable has been attended by a promising measure of success, and that the extension of notification should be encouraged in all districts in which sufficient sanitary ministration renders it practicable to adopt the consequential measures."

PREVENTION OF TUBERCULOSIS IN CHILDHOOD

Two papers on the prevention of tuberculosis during childhood were presented. One by Dr. Leon Petit, of Paris, reporting the establishment of dispensaries for children in that city and the good that had resulted. Dr. Knopf, of New York, read a paper on the state and individual prophylaxis of tuberculosis during childhood, advocating the separation of consumptives and children and the doing away of many habits tending to infect children, such as kissing and the tasting of food.

THE INFLUENCE OF HOUSES AND ACCREGATION

Under the "Influence of houses and aggregation," Dr. Coates, of Manchester, reported experiments made with dust from various localities. In 23 specimens taken from dirty and infected houses, 66 per cent proved infective. In 10 clean but infected houses 50 per cent proved infective, and from the waiting room of a large consumptive hospital and a large general hospital the results were negative, but specimens from a railroad waiting room gave positive results in 2 cases. For disinfection he recommended the use of a solution of chlorinated lime, 1½ ounces to a gallon. Walls, ceilings and floors, and all suitable articles of furniture were to be thoroughly washed with this several times. Clothing and bedding should be steamed, and wall paper in clean houses and with no sputum attached might be cleaned with bread dough. Various members spoke of spittoons, and the general opinion seemed in favor of some form of combustible receptacle contained in a metal or porcelain carrier.

CONTROL OF MEAT AND MILK SUPPLIES

Mr. Shirley Murphy opened a discussion on the control of meat supplies. He said there was very little new to be said on the subject. He gave a review of the measures adopted in England for the prevention of the sale of tuberculous meat, but added that there was always the possibility of a tuberculous animal being slaughtered under conditions avoiding inspection. Other speakers spoke in the same vein.

In the discussion of milk supplies, nearly every speaker took occasion to disagree with Professor Koch, and to express the opinion that tuberculous milk was dangerous to man as a food. Professor Delapine thought no animal could be declared free of tuberculosis unless the tuberculin test had been applied.

SANATORIA

In opening a discussion on the provision of sanatoria, Sir James Creighton-Browne said that sanatoria were needed for two reasons, first to cure those affected in curable cases, and second that incurable cases might be removed so as not to be a source of infection as well as having a life prolonged and the comforts necessary to their condition. It was held that the tendency to spontaneous cures were what made sanatoria so necessary, and it ought to be brought within the limit of all classes. He thought there ought to be three classes of sanatoria, first, for the affluent; second, for the competent, and third, for the poor.

CLIMATOLOGY

In opening a discussion on climatology, Dr. Theodore Williams said that in whatever climate the patient was treated the great object was to get him into the open air and to live under the most favorable hygienic conditions. The climate that best fulfills the open-air treatment need not be a very warm or a very cold one, but should be dry and stimulating, and with abundant sunshine, admitting of much exercise and producing nervous and muscular vigor. Climates might be classified as, first, marine climates, including sea voyages; second, mountainous climates, partly inland, partly marine, and third, mountainous climates. Under marine climates are the south coast stations of England and Ireland having an equable temperature and a good deal of wind with considerable rain and many rainy days. They were suitable for chronic cases and especially the strumous forms. Sea voyages were going out of vogue, partly at least, because steamers made the trip too short, and also because of the disadvantages of the close cabin and the lack of exercise and also because other methods of treatment had come into use.

Under dry warm climates are, first, the desert, giving dryness and warmth. sunshine and great radiation with the consequent great variation of day and night temperature, and the asepticity of the atmosphere. In experience these climates produce a diminution of secretion and

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improvement and quiescence, but seldom absolute arrest. Second, comesthe warm dry climate of the Mediterranean Basin. It is cooler and more stimulating than the desert and clearer and with less fog and rain than the English-coast stations, and the cool nights are especially advantageous.

Mountainous climates are characterized by: First, diathermancy; second, asepticity, and third, by the physiological effects on the body, tanning the skin, at first quickening, then slowing the circulation, and fuller respiration accompanied by dilatation of the thorax. He gave statistics of 385 cases treated in high altitudes in various places, the treatment averaging eleven and a half months. The results were that 173 or 45 per cent completely recovered, 77 or 20 per cent greatly improved, and 54 or 14 per cent improved, so that in all 334 improved. His conclusions as regards the effects of the high altitude on consumption are, first, that the respiration of the rarified atmosphere produces hypertrophy of the healthy lung and local pulmonary emphysema around the tuberculous lesion, giving rise in due time to thoracic enlargement; second, that it is possible the arrest of tuberculous disease is at least partly due to the pressure exercised on the tuberculous masses by the increasing bulk of the surrounding lung tissue, which, by emptying the blood vessels, promotes caseation and cretefaction of the tubercle; third, that these changes are accompanied by general improvement in digestion and assimilation, the cessation of all symptoms of disease, the return of normal functions by gain of weight, of color, of nervous and muscular activity, and of respiratory and circulatory power: fourth. that arrest of disease takes place in 58 per cent of tuberculization cases and great improvement in 87 per cent; that in excavation cases arrest occurs in 21 per cent, and great improvement in 61 per cent; fifth, that the climate is especially beneficial in hemorrhagic phthisis and phthisis in which hereditary predisposition is strongly marked, and is well suited to chronic tuberculosis of the lungs in general; sixth, that males and females seem to do equally well and to profit most between the ages of 20 and 30, and seventh, that the climate is contraindicated in acute phthisis, catarrhal phthisis in laryngeal phthisis, in cases of phthisis accompanied by great nervous irritability, in cases of double cavities with fibroid phthisis and in all patients whose pulmonary surface has been so much neduced from any cause that it does not suffice for complete respiratory purposes.

Dr. Burney Yeo followed on much the same lines, the objects of treatment by climate being, he stated, to arrest catarrhal conditions of the air passages, to improve nervous and circulatory tone, to increase the activity of the digestive functions and thus stimulating nutrition by promoting the desire and increasing the power to exercise, to raise the moral tone by affording a clear, bright and cheerful environment, and to diminish by its asepticity bacteriological activity.

In conclusion, he stated that a suitable climate relieves or removes catarrhal conditions acompanying the disease in a number of cases; it raises nervous and vascular tone, it increases muscular energy and the ability as well as the desire for exercise; by rendering an open air life possible, it increases the aeration of the lungs and diminishes the activity of bacterial agencies. It improves the tone and promotes the activity of the digestive functions.

In regard to suitable climate, he said that cases treated at the commencement of the disease, and who were otherwise in good health, may be permitted a certain amount of latitude in the choice of climate. Second, for progressive febrile cases, repose in bed or on the couch at home is the best condition practicable for the free access of air and sunshine. Third, for catarrhal cases, soothing climates like Maderia or Teneriffe are best. Fourth, for rheumatic or gouty cases of the fibroid type, dry marine climates or the desert are most suitable.

USE OF TUBERCULIN

The discussion regarding the therapeutic and diagnostic value of tuberculin was opened by Dr. Heron, who gave a short history of it, and thought it had fallen into disuse owing to its frequent use in unsuitable cases, its administration in too large doses, neglect of the rule that a dose should never be given until the patient's temperature had been normal for the pervious twenty-four hours at least, neglect of the rule that the dose of tuberculin should never be increased, but rather diminished, when its administration has been followed by a rise of temperature, and the prejudice raised against the remedy among both medical men and patients, because of the severity of the symptoms which not seldom follow upon its use. Of 51 cases treated by him, 17 were lost sight of, and of the remaining 34, 16 were known to be well. Lupus did well up to a certain point and then relapsed. One case of lupus treated by the new tuberculin recovered permanently. Tuberculin was now known to be worse than useless in cases of mixed infection. For diagnosis, tuberculin was most valuable, making very early diagnosis possible, when the chances of recovery were best.

Professor Koch said that if the diagnostic injections were properly made in the human subject, it was a valuable method and without danger. The injections should be small enough in weak subjects; not more than .1 mm. was enough to begin with, and no second injection should be given until the temperature was again normal. If the first injection gave a faint reaction a second injection of the same quantity frequently gave a very marked reaction. Over 3,000 cases had come under his observation, and he concluded that the diagnostic test of tuberculin was almost absolute. As a therapeutic agent he had no doubt it was of great value in early uncomplicated cases, and when used in these cases a complete cure frequently resulted. In advanced cases it was necessary that the temperature should be normal before the injections began. The treatment should be continued over a long period, if necessary, with intervals of three or four months, until they gave no reaction. In answer to a question, Professor Koch said the tuberculin was prepared from tubercle bacilli of human origin, but that the reaction was produced in both man and cattle, and though the bacilli were different they possessed a common "group" reaction.

Many members spoke for and against the use of tuberculin, but most were agreed that its diagnostic value was great and harmless, but opinion was much divided on the curative qualities.

DISCUSSION ON SANATORIA

In opening the discussion on sanatoria, Dr. Clifford Allbutt said that open-air treatment was possible at home, but was best carried out in sanatoria and had been perfected there. The coldest air possible was the best stimulant for the appetite and made forced feeding unnecessary, but it varied for different individuals. What a young man could stand was too cold for an old or a weak one. Two degrees of cure were possible in sanatoria, arrest or oblescence; but the latter was hardly possible with the poor, requiring on the average two winters and one summer; so an economic cure was to be aimed at rather than absolute cure. Six months would be required in the majority of cases. He protested against the empitness of mind advocated by some reformers and would give amusement and tranquil occupation.

Dr. Phillip, as a result of ten years' experience, said that each case must be treated per se; rest and exercise must be considered together and regulated by the temperature and the pulse; a full dietary was necessary, but not forced feeding. The location of the sanatorium was not dependent upon the surroundings or ground; it could not be too far from the large centers of population, and it was better if patients were treated in their native air.

Dr. Burton-Fanning presented a report of a sanatorium treatment in England, covering 716 patients from sanatoria where patients paid their way. As a result, 92 per cent gained weight; quiescence or definite recovery occurred in 25.1 per cent; of patients without fever or quickened pulse, 63.6 had quiescence or recovery.

THE ROENTGEN RAY IN TUBERCULOSIS

In discussing the use of the Roentgen ray in the diagnosis of pulmonary tuberculosis, Dr. Walsham said that in normal lungs they were quite transparent from apex to base, with the exception of a few illdefined shadowy lines to the right of the heart. The movement of the diaphragm like a piston up and down was ordinarily equal on the two sides of the chest, but in disease was much less on the affected side, even when the disease was limited to one apex. In well-developed cases of tuberculosis the diseased areas showed as flocculent shadows punctate in parts. He would say that the rays could not decide the earliest stage of tuberculosis in the lungs, but they would definitely show tuberculosis, and that at a very early stage.

THE TURERCLE BACILLUS

Dr. Alfred Moeller, of Belzig, in opening the discussion of the morphological and physiological variations of the bacillus of tuberculosis and its relation to other bacteria resistant to acids and to the streptothrices, said that he had shown that bacteria which were acid fast were not necessarily tubercle bacilli, as, for instance, the smegma bacillus and the bacillus of avian tuberculosis. A series of bacilli resembling the tubercle bacillus had recently been found, including the butter bacillus and the Timothy bacillus. The tubercle bacilli, like all the acid fast bacilli, seemed to belong to the streptothriciae.

RESOLUTIONS ADOPTED BY THE CONGRESS

The last general meeting was held on the afternoon of July 26th and the following resolutions were adopted:

I. That tuberculous sputum is the main agent for the conveyance of the virus of tuberculosis from man to man. Indiscriminate spitting should, therefore, be suppressed.

2. That is the opinion of this congress that all public hospitals and dispensaries should present every out-patient suffering from phthisis with a leaflet containing instructions with regard to the prevention of consumption, and should supply and insist on the proper use of a pocket spittoon.

3. That the voluntary notification of cases of phthisis attended with tuberculous expectoration and the increased preventive action which it has rendered practicable has been attended by a promising measure of success, and that the extension of notification should be encouraged in all districts in which efficient sanitary administration renders it possible to adopt the consequential measures.

4. That the provision of sanatoria is an indispensable part of the means necessary for the diminution of consumption.

5. In the opinion of this congress, in the light of the work that has been presented at its sittings, medical officers of health should continue to use all the powers at their disposal and relax no efforts to prevent the spread of tuberculosis by milk and meat.

6. That in view of the doubts thrown on the identity of human and bovine tuberculosis, it is expedient that the government be approached and requested to institute an immediate inquiry into this question, which is of vital importance to the public health and of great consequence to the agricultural industry.

7. That the educational work of the great national societies for the prevention of tuberculosis is deserving of every encouragement and support; it is through their agency that a rational public opinion may be formed, the duties of public health officers made easier to perform, and such local and state legislation as may be required called into existence.

8. That this congres is of the opinion that a permanent international committee should be appointed to collect evidence and report on the measures that have been adopted for the prevention of tuberculosis in different countries, to publish a popular statement of these measures, to keep and publish periodically a record of scientific research in relation to tuberculosis, and to consider and recommend measures of prevention. This congress is further of opinion that such a committee should consist of representatives to be elected by the great national societies formed for the suppression of tuberculosis and also representa-

tives nominated by various governments. It is further of the opinion that all international committees and great national societies whose object is the prevention of tuberculosis should be invited to co-operate.

9. In the opinion of this congress, overcrowding, defective ventilation, damp general unsanitary condition in the houses of the working classes, diminish the chance of curing consumption and aid in predisposing and spreading the disease.

10. That while recognizing the great importance of sanatoria in combating with tuberculosis in countries, the attention of governments should be directed towards informing charitable and philanthropic individuals and societies of the necessity for antituberculous dispensaries as the best means of checking tuberculous disease among the industrial and indigent classes.

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SMALLPOX—DIAGNOSIS AND PREVENTION

BY J. H. SAMS, M. D., CLARION, MEMBER OF STATE BOARD OF HEALTH, FOURTH PUBLIC HEALTH DISTRICT

In attempting to write on the subject of smallpox it is not my intention to enter into a purely scientific discussion of the subject, nor, in fact, to discuss at any very great length the symptoms and diagnosis of smallpox, as these are, through the instrumentality of smallpox circulars issued by the State Board of Health, health bulletins, medical journals and text-books, well known by physicians, and quite so by a portion, at least, of the laity.

TYPES OF THE DISEASE

There is, however, so much contrast between the older description of smallpox as related in the text-books and the behavior of the present epidemic, that there is some excuse for a physician, on being called to his first mild case, for overlooking the true condition. Though mild cases are described it is the severer cases that are given the most attention. Flint says, "Not every smallpox vesicle is umbilicated; in mild cases there may remain no trace of the eruption." Some of the pocks do not break, but harden, and their contents are absorbed. It is probable that in these cases the corium is not involved in the suppuration, or that the vesicles are not converted into postules. Some persons are wholly insusceptible without vaccination. Some have become susceptible after having been insusceptible for many years.

Osler's "Practice of Medicine" reads: "Whether pitting takes place depends a good deal upon the severity of the disease." In the majority of cases Sydenham's statement holds good, that: "It is very rarely that the distinct (discreet) smallpox leaves its mark."

"The American Ssystem of Practical Medicine," by Loomis-Thompson, quotes Dr. Wm. M. Welch as saying: "There may be only a few small pustules scarcely definite enough to verify the disease. Discreet variola is attended by no great danger." It is well known that in some unprotected persons there is naturally but slight susceptibility to

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the infection, and the disease in this class is mild and of short duration. Hyde says: "The most significant and startling contrast between modified and unmodified smallpox is exhibited when the patient, after reaching the stage described of complete development of pustules, suddenly ceases to betray any further significant symptoms of smallpox. The pustules dry rapidly into crusts which are thrown off and leave the skin either somewhat stained at the point where the crusts formed, or in nearly its normal condition."

CAUSE OF ITS SPREAD

In the face of these statements by men of recognized ability and experience, we still have some physicians in Iowa who, I am sorry to say, are calling their mild smallpox cases chicken-pox. Cuban itch, or perhaps, not giving it any name save to say that it is not smallpox. In a good many instances this is not from lack of ability to make a proper diagnosis, but from the selfish or timid idea that if they are called to those cases and diagnose smallpox they will be replaced by some physician who will diagnose chicken pox. Cuban itch or anything but smallpox, and the family thus escape quarantine and the regulations governing such cases. This is a pitiable condition of affairs in some localities, and a condition which, through the action taken by our State Board of Medical Examiners in dealing with some physicians when they repeatedly fail to recognize or diagnose this disease as smallpox, even after efficient counsel has made a diagnosis of smallpox clear, is making rapid change in the right direction. Some, in the early part of the present epidemic, have been honestly mistaken in diagnosis, but when their mistake was recognized they were quick to acknowledge the same. and energetic in their efforts to prevent further spread of the contagion.

The mildness of the epidemic has, no doubt, been the great contributing factor in the spread of the disease, inasmuch as a very great number of people are ignorant, indifferent, or directly opposed to vaccination, even in the face of abundant clinical evidence, scientific research and statistics testifying to its efficacy as the means par excellence in the prevention of smallpox; others claiming they would rather have smallpox than be vaccinated, this latter class using the untrue statement that more people die from vaccination than from smallpox, and, when oncecontracted, the majority of the above class pay but little attention to quarantine, going about their ordinary duties, sending their children to school, mingling with their fellowmen in public places, on railroad trains, etc. It is this mild epidemic, the importance of which an early diagnosis of a case and the prompt and efficient measures adopted to limit its spread and protect others, that the writer has in mind in writing this article. However, I would not lose sight of the fact that not all persons contracting the disease have it in such a mild form, for a very considerable number have succumbed to smallpox each year in the United States since the beginning of the mild epidemic, which has existed in different sections of our country since its first appearance in Alabama and Tennessee in 1897.

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The above statement may be borne out fully if anyone will take the trouble to look up the vital statistics on this point. The city of Cleveland, during an administration of anti-vaccinationists who claimed that thorough disinfection was all that was necessary to stamp out the disease, had an epidemic during which some twelve hundred persons suffered from the disease, and over two hundred deaths resulted. Seeing that the disease was not being controlled in this way, a most vigorous crusade was inaugurated, in which vaccination and revaccination was made the main weapon of defense, with the result that the disease was soon under control, and finally entirely wiped out. This affords another dearly learned lesson of the efficacy of the foremost method in the prevention and control of this formidable trouble.

The death rate from smallpox in the state of New York during the month of June, 1901, was the highest ever recorded for any one month in the history of the state. The tendency of the disease seems to be toward a change in type to the more severe forms of the disease, and the sooner the laity awaken to the necessity of this prophylactic measure, viz.: vaccination, as the means of stamping it out; and act in accordance with such realization, just so soon will we get rid of it. Let us look for a few moments at some comparisons and facts concerning vaccination, and, after doing so, draw our own conclusions.

VACCINATION AS A PREVENTIVE

Vaccination was made obligatory in the German army in 1834, and among all classes of the community in 1874. The effect was at once seen in the mortality from smallpox, which was almost eradicated in the first instance and very greatly reduced in the second. In 1870-71, during the Franco-Prussian war, the two peoples inter-penetrated each other, the German having its civil population vaccinated optionally, but its army completely vaccinated, while the French (population and army alike) were vaccinated perfunctorily. Both were attacked by smallpox. The French army numbered 2,200 deaths by it, while the German army had only 278, and in the same tent, breathing the same air, the French wounded were heavily visited by the disease, while the German wounded. having been vaccinated, had not a single case. From 1875 to 1887 one death occurred from smallpox in the German army, and this in a soldier who had been revaccinated unsuccessfully; while in the French army from 1875 to 1886 there were 550 deaths from the same cause. In France, in 1896, the disease was 1,176 times as great as that of Germany for the same year, notwithstanding the contiguity of the two countries. The comparative immunity of the entire German nation from smallpox, at the present day, is due solely to vaccination.

Attempt has been made by those who oppose vaccination to minimize the value of these remarkable figures by attributing the diminished death rate and comparative absence of the disease in the German army and in Germany, as in Sweden, to the improved sanitary conditions. This argument is absurd. There was no sudden movement in sanitary conditions in either Sweden or Germany, and neither country was more

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sanitary than others with which comparisons have been made. Furthermore, during the Franco-Prussian war the German soldiers suffered and died from such infectious diseases as dysentery and typhoid fever, not only in like, but often in greater numbers than the French troops. If the "improved sanitary conditions" referred to existed in the German army, the spread of these infectious diseases would have been prevented also.

The futility of placing sole dependence on isolation and cleanliness, as a means of quelling an epidemic of smallpox, was conclusively shown in Gloucester, England, the former center of the anti-vaccination propaganda, during the epidemic in that city in 1895 and 1896. Among a population of 42.000 there occurred 1.979 cases of smallpox, 439 of which proved fatal. The strongest efforts were put forth to check the spread of the disease by disinfection and quarantine, but without avail. The epidemic raged until vaccination was enforced, when it rapidly subsided. As elsewhere, those who were loudest in decrying the influence of vaccination were among the first to avail themselves of its benefits as soon as it became evident that the plague could not be quelled by any other means.

In an epidemic of smallpox in Birmingham, Ala., in 1897 and 1898, investigated by the United States Marine Hospital service, 225 cases were treated, of which 219 were in colored persons and 6 in white. Of the whole number 106 had never been vaccinated, and 101 unsuccessfully; two presented good scars, five doubtful ones, and seven had been recently vaccinated.

At the Philadelphia Municipal Hospital for infectious diseases 300 cases of smallpox were treated between January 1 and December 1, 1901. Out of this number not a single patient had been successfully vaccinated. In St. Paul, between May 1, 1899, and May 10, 1901, there were 104 cases of smallpox. Of these but two had ever been vaccinated, one fifteen and one twenty years before.

The vaccinal status of 346 cases of smallpox, treated in the Isolation Hospital at Chicago between February 14, 1899, and December 1, 1901, was as follows: Five patients had typical old scars. The date of vaccination ranged from 16 to 50 years previous to the attack. Nine had fair old scars, and twenty-six had old, imperfect, doubtful scars. Three hundred and six had never been successfully vaccinated. All patients were carefully examined by experienced physicians for evidence of vaccination, and the record here given, which is furnished by the chief medical inspector of the Chicago Health Department, can be relied upon as correct.

Statistics of the smallpox epidemic in Illinois during 1901 and 1902 furnish indisputable evidence of the beneficial influence of vaccination. During the period from October 1, 1901, to March 1, 1902, there were reported to the State Board of Health 5,000 cases of this disease among a population of 5,000,000 people. In the city of Chicago, among an estimated population of 2,000,000 people, only 66 cases were found during the period mentioned. Chicago is known to be one of the best vaccinated cities in the United States. The inference is plain. Of these 66 cases, 23 occurred in the persons of patients coming from surrounding municipalities and states; twenty-six cases were traced directly to those imported, or to some known case outside of Chicago. The source of contagion of the remaining 17 is unknown, but is supposed to be due to importation. There was no smallpox in the city of Chicago between August 12th and November 12, 1901. In many other cities and villages, in which vaccination had been observed, there was an entire absence of the disease among the inhabitants, although in some instances smallpox prevailed in adjoining districts.

DURATION OF IMMUNITY FROM VACCINATION

Facts of the above character could be quoted in several additional pages, but it is believed that no further demonstration of the preventive potency of vaccination is necessary. The question is very often asked: How long does vaccination protect the individual against smallpox? A vaccination is probably protective as long as it is protective against itself. The immunity conferred by vaccination has its limits, as sometimes has that conferred by smallpox itself. Few persons are insusceptible to revaccination. Many are susceptible after five years. But, in the words of the Berlin board of health, which assuredly can speak with authority: "Vaccination in infancy, renewed at the end of childhood, renders an individual practically as safe from death from smallpox as if that disease had been survived in childhood, and almost as safe from an attack. A recent successful vaccination is a positive protection against an attack."

VACCINATION-HOW AND BY WHOM PERFORMED

Upon the first appearance of a case of smallpox in a given locality, systematic vaccination or re-vaccination should at once be resorted to vaccination of all not previously protected, and re-vaccination in all cases where the operation had not been successfully performed within the preceding twelve months. It is not prudent to rely on an old vaccination, no matter how typical the scar may be. The inconvenience of vaccination is trifling compared with an attack of smallpox. If it doesn't "take" one may ω e assured of safety if exposed, provided the operation has been properly performed, and the virus new and of good quality. If it does "take" it is conclusive evidence that the individual was in a condition to have contracted smallpox if exposed.

Vacination should, in all cases, be performed by a legally qualified physician, and too much care cannot be exercised in the selection of virus and the performance of the operation. There are many spurious vaccinations. These are worse than none, because they give false sense of security, and when they fail to afford the protection expected of them they not only imperil the lives of the subjects, but bring an unjust odlum upon the practice. Trivial and simple as the operation appears, it never212

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theless is one requiring skill and special knowledge to secure special results. It is not only foolish, but a dangerous economy to intrust this responsible duty to persons having no knowledge of the phenomena of vaccination.

No harm can result from vaccination with reliable vaccine, properly performed by a qualified physician. Much harm can, and in all probability will, result if the vaccination be performed by a person ignorant of the technique of the operation, who vaccinates (?) any individual presented, without proper examination as to fitness or physical condition, by merely abrading, scarifying or puncturing the skin, which may or may not be clean, and rubbing in the virus, and fails to give proper directions regarding the care of the wound. I have vaccinated many individuals, adults and children; I have vaccinated myself a number of times during the past ten years, and I have never observed any serious results from the operation, and have seen but very few "bad arms." I have been wholly unable to find, in authentic literature, any record of serious results from vaccination alone, and do not believe that a permanen. injury has ever been caused by vaccination with reliable vaccine, performed by a competent physician. To dirt, not to impure vaccine, may be attributed the greater number of serious results which have followed vaccination during recent years.

Too little care is taken by the ordinary person after vaccination to protect the vaccinated areas against infection. In fact, vaccination is too often regarded as an operation without danger, and in consequence, dirty clothing is allowed to come in contact with the sore, which is often handled with dirty hands, and scratched with dirtier finger nails. Under such conditions it is remarkable that serious results do not follow oftener than they do. The wound made to receive the vaccine matter must be kept protected and clean.

VACCINATION AND TETANUS

An unusual number of cases of tetanus were reported in Camden, N. J., during November, 1901, and several deaths occurred. Unfortunately the majority of persons attacked had recently been vaccinated, and although the disease developed in persons who had not been vaccinated, the epidemic was attributed to vaccination. The connection between the process of vaccination and the attack of tetanus, as cause and effect, has not in a single instance been established. On the contrary, a commission of experts, appointed by the Camden board of health to make a thorough investigation of the epidemic, has demonstrated that not one case of tetanus was caused by vaccination. An epidemic of tetanus prevailed in other parts of New Jersey in November. The atmosphere, soil and dust were impregnated with the fatal germ; hence it was possible that any one who had a wound, a mere scratch, or even an abrasion of the skin from a bruise, might be attacked unless the proper precautions were taken to prevent it.

A COMMENDABLE CREED

During the prevalence in Camden over 70,000 vaccinations were performed in Philadelphia and its suburbs. Not a single case of tetanus resulted from any of these vaccinations. Chicago, which is one of the best vaccinated cities in this country, has a health department that has for its creed concerning vaccination the following: "We, the undersigned, hereby publicly profess our firm belief, based on positive knowledge gained through years of personal experience and study of smallpox and vaccination:

"First.—That true vaccination, repeated until it no longer 'takes' always prevents smallpox, NOTHING ELSE DOES.

"Second.—That true vaccination, that is, vaccination properly done on a *clean* arm, with *purc lymph*, and kept perfectly *clean* and unbroken afterwards, never *did* and never *will* make a serious sore.

"Third.—That such a vaccination leaves a characteristic scar, unlike that from any other cause, which is recognizable during life, and is the only conclusive evidence of a successful vaccination.

"Fourth.—That no untoward results ever follow such vaccination; on the other hand, thousands of lives are annually sacrificed through its neglect, a neglect begotten of a lack of knowledge.

> "ARTHUR R. REYNOLDS, M. D., "Commissioner of Health, City of Chicago. "HERMAN SPAULDING, M. D., "Chief Medical Inspector, Department of Health.

"December, 1901."

As above stated, the number of smallpox cases in the city of Chicago, as compared with the number outside, and in the state of Illinois, show without mistake the protection that vaccination gives against smallpox. It is a higher and more exacting task to prevent than to cure; but it is a task often thankless and unrewarded.

The cause of smallpox is, no doubt, some infectious micro-organism, which, as far as I know, is not fully understood; the infection being capable of producing any of the various forms of the disease acording to the susceptibility and condition of the person infected. Age cannot be said to affect the susceptibility to smallpox, while nursing children under six months commonly resist the infection of scarlet fever and measles; they are almost certain, if not immune, to contract smallpox if exposed. The same may be said of varicella or chicken pox, with which smallpox has been so frequently confounded during the epidemic of the past four or five years. Sex does not influence the predisposition to the disease.

THE TAMA INDIANS

There is a difference of opinion as to whether race has any predisposing influence, but most authorities, I believe, agree that the predisposition is greater among the dark-skinned races, and that among these it is more fatal. This was certainly demonstrated during our Iowa epidemic among the Tama county Indians. This I believe to be due:—

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First .- And of most importance-to the neglect of vaccination, not only in the present age, but in ages past, and a consequent lack of a certain degree of transmitted immunity by past generations.

Second.-... the unsanitary conditions usually prevalent in the homes and colonies of these individuals.

Third.-To the lack of medical attendance, and nursing generally secured by the white race.

The following from the Iowa Health Bulletin will illustrate these points:

"Dr. A. M. Linn, of the State Board of Health, was called to Toledo a short time since by the United States Indian agent because of the outbreak of smallpox on the Indian reservation. We present herewith his report. It will be noticed that the rate of mortality is high. It is said that the attack of the same disease among the Winnebagos, in Nebraska near Sloux City, is also attended by a high rate of mortality. The disease in no respect differs from the eruptive affection so prevalent all over the state except in the character of its victims. Indians do not have the inherited immunity that comes from generations of vaccinated ancestors. We firmly believe the cause of the mild type of smallpox as seen so generally is because of the heritage bestowed by the vaccination of parents or grandparents. There could hardly be a more striking illustration of our belief as above expressed than is afforded by the presence of smallpox among the unvaccinated races.

William G. Malin, United States Indian Agent, Toledo, Iowa:

My Dear Sir,-In compliance with your request to Secretary Kennedy of the State Board of Health (referred to me because of your location in this health district), and also in response to your telegram to me. I visited the Indian reservation under your charge.

In company with Dr. Carpenter of Toledo and Dr. Thompson of Tama. we carefully inspected a portion of the reservation, enough of it to learn definitely of the situation, and to be able to report upon the same.

The Indians upon the reservation are at this time afflicted with smallpox. It was reported to us from a trustworthy Indian that five of the tribe had died thereof, one of the victims being the wife of our informant. In his own house four others were ill with smallpox in various stages. One of these will probably die. The daughter-in-law, not confined to the house. has the affection in a very mild form, and two of the sons have recovered from the disease.

In another part of the reservation we found two young men who had the disease in a very mild form. Then several cases which had been seen on the previous day by my companions could not be found. They had been secreted and all inquiry as to their location failed to elicit any knowledge of them. With careful cunning they all professed to be ignorant of their hiding place.

It is wholly impossible at this time to state the number of victims affected. Save such as are immune or will consent to be vaccinated it is

probable nearly all will contract the disease. Enough was elicited from them to know that they object to being vaccinated. It is indeed a matter of doubt whether they can be compelled to submit. Our state courts have held against compulsory vaccination. What the government regulations may be I cannot state. As the state and local boards cannot quarantine them, and the government supplies no funds for such purpose, your only recourse is to quarantine against them. To make such a quarantine effective the various health boards surrounding the reservation must act in harmony and unison. By so doing an effective quarantine may be maintained against them until by means of vaccination and the run of the contagion it will expend itself. This will doubtless be at the cost of numerous lives among them.

When the epidemic is passed I would urgently recommend that every vestige of clothing be burned and every house be reduced to ashes, and all dogs killed. It would be infinitely more safe if the government will consent to issue new clothing and provide lumber for new residences. Otherwise outbreaks of smallpox may be expected from time to time, as others from different agencies and curious whites visit them. The situation is a perplexing one to meet, because of the lack of application of our state laws, and of the lack of jurisdiction of our State Board of Health. As, however, the maintenance of the public health is of paramount importance, we promise you the active assistance of the state health authorities in every needed measure to stamp out the disease.

> Most respectfully yours, A. M. LINN.

SYMPTOMS

There are rarely any symptoms manifest during the first or incubation stage, which does not vary much from ten to twelve days. The period cannot be accurately determined, only when there is known to have been one exposure. The last few days of the incubation period the patient may complain of some headache and backache, possibly some gastric disturbances, and present an anaemic appearance, when suddenly the smpmtoms of smallpox appear and usher in what is called the

INITIAL STACE

The first symptoms of which is a chill more or less severe, or more often repeated rigors, usually followed by, or associated with, high fever. The rigors and fever may, in some instances, be very slight—in fact, so slight that the former may pass by unnoticed. The fever, however, is a very constant symptom and rises more rapidly in this than most any other disease, often rising on the first day to 103 or 104 degrees Fahrenheit. The fever continues, with slight morning remissions, until the eruption makes its appearance. Pain in the back and headache are almost constant symptoms in this stage. Irritability of the stomach is also quite a constant symptom of this stage, and in the hemorrhagic variety continues after the eruption appears.
The headache and backache, along with the other symptoms of this stage, usually disappear when the eruption makes its appearance. Sometimes the fever continues for two or three days afterwards, but that, too, falls considerably, and in not a few cases drops to the normal, or nearly so, when eruption makes its appearance, which is usually on the third or fourth day of the stage of invasion, or initial stage.

ERUPTIVE STAGE

The eruption makes its appearance almost always on the forehead and temples and on the wrists first. It rapidly spreads to the face, neck, ears, hands and forearms, and appearing last on the parts not so much exposed to the atmosphere. Usually within twenty-four hours the eruption has spread to all parts of the body. However, the eruptions continue to multiply for two or three days after making its appearance.

The development of the eruption is as gradual as is its appearance. It usually appears as minute red points: these gradually increase in size and number until, within twenty-four hours after their first appearance, they assume the form of elevated papules indurated, and convey to the sense of touch a feeling not unlike that of fine shot beneath the skin. About the third day after making their appearance these papules will be seen to contain a little clear serum, and by the fourth or fifth day they will be transformed into what writers on the subject choose to call vesicles, and contain a cloudy, milky substance. These vesicles continue to enlarge, reaching their maximum size about the eighth or ninth day. As soon as the vesicles form there may be seen in a great many of them a central depression called umbilication. This symptom is very diagnostic when seen, but in very many of the cases in the recent epidemic was not observed, and especially was this so in the milder cases of the type.

SUPPURATIVE STAGE

These milky vesicles gradually grow more and more turbid, filling with pus corpuscles, until about the sixth day of the eruption, or ninth day or the disease, when the vesicle's contents become distinctly purulent and marks the beginning of the suppurative stage, The pustules, whether the vesicle from which it was developed ever assumed the umbilicated appearance or not, becomes large and globular, and the skin immediately surrounding them presents a broader and more deeply inflamed appearance. The pustules develop in the same order in which the eruption made its appearance. Usually about the eighth or ninth day of the eruption the pustules have reached their full development and begin to shrink and contents become more yellow, and the stage of pustulation is merged into the stage of desiccation. This begins earlier on the face, as do the other stages, and has usually reached this stage on that part of the body about the eleventh or twelfth day of the eruption. All the symptoms abate at this time, even in severer cases, if the case is pursuing a favorable course. During this stage the pustules begin to dry, a yellowish exudate is thrown out on their surface and dry altogether, forming thick brownish or almost black scabs. This process is often accompanied by an almost intolerable itching, which takes the place of pain during the formation and development of the pustules. This pain is greater in the pustules, occurring on the soles of the feet and in the palms of the hands.

DURATION OF THE DISEASE

In regular cases of variola vera it usually requires from two to four weeks after the scabs begin to form for desication to be complete. The more mild the case the shorter the duration of the various stages of the disease, so that in some very mild cases the time from the eruption beginning until complete desication has occurred may not exceed 25 or 30 days. When the scab falls off there still remains a purplish or red spot which does not disappear for some weeks afterward. In very severe cases, and especially if the eruption has been very profuse on the scalp, the hair falls out, but is most always restored again.

In giving a description of smallpox it has been my purpose to describe as nearly as possible the typical forms of variola vera. There is nothing during the initial stage of smallpox enabling us to determine with any degree of certainty that a given case will be one form or the other. However, in the severer forms the symptoms of the initial stage are almost always intensified.

DIFFERENTIAL-DIAGNOSIS

An early diagnosis is a very important thing in this disease, as well as all contagious and communicable diseases. It is no doubt contagious even in the initial stage. The history of an exposure would be of valuable aid in the prevalence of smallpox in the community, and should put the physician on his guard. The method of diagnosis by exclusion is valuable in this stage. Pneumonia usually begins with a chill, followed by fever, but the physical signs will be such as to exclude pneumonia.

In typhoid the gradual rise of the temperature with the enteric symptoms will exclude this disease. In scarlet fever the onset is sudden, distinct chill, followed by high fever. The fever continues after the rash appears. The rash is uniformly diffused, and the throat symptoms, in scarlet fever, will usually distinguish it from smallpox. In malignant scarlet fever, however, the differential diagnosis will be difficult to make until the characteristic rash of variola makes its appearance. When the eruption of variola first makes its appearance it may be mistaken for measles; the catarrhal symptoms, the continuance of fever after the appearance of the eruption, the eruption appearing on the back and chest quite as early as on the face and wrist.

The maculae of measles being much larger than the papulae of smallpox, the contents of the maculae of measles being velvety, while the papulae of smallpox are hard and convey to the sense of touch the re-

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semblance of small shot beneath the skin, will distinguish measles from smallpox.

Dry rash, and some diseases of the skin of a vesicular or pustular nature, may be mistaken for smallpox, and vice versa. In our late epidemic more often vice versa. A thorough understanding of the course of development and peculiar features of the various eruptions should guard the physician against any errors of this kind.

There is no disease which has, I believe, been so often confounded with smallpox during our Iowa epidemic, and perhaps during the mild epidemic in other states, as has varicella, or chicken pox. Chicken pox is much milder than smallpox, in any of its forms, except, perhaps, some cases of the discreet form and varioloid; but even in these forms there are certain characteristic marks of difference that should render a diagnosis easy after a few days, and until that time, if a diagnosis is demanded, it would be far better for the community, both from a sanitary and financial standpoint, to err on the side of safety and make it a diagnosis of probable smallpox until such time as a positive diagnosis could be made. Our Iowa State Board of Health has recently added chicken pox to the list of quarantinable diseases, at least to the classof contagious diseases which shall be reported to the health officer. who shall placard the premises with the sign "Chicken-Pox," the sick being isolated until complete recovery of the patient, and thorough disinfection of his person and of the premises. The common diagnosis, either intentional or otherwise, of chicken-pox for smallpox, rendered this necessary as a preventive measure to the spread of the disease, smallpox.

In making a diagnosis between the two it is very important to note the behavior of the fever. In the former the temperature rises suddenly, and continues until the eruption has fully made its appearance. when it suddenly falls to normal, or nearly so. In the latter the fever does not make its appearance until the advent of the eruption. The secondary fever, so much talked of as a symptom of smallpox, while it is always present in the severer form of the disease, it is almost always absent, at most only an elevation, in the modified form. It frequently happens that there is no initial chill or fever in the modified form of smallpox, as well as in chicken pox, buf then there are certain distinctions manifest in the eruption itself which distinguish one from the other, viz: the eruption of smallpox first appears in the form of papules which are slowly transformed into vesicles, and then in pustules. The papules are hard, and to the sense of touch convey a shot-like appearance beneath the skin. They are more abundant in the exposed surface of the skin, and usually begin on the face and wrist, spreading to the back, hands, arms and lower extremities with a decided degree of regularity. While they spread and develop slowly they do not break out in successive crops; they do not increase in size by peripheral extension. It requires from eight to twelve days for eruption to pass through its various stages up to the stage of desiccation. The scab is more dense, thicker, darker, more deep seated. and requires from the beginning until the completion of the stage of desiccation from ten days to three weeks, while in chicken pox the eruption first appears in distinct vesicles containing clear serum. They are usually first seen in great numbers on portions of the body covered by clothing, and in the cases I have seen especially on abdomen, inner surfaces of the thighs and on the back, but scarcely ever on the palms of the hands and soles of the feet. They make their appearance in successive crops, and vary greatly in size, their edges being irregular and not presenting the inducation that the smallpox vesicles do.

Their covering is very delicate and easily broken down. They run their course in from two to four days, and form their brown scabs, which readily fall off, so that by the end of eight to ten days from the beginning of the disease desiccation is complete, and the underlying skin soon assumes its natural color; whereas, the desiccation from smallpox leaves a red or purplish spot, which does not fade for several months.

Impetigo contagiosa may be distinguished by the suddenness with which the vesicle or watery heads makes their appearance, by their superficial and enlarging by lateral extension. They are the result of infection from pus organism, and is properly termed by some writers a "finger nail filth" disease of early life. The crusts are friable and readily removed, being very superficially attached, and are never implanted on a small base as are smallpox crusts. Many names have been given to our present epidemic of smallpox, among which may be mentioned "Cuban itch," "Manila itch," "Filipino itch" and "yaws." I presume no one will doubt but what the Cubans and the Filipinos as well as Americans have the itch, but to confound it with smallpox is a mistake that no intelligent physician, even without experience in diagnosing either itch or smallpox, will conscientiously make. As for "yaws," such a disease is spoken of in some text-books, but it is not a common disease in the United States, and should no more readily be confounded with smallpox than should syphilis. It is a disease said by some to be syphilitic; by others idiopathic. It is characterized by the development of mulberry-like excrescences, and when the outgrowths proliferate rapidly their epidermis is detached as a dirty detritus, or is cast off by the formation of vesicles.

PREVENTION, RESTRICTION AND SUPPRESSION

Of all the preventable diseases smallpox is the one over which we should have the most complete control—vaccination and re-vaccination being the remedy, proof of which has already been given in this article. The disease never has and never will spread in a well vaccinated community or country. The prompt vaccination of persons exposed to smallpox will invariably avert an attack. Even if performed as late as the fourth or fifth day after exposure the disease will be so modified that the symptoms of the various stages will not only be much more mild, but will be of shorter duration, if it should be contracted.

The contagion of smallpox may be communicated from one person to another by actual contact, or it may be carried through the air of a room, or from place to place in clothing, merchandise or any other in-

fected articles. The contagion also exists in the secretions and excretions of the body, and in the exhalation from the lungs and skin,

Books, toys and other articles used to amuse convalescent patients should be burned. No inmate of the house should be allowed to leave until permission has been given by the health authorities. Letters must not be sent from the patient, and mail from the house should be subjected to a dry heat of from 250 to 260 degrees Fahrenheit. Dogs and cats should not be permitted to enter a house in which there are persons suffering from the disease. The physician should be very careful that he is not the means of conveying the disease from one to another; an outer garment completely covering his ordinary wearing apparel, head, face, hands and shoes should be put on before entering the house of a smallpox patient, and removed on coming out. In addition to these precautions he should wash his hands and face in a one to 1,000 bichloride solution, and brush his hair and clothes with a brush dipped in the same solution before leaving the premises.

The premises should be quarantined immediately upon the recognition of the disease, and in suspicious cases, before the eruption makes its appearance, temporary guarantine should be established until it becomes possible to make a positive diagnosis. The patient should occupy a room in the upper story, all persons excluded except the nurse and physicians until after complete recovery, i. e., after the scabs have all fallen off and the skin becomes perfectly smooth.

The patient, before being released, should have daily baths for four or five days, followed by thorough rubbing of the skin with pure vaseline; and just before he is discharged he should have a full and thorough bath with bichloride solution one to 3.000, and have clean underclothing that has been disinfected by formaldehyde gas and aired in the sunlight. All other persons occupying the house should have the full bath and as thoroughly sterile clothing as the patient who has recovered, before being released from quarantine. After this has been done the attention should next be directed to the disinfection of the house and contents. This should commence with the beginning of the disease, the object of disinfection being the destruction of the germs attached to clothing, carpets and other articles as well as that deposited as dust upon windows. etc.

A great obstacle to the thorough performance of this would be accomplished if all carpets, curtains, rugs, unnecessary bedding, furniture and pictures were removed before being occupied by the sick person. Efficient disinfection will be further rendered easier if the room had been thoroughly cleaned and ventilated during its occupancy by the sick person. This may be efficiently done by the frequent wiping of window casings, side wall, ceiling and floor of the sick room with cloths saturated with bichloride solution one to 1,000. All excretions should be well disinfected and emptied into a hole dug for that purpose, a little fresh dirt being used each time to cover the excretions thus emptied.

Formaldehyde gas, properly used, and in efficient quantities, has been shown to be an efficient disinfectant, but can only be depended on to disinfect the surface of things. All clothing, carpets, curtains, etc., that cannot be boiled should be burned. The room should then be closed as nearly air tight as possible by pasting paper over keyholes and other openings into it, chinking the cracks around windows and doors, and not less than ten ounces of a forty per cent formaldehyde solution to every 1,000 cubic feet of space should be generated as quickly as possihle into gas in the room. The doors and windows should remain closed for ten or twelve hours, then thoroughly ventilated. All wood work and floors being washed in sublimate solution, as well as the bedstead, chairs and other articles of wood which have been in the room. The side walls and ceiling should then be re-papered.

When measures along these lines become general and thorough throughout our United States we will get and keep rid of this often loathesome and formidable disease. And it seems to me that while we may not wish to pattern after some of our sister countries in the enactment of laws governing our people in a great many respects, yet the enactment and enforcement of a vaccination law similar to that governing some of these countries would be a sanitary measure, the force of which would eradicate forever this disease, smallpox.

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XVII

THE MANAGEMENT OF OUTBREAKS OF SMALLPOX, DIPHTHERIA AND SCARLET FEVER*

BY H. D. GEDDINGS

Assistant Surgeon-General, Public Health and Marine-Hospital Service GENTLEMEN:—I have been assigned the duty of addressing you upon the subject of "The Management of Outbreaks of Smallpox, Diphtheria, and Scarlet Fever" from the standpoint of the municipal, local and rural health officer, a subject full of importance and pregnant with the most vital interests of the community in which you live.

SMALLPOX

Without further preliminaries I would beg to enter at once upon the subject of smallpox, and in considering its management I beg to consider not only the management of epidemics when they have once made their appearance, but the prophylaxis or prevention of such outbreaks.

Prevention—In all communicable diseases there are various means at our disposal for the control and prevention of their spread. Such, certainly, is the case with smallpox; but I think it admits of no argument that were we limited to one method for the prevention of the spread of smallpox that method would be vaccination.

Into the subject of vaccination it is hardly necessary to go before an audience of this character. What the nature of vaccinia is—whether vaccinia is smallpox in the heifer—may be subjects full of interest, but I do not consider that their discussion, however important, properly belongs to an occasion like this. Much prejudice in the past has existed against vaccination, which *might* possibly have been justified in the days of arm-to-arm vaccination or vaccination from the scab. I can conceive that it is possible that certain constitutional diseases, viz, tuberculosis or syphilis, might be conveyed by these processes; but practiced as vaccination is to-day, with bovine lymph, and that lymph largely purified of

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extraneous organisms and contaminations by the process of glycerination, such untoward results are now of infrequent occurrence, and it is high time, in this third year of the twentieth century, that the prejudices against this most valuable prophylactic should disappear with the advance of education and intelligence. Of course, it is essential that vaccination should be carefully performed. The arm—or leg, in the case of females—upon which vaccination is practiced should be cleansed by soap and water, followed by alcohol. The scarification should not be large; a spot of one-eighth inch in diameter is sufficient. The vaccine should be glycerinized, and care should be taken to prevent its contamination. As soon as the lymph has dried some light protective dressing should be employed to prevent contamination of the area by pus organisms, either rubbed in by the fingers or the dress from the surrounding area.

Having placed vaccination thus in the first place of importance for the prevention of smallpox, it might well be asked what measure takes the next place in importance in the prevention of this disease. I answer, after mature deliberation and consideration and hope that it will meet with your approbation, that thorough, early, diagnosis in my opinion easily takes the place of next importance.

Diagnosis-Smallpox may be mistaken for several other conditions, viz., measles, scarlet fever, chicken pox, syphilis, or impetigo contagiosa.

A few words as to the differential diagnosis of these maladies will not be out of place.

In measles the period of incubation is a little longer than in smallpox (about fourteen days). The stage of invasion resembles an ordinary cold, attended with shivering, not often with definite chills, sneezing, injection of the eyes, running of the nose, and a more or less severe cough. The eruption makes its appearance upon the fourth or fifth day, and the condition of the patient is not materially improved with the appearance of the eruption. By the sixth day the eruption is well' developed and gradually fades, though coming out in successive crops. There is no secondary fever with the appearance of the eruption.

In scarlet fever the incubation is much shorter, ranging probably as high as seven days, about four days on an average, and the period of invasion is attended with high temperature and more or less sore throat, generally a very considerable sore throat. The eruption appears on the second day and is in the form of a bright red scarlet rash in which there are spots more or less deep mottling, giving a particularly red appearance, with marble streakings. The tongue has a strawberry or raspberry appearance, owing to the projection of the papillæ of the tongue. Albuminuria is a frequent complication of scarlet fever.

Chicken pox or varicella might be strictly called a disease of children, though it sometimes occurs in adults. The period of incubation is rather long. The initial symptoms are somewhat mild and frequently attract little attention, though there may be fever, vomiting, and pain in the back and limbs. The eruption appears within the first twenty-four hours, being first papules, which in a few hours change to pustules filled with a gray though generally turbid fluid. In three or four days the eruption dries up and forms scales which fall off, and the scarring, if any, is very superficial. It is to be noted that the scabs of chicken pox are generally bloody in character. It is possible that varioloid may be mistaken for chicken pox.

Impetigo contagiosa in outward appearance approaches nearer to chicken pox than smallpox. The eruption is without constitutional symptoms and occurs in groups or patches. The patches coalesce and as desiccation takes place large crusted patches are formed.

Syphilis in some of its protean aspects resembles smallpox. In this disease we must be guided by the history of the case, which is the strongest point of differentiation, though the absence or very slight character of the fever and other constitutional symptoms aid us in making a differential diagnosis.

I pass over typhus fever, glanders, the first stages of typhoid fever, and other diseases without more than mentioning them, and make no attempt to draw a strict differential diagnosis. A brief review now of the symptoms of smallpox may be of interest.

Smallpox may appear in any form, from the mild varioloid, which is smallpox modified by vaccination, up to the hemorrhagic form. The forms as usually described are *variola vera* or true smallpox, the discrete form, the confluent, and the hemorrhagic form, which may occur as the purpuric form and a hemorrhagic form, in which hemorrhage takes places into the pocks or from the mucous membrane.

The invasion of smallpox begins suddenly, and is usually ushered in with a chill. It may or may not be followed, but usually is attended, by severe aching in the small of the back and limbs, sometimes with intense headache, always with vomiting and with a fever reaching 103 degrees to 104 degrees F. The pulse is rapid and strong. Convulsions may occur in children. There is an initial rash, which usually appears on the second day, in the form of a definite redness. According to Osler, in about 13: per cent of the cases there is an initial rash on the inner surface of the thighs, the lateral surfaces of the thorax, the lower part of the abdomen, and occasionally on the anterior surface of the knees and the inner surface of the elbows.

In the discrete form of smallpox the eruption usually appears on the third day at the margin of the hairy scalp, around the mouth, and on the wrists. At this point, to be thoroughly noted, the temperature, which up to this time has been high, falls to nearly normal. Within twentyfour hours the eruption becomes general over the body, and at this stage of the disease there is a strong resemblance to measles. On about the fourth or fifth day of the disease the eruption becomes papular, and there is noted by passing the fingers over the surface a shotty sensation, viz, as if small shot were imbedded under the skin. About the sixth day these papules become vesicles, which vesicles change to pustules. The stage of pustulation is attended with a sinking in the center of the pustules, or umbilication, and each pustule is surrounded by a red border. This ushers in the stage of suppuration and the secondary fever comes,

on, the temperature rising again rapidly and being strictly a fever of suppuration. It is not infrequent that the eruption makes its appearance on the mucous membrane of the throat, fauces, and pharynx twenty-four hours before its appearance upon the cutaneous surface.

About the twelfth or thirteenth day of the disease the pustules begin to dry up and form scabs. These scabs fall off in the order of their appearance upon the body. The temperature falls, soon reaches normal, and convalescence begins.

In the confluent form the initial symptoms are more intense and the eruption may occur a little earlier. The papules are discrete, but the vesicles and pustules coalesce, especially upon the face, hands and feet, and there is, of course, a great deformation and swelling of the face, and there is swelling of the lymphatic glands, salivation, possibly diarrhea, and almost always acute albuminuria.

I feel that this description is brief to a point of meagerness, but it must be apparent to you that a week could be easily spent in a minute description of all the clinical features of smallpox, and even then leave the subject improperly described.

Vaccination-I have already gone into the technique of vaccination. Vaccination should begin naturally with the "contacts," or those who have been exposed directly to the infection from the first-declared case of smallpox. The area of vaccination should be greatly extended, and if the disease threatens to spread vaccination in a community should be general. The question may be pertinently asked, what should be the practice in regard to the repetition of vaccination. I think it admits of little doubt that the community should be vaccinated and revaccinated until everyone is either protected by vaccination or it has been demonstrated beyond peradventure that individuals are not susceptible to vaccinia. There are quite a number in this latter class. In my personal experience I know of one who was vaccinated successfully in infancy, revaccinated at the age of eight; vacination was unsuccessfully attempted again at the age of eleven, and since that time he has been vaccinated more than thirty times with only one rather imperfect "take." I have seen other instances equally conclusive. It is also reasonable to suppose that a person or persons susceptible to vaccination are to some extent susceptible to smallpox, though the course of smallpox will usually be modified even by one successful vaccination.

It would seem reasonable, therefore, that vaccination to be absolutely efficient should be repeated from time to time until a complete immunity against it is acquired. This, it is natural to suppose, would lead to an equally complete immunity against smallpox, though this remains to be demonstrated.

I do not propose, before this audience or at this time in the world's history, to defend the subject of vaccination. I confess it with shame that there are some, even in the medical profession, who cast discredit upon the efficiency of vaccination as a protective measure against smallpox. Is it surprising, then, that there should be a comparatively large number among the many millions of inhabitants of the United States and of some other countries who doubt the expediency of the process and invoke law, sentiment and legislation to prevent the performance of compulsory vaccination?

Management—We now take up the consideration of the management of individual cases of smallpox from a point of view purely sanitary and prophylactic—that is to say, to prevent its spread.

I do not know what the law in all states is. I do not know whether under your law the health officer is authorized and empowered to remove every case of smallpox to a special contagious-disease hospital for treatment. Please note that I use the term "contagious-disease hospital." I protest with all my power against the term "pesthouse." Is it surprising that persons stricken with smallpox object to being removed to a "pesthouse?" The nature of the disease is sufficient in itself without the addition of this terribly sounding word, "pesthouse," by which it is assumed that the person who is being removed is loathsome, dangerous, and an object to be shunned alike by his friends and the general public. Certainly if the community is provided with a well-built, well-administered, comfortable, contagious disease hospital the case of smallpox had better be removed there, but if this be not so, or if the objections of the patient's friends or family can not be overcome, or if he have law upon his side forbidding his removal otherwise than by his own free will and consent, it goes without saying that the case should be carefully isolated in his residence, preferably upon the upper floor, and that the floor of the house upon which the disease is to be treated should be abandoned by the rest of the family and placed in strict quarantine.

Sanitation and Disinfection—The room should be prepared by having all unnecessary furniture, curtains, hangings, or draperies removed. It should be upon the sunny side of the house and at the same time capable of being darkened, should be freely ventilated, and be maintaind at an equable temperature. All bed linen, garments, handkerchiefs, towels, etc., worn or used by the patient and soiled by him should be immersed in a solution of carbolic acid, 5 per cent, or a solution of chlorinated lime, two ounces to the gallon of water, for one hour, and after this immersion they should be boiled and then laundered, aired and sun dried. The dishes, cups, medicine glasses, eating utensils, etc., used by the patient, should be immersed in actually boiling water. Food that has been in the sick room and which is not consumed should be burned, either in a stove in the room or, after being covered with a towel wet with one of the above germicidal solutions, should be removed from the room and burned in a stove or fireplace.

As I said before, the room, or preferably the floor, of the house should be in strict quarantine. The patient should be seen only by his attending physician and nurse. The nurse should wear easily washable gar ments, which should be treated in the same way as the bed and body linen of the patient. The physician after his visit should change his outer clothing before mingling with other patients or the public.

We will suppose that a case goes on to a favorable termination. What should be done upon its conclusion? It must be remembered that

smallpox is communicable so long as there are any scales about the patient, and even further—so long as there are any minute scales or epithelium desquamating from the bottom of the pocks or retained in the hairy scalp. The patient, therefore, after the stage of desquamation begins, should receive frequent mild antiseptic baths, paying especial attention to the hairy scalp, and should not be considered as safe until a careful examination of the pocks shows that the epithelium or skin at the bottom of the pocks is smooth and shows no tendency to desquamate. Special attention should be paid to the throat, mouth and nose of the patient. These should be washed or gargled with a mild antiseptic solution, and any towels or cloths which are used to receive the secretions of the mouth and nose had better at once be burned; it is useless to go to the trouble of disinfecting them, as is provided in the case of clothing, either bed or body.

These precautions having been observed, the patient being convalescent and the desquamation completed: what should be done with the room? The answer is, It should be completely disinfected.

The methods adopted for this disinfection will vary much with the circumstances. Provided that the room prior to being occupied by the smallpox patient has been stripped of all unnecessary furniture, hangings and draperies, much may be accomplished by washing the walls and floors of the apariment with water as near boiling as possible, to which has been added a liberal quantity of ordinary carbonate of soda, which should be used in the proportion of about half a pound to three gallons of water. All woodwork about the room and the bed, if a wooden one, should be washed with this solution. If the walls of the apartment are papered, this paper had better be torn down, the walls scraped, and the paper replaced with new after the apartment has been disinfected by burning sulphur in the room in the proportion of about three or four pounds per 1,000 cubic feet of space, care being taken to thoroughly close the room and render it as near air-tight as possible and at the same time to volatilize or evaporate water to the extent of half a pint at least per 1,000 cubic feet. This is necessary for the reason that sulphur burned in a dry atmosphere has very feeble germicidal properties, but when hydrated so as to form sulphurous acid (H. SO.) the germicidal effect is much increased, though the penetrating power of the gas is small. The mattress that has been used by the patient, if a cheap one, had better be burned, it being wrapped in a sheet wet with the carbolic or chlorinated lime solution before being carried out of the house. The burning should be accomplished under supervision, and should be absolute and thorough. because, if not, it may be removed by some careless or innocent person and the spread of the disease thus incurred.

Disposal of the Dead—It is a melancholy fact that while the mortality attendant upon smallpox has of recent years much diminished, our art, nevertheless, is sometimes impotent and death results. What should be the disposition of the remains? The body had better be wrapped without preliminary washing in a sheet, or two or three sheets, wet with a strong germicidal solution, such as carbolic acid, chloride of lime, or bichloride of mercury 1:1,000, and be immediately placed in a metallic or other hermetically-sealed coffin. It goes without saying that there should be no attempt at a public funeral. Any funeral services held over the remains had better be conducted in private, and there should be the least possible exposure of persons and the things in the house to the patient or his attendant.

If it be possible, or the sentiment of the community or family be not opposed to it, cremation should be practiced. I am aware that this is fraught with many difficulties, but simply throw out the suggestion for what it is worth.

Epidemics—Now suppose that in spite of our efforts the disease spreads. What should be our course? If there are large numbers of patients, it will be most essential that a contagious-disease hospital should be opened in the community. This should be in an isolated spot, and should be maintained in absolute quarantine. The attending physician had better become a resident during the continuance of the epidemic. The nurses and other attendants about the hospital should be interdicted from passing beyond the quarantine limits, and any necessary supplies for the use of the hospital should be deposited at a safe distance and carried into the confines of the institution without any personal intercourse with the outside world.

Cases should be sought for; they should not be waited for to declare themselves. "Contacts" should be vaccinated and revaccinated, as already stated, and the vaccination and revaccination should be conjoined with a house-to-house inspection made at intervals corresponding to the period of the incubation of the disease, say every ten days.

This brings up the question, "What should be the treatment of 'contracts?' " My views on this question may be different from those held by some of you; but, believing as I do that smallpox is not communicable until the appearance at least of the preliminary rash, I should say that if it is possible to keep the contacts under observation they need not be quarantined after having been successfully vaccinated. Arrangements should be made for keeping them under observation from day to day, but until they manifest some initial symptom of the disease, as fever, chill, headache or backache, nausea or vomiting, it is not necessary, in my opinion, to quarantine them. Of course if a contact refuses vaccination that contact should be placed in strict quarantine during the incubative period of the disease, and, this passed, should he again refuse vaccination he should be kept under an observation which will insure him doing a minimum of damage to the community in which he is resident.

Additional Remarks on Disinfection—We have discussed, already, the disinfection and purification of the individual room in which a case of smallpox has occurred, but I feel that I would be derelict if I dismissed the subject of disinfection in this curt manner. Suppose, that the disease has assumed an epidemic form in a community—that is to say, smallpox spreads and possibly the connection between cases is lost, viz, there is no definite history as to where the case under consideration acquired its infection—disinfection will then be required of, first, the [No 21

infected premises; second, the person and his belongings; third, disinfection of vehicles, such as railway coaches in which persons suffering with smallpox may have been conveyed; and fourth, possibly, the disinfection of merchandise shipped from a place in which smallpox prevails; and finally, and fifth, disinfection of mails.

In the Matter of Premises—On the removal of a patient from the house or apartment in which he has developed smallpox, it is always better to have the contents of the room remain *in situ* while a preliminary disinfection with sulphur or with formaldehyde gas is given. The object of this is to reduce to a minimum the danger in handling articles likely to convey infection preliminary to their final and complete sterilization. The room and its contents, as has already been said, may be disinfected with sulphur or formaldehyde gas, and the contents of the room, bedding, etc., by burning, by boiling, or by steaming in a special apparatus where facilities for these processes are available.

The formaldehyde may be applied in several ways, either by an apparatus producing formaldehyde direct by the partial oxidation of wood alcohol, by evolving the gas under pressure in an autoclave from one of its commercial solutions which are known as "formalin," "formol," "formolose," etc., or by sheets sprinkled with one of these solutions hung in the apartments to be disinfected, the room being tightly closed. For the production of formaldehyde gas from wood alcohol twenty-four ounces of wood alcohol should be oxidized for each 1,000 cubic feet of air space of the room. In using the autoclave ten ounces of formalin (40 per cent solution), to which has been added 20 per cent of a neutral salt, such as calcium chloride, borax, etc., should be used per 1,000 cubic feet. For the sheet or sprinkling method ten ounces per 1,000 cubic feet (40 per cent solution) should be sprinkled upon the sheet suspended in the apartment tightly closed. In using the sprinkling method it is essential that the sheets or cloths should not be wet or wrung out of the solution. but that the solution should be so sprinkled as to remain in small drops without coalescing, and thus furnish the largest space possible for evaporation.

I have mentioned sulphur dioxide and formaldehyde as disinfecting agents, and it might be well here briefly to discuss the limitations of each.

Sulphur dioxide is especially applicable to the holds of vessels, to freight cars, to apartments that may be tightly closed and which do not contain objects injured by the gas. It bleaches fabrics or materials dyed with vegetable or aniline colors. It destroys linen or cotton goods by rotting the fiber through the agency of the acids formed. It injures most metals.

On the contrary, formaldehyde gas has the advantage that it does not injure fabrics or colors, except, perhaps, the most delicate. It is not fatal, however, to the higher forms of animal life, though germicidal to the ordinary forms of bacteria, especially those of the non-spore-bearing varieties. It is effective in a minor degree against spore-bearing bacteria, such as anthrax, tetanus, etc. It is applicable to the disinfection of rooms or clothing and fabrics. It is to be borne in mind that commercial solutions do not contain a full 40 per cent of formaldehyde gas, and that all of them are apt to deteriorate with time. A quantity in excess of the amounts prescribed should therefore be used in disinfection unless the full strength of the solution has been determined by recent reliable analysis.

A comparison of the three methods of using formaldehyde may be of interest. The lamp or generator is easy of application and requires no amount of mechanical skill. The apparatus is heated for one and onehalf minutes by igniting the alcohol. The flame is extinguished and the oxidation of the alcohol then proceeds by means of the platinized surfaces contained in the lamp. The gas is produced regularly in a form very active and destructive to bacterial life, and is not prone to a change of form or polymerization. The process by this method requires six to elghteen hours' exposure, depending upon the size of the room and the nature of the contents. The sole disadvantage of the lamp is that the gas is produced rather slowly, but it leaves little or no odor when applied to clothing and textiles. The articles to be disinfected should be suspended in a tight room, and so disposed as to permit free access of the ther quantities of formaldehyd gas, which is irritating to the eyes and should not contain more than 5 per cent of acetone.

The autoclave process has the advantage that the gas is evolved rapidly, but the autoclave is in fact a steam boiler operating under considerable pressure, from forty-five to sixty pounds per square inch. It is somewhat liable to get out of order, requires a considerable degree of mechanical skill to operate it, and is prone to rapid deterioration. A further disadvantage of the process is that the gas evolved is exceedingly prone to polymerization into paraform or trioxymethlene, and this polymerized product, combined with the neutral salt, calcium chlorid, or borax, which it is necessary to use, leaves a disagreeable odor upon fabrics or garments submitted to its action. The paraform deposited has a tendency to volatilize upon every elevation of temperature, evolving further quantities of formaldehyd gas, which is irritating to the eyes and respiratory mucous membranes.

The limits of either of these processes as to size of rooms, buildings, or apartments to be disinfected have not yet been accurately worked out, though the matter will be taken up shortly; but it is known that for rooms such as are found in an ordinary dwelling house both methods are efficient, and experiments have shown that this efficiency extends to apartments of very considerable dimensions.

The spraying or sheet method of formaldehyd disinfection gives unequal results, and should only be used in the absence of the apparatus mentioned above.

We have already discussed disinfection of clothing, bedding and the articles used in the treatment of the sick. Where these are of value they should be boiled or steamed. When not of much value they had better be burned without further delay.

The dejecta of smallpox patients should be disinfected in carbolic acid solution, 5 per cent, tricresol, 1 per cent, or a solution of chloride

of lime, or milk of lime. If smallpox has declared itself in a person during transit on a railway or other public conveyance, no article used by him should be thrown away *en route*, but they should be gathered, kept as carefully as possible, and at the end of the journey be disinfected or burned. Railway coaches may be disinfected as well as sleeping cars by any of the methods given for the disinfection of rooms, but particularly by means of formaldehyde gas, using the generator for direct production of gas from wood alcohol, or the autoclave.

The disinfection of merchandise is seldom if ever required, as no merchandise is perhaps infected. Surface disinfection, at most, is all that would be required, and for this sulphur dioxide or formaldehyde by any of the methods given, is ample.

The mails emanating from an infected locality should be disinfected by formaldehyd or by sulphur dioxide methods for accomplishing which disinfections have been prescribed by the Post Office Department.

SCARLET FEVER

I am going to ask your permission to depart from the order of the caption laid down in my address and take up next the subject of scarlet fever, for the reason that in certain important particulars there is a strong analogy between smallpox and scarlet fever.

Beyond doubt smallpox is caused by a specific germ. Of the nature of that germ we are as yet uncertain in spite of the recent discoveries of Councilman, but in all probability it is a protozorn and not a bacterium. The same statement applies to scarlet fever. We do not know as yet the specific cause of scarlet fever, though it has been attributed both to protozoa and bacteria. Time will not permit that we should go into the consideration of scarlet fever with even that degree of minuteness with which we have treated smallpox, incomplete though that treatment has been.

Symptoms—Scarlet fever is a highly communicable disease. It is probably to be accepted as the type of a communicable disease, and the infection, using the term in its broadest sense, is, while not very resistant, quite long lived. It is usually a disease of childhood, though it may attack adults at any time of life. The reason for the communicability of scarlet fever is that it is a disease attended by very extensive desquamation, amounting in many instances to a complete peeling of the cutaneous surface of the body, and the infective principle, whether it be bacterial or protozoal, is conveyed in these scales or particles. In addition, the contagion or infection of scarlet fever can also be communicated by the nasal and buccal secretions, and as scarlet fever is always attended by more or less sore throat, this sore throat being a very severe and a most prominent symptom in some cases, it is a disease of easy spread unless stringent precautions are taken.

It is also very possible that the disease may be conveyed by the other secretions of a scarlet fever patient, such as the urine and feces, also, possibly, the vomited matter, though this may result from the fact that the vomit has passed through an infected throat. Scarlet fever being, as has been intimated, usually a disease of childhood, it is to schools, public or private, that we must look primarily as a means for the dissemination of the disease in a community. Unfortunately, we are not at this time in possession of a prophylactic measure against scarlet fever as we are in vaccination against smallpox. Therefore, we are not able by one general method to prevent the spread of the disease. I think, therefore, it is fair to assume that, given a case in which scarlet fever has appeared among the pupils of any school, it would be well either to close that school or to make frequent—possibly daily—inspections of the health of the rest of the scholars. This inspection should take into consideration the general condition of the child, whether he presents suspicious symptoms—complains of sore throat—or presents evidence of a commencing infection of any kind, as is noted by the symptoms of a bad cold, suffused eyes, or a coryza.

Sanitation and Disinfection-The sanitary treatment of scarlet fever in a household should be upon the same general principles that have been outlined in the case of smallpox. The patient should be kept in an isolated room, preferably in the upper story of the house, and should be guarded from contact with all save those absolutely necessary to care for him, his physician and nurse. It is not our purpose to follow the clinical course of the disease, but during the height of the disease care must be taken to disinfect all discharges from the patient, especially the secretions from the nose and mouth; secondly, from the bowels and bladder, but it is only when the height of the disease is past and the brilliant scarlet eruption gives place to a commencing desquamation that the real trouble begins. This desquamation is a natural process and must go on. The outer layers of the skin have been rendered dead by the disease and must be eliminated, and so long as this desquamation continues the patient is a dangerous object and a source of infection to others. During the peeling or desquamatory stage of scarlet fever the patient's skin should be bathed once or twice a day with a germicidal solution. A weak solution of carbolic acid, not exceeding 1 or 2 per cent, should be used to bathe the entire body surface, and especially the hairy scalp. The use of carbolic acid for children under ten years of age is not unattended with danger: therefore some other antiseptic sufficient in power but mild in character may be substituted. A saturated solution of boric acid is a good one, and it is well that this solution be rendered decidedly alkaline by the addition of a small quantity of carbonate of soda. The throat should be gargled frequently and the nose cleansed with a mild antiseptic. Boric acid is probably the best solution for this purpose.

So long as a single scale is visible about the skin or upon the scalp of the child, so long is the child capable of conveying infection, and should not be released from quarantine until this process is entirely at an end.

The same care should be taken with the bed and body clothing of the patient as was recommended in smallpox.

Articles of value should be boiled or immersed in a strong germicidal solution. The carbolic acid solution is here good, or if facilities are

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available, they should be thoroughly disinfected by steam. In removing the articles from the sick room to be either boiled, burned or steamed, care should be taken to envelope them in a sheet wrung out of one of the strong germicidal solutions.

A great source of the spread of scarlet fever has been the fact that the books, toys, or other articles used for the amusement or entertainment of the patient, are not disinfected at the end of the sickness. If these toys or books or playthings are of little value they had better be burned. If value is attached to them, either by their intrinsic worth or by association, they may be disinfected at the end of the illness by sulphur dioxid, or formaldehyd used by any of the methods prescribed as for smallpox, or, if permissible, by immersion in one of the strong germicidal solutions.

I do not intend again to go over the while subject of disinfection with the minuteness with which I treated of it in the case of smallpox. Any one of the methods outlined in the treatment of that disease is applicable to disinfection after searlet fever. I attach particular importance to formaldehyd because sulphur dioxid is destructive and injurious to fabrics and textiles. Particular attention should be paid to the walls and to cracks and crevices of the sick room. The quantity of epithelial detritus which results after an attack of scarlet fever is great beyond all belief, and so long as this is not reached by a disinfecting agent the room is dangerous for occupancy by others who are not already protected by a previous attack of the disease. Great attention should therefore be paid to washing the floors and scrubbing the walls of the apartment. If care has been taken in the early stages of the illness to remove all unnecessary articles from the room, an excellent plan would be to subject the room to a preliminary disinfection by sulphur dioxid, this to be followed by a scrubbing with a strong soda solution and a subsequent application of fomaldehyd gas by any one of the three methods which have already been brought to your attention.

Concluding Remarks—I feel that I have dismissed this part of the subject briefly, but I do not wish to be considered alone by what I have said, but rather by what I have referred to in the previous account of measures to be taken for the prevention of smallpox.

Isolation and disinfection are, therefore, our greatest safeguards in the prevention of the spread of scarlet fever, and these measures may, in the discretion of the health officer, with advantage be supplemented by house-to-house inspection, as has been recommended in the case of smallpox, and the immediate isolation of all children or adults who present the initial symptoms of the disease.

DIPHTHERIA

The time at our disposal being short, I am going to pass on to the subject of diphtheria.

Etiology—Diphtheria is an acute, specific, communicable disease caused by infection with the Klebs-Loffler bacillus. It is unnecessary

to point out to you at this day that the principal local symptoms of diphtheria are referred to the throat, where they are made manifest by the exudate or false membrane, highly fibrinous in character. which has given the disease its name, from the Greek (*diphtheria*) skin. It is to be distinctly understood, however, that diphtheria is to be regarded as a local infection with constitutional manifestations, the local being manifested in the throat, the larnyx, and, in many cases, in the nasal passages. The disease is a distinctly bacterial infection whose degree of communicability is very great. The virulence of the organism varies and also the degree of susceptibility of different persons. The infectious agent is the Klebs-Loffler bacillus, and this is contained in the secretions of the mouth, throat and nose, and may also be sometimes present in the blood, causing a true septicemia, and may, in exceptional cases, be contained in the bladder and fecal discharges of the patient.

Prevention—In the matter of prophylactic measures diphtheria must be considered as occupying a medial position between smallpox—against which there is a well-recognized protection—and scarlet fever, for which we have as yet no well-authenticated prophylaxis. It is needless for me to bring to your attention that most wonderful discovery of the nineteenth century, the diphtheritic antitoxin, announced conjointly and at the same meeting of the International Medical Congress by the two eminent scientists, Behring, of Frankfort, and Roux, of Paris.

In the diphtheritic serum we have an agent of wonderful properties, an agent that has reduced the mortality to a degree which will ever render these two scientists the admiration of the scientific and lay world, and in the same agent we have at our disposal a measure of distinct prophylactic value.

I do not think it is necessary in this gathering to go into the subject with great minuteness; but, as in the case of scarlet fever, schools, public and private, and congregations of children for purposes of instruction or amusement are agents for the dissemination of the disease. A school in which diphtheria has made its appearance in the person of one or more pupils should be closed until thorough measures of disinfection can be applied to the building, and during the period of incubation of the disease it would be decidedly advantageous to have all pupils of the school subjected to a thorough and oft-repeated medical inspection, particular attention being paid to the general condition of the children and more especially to the condition of their throats and of their nasal mucous membranes. Every case of sore throat, mild or grave in character, should be subjected to bacterial diagnosis, and whether the symptoms are urgent or not every child or adult presenting suspicious microscopical forms in their throats as a result of these cultures should be isolated until the disease is frankly announced or until suspicion is removed. These examinations should be frequently and thoroughly repeated.

Sanitation and Disinfection—The sanitary treatment of individual cases of diphtheria should be conducted upon the general lines given for scarlet fever. The patient should be isolated in a room, and there should be no communication with the patient except on the part of necessary

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attendants, nurses and the physician. The danger being in the Klebs-Loffler bacillus being contained in all the secretions of the mouth, throat and nose, it is obvious that these secretions should be thoroughly disinfected as soon as eliminated, and that clothes, handkerchiefs, etc., used to receive them should be either thoroughly disinfected or promptly burned. I am decidedly in favor of burning. The same measures apply to the bed and body clothing of the patient as apply in the case of smallpox or scarlet fever—they should be disinfected either by burning, boiling or by steam.

I do not intend here to enter into the treatment of diphtheria by the administration of antitoxin, but I do distinctly place myself on record as saying that the physician who neglects to employ antitoxin in the treatment of the disease lays himself open to criticism and deprives his patient, child or adult, of the very best means known to modern science in the cure of a dreadful malady. The question of immunizing "contracts" by doses of the prophylactic serum is one that the physician must decide for himself, and in this he must be governed largely by the prejudices of the parents and friends of his little patients. Speaking for myself, I should say that given a large family—especially one in which children predominate—it would be the wisest measure to administer a prophylactic dose of diphtheria antitoxin. It can do no possible harm and may be the means of averting an attack of diphtheria and of preventing the spread of the disease beyond the house in which it first appeared.

The same general principles as to the disinfection of articles in the sick room and the sick room itself as given for scarlet fever and smallpox apply to diphtheria. Especial attention should be paid to the drinking vessels and eating utensils, and these should always be thoroughly sterilized with actual boiling water. On no account should food which has been exposed in the room of a scarlet fever or diphtheria patient be used by anyone else, but it should be promptly destroyed. Again, in both scarlet fever and diphtheria we are confronted with the possibility that all of our efforts to cure disease and to prolong life may be inefficient. The same measures given in the case of scarlet fever and smallpox should be taken in regard to the disposal of the remains of the deceased. They should be wrapped in sheets wet with a strong germicidal solution, the body at once closed in a hermetically sealed coffin, and burial should be prompt. There should be no attempt at anything partaking of the nature of a public funeral. As in the case of smallpox, cremation would be advisable did facilities exist and the prejudices of friends and relatives permit.

CONCLUSIONS

I am going to bring this address to a close without farther comment. I have already said much, though much also remains to be said.

The three subjects committed to me for discussion are so vast that volumes might be written upon their management, but the time allowed me is that given to an ordinary address, and this time I am afraid I have exceeded. I shall lay down certain axioms for your consideration and then close;

1. In the case of smallpox, vaccinate, isolate, and disinfect.

2. In the case of scarlet fever, isolate and disinfect.

3. In the case of diphtheria, isolate, administer antitoxin, and disinfect.

Had I said nothing more than to give these three closing remarks I would have covered the subject, giving you these cardinal principles, and leaving to your intelligence and experience the methods of carrying them out.

XVIII

THE FLY AND MOSQUITO AS CARRIERS OF DISEASE*

BY H. D. GEDDINGS,

Assistant Surgeon-General, U. S. Public Health and Marine-Hospital Service

GENTLEMEN,—In responding to the invitation of your secretary to address you upon the subject of "The Fly and Mosquito as Carriers of Disease." I feel that you have assigned to me a duty at once important, in that it embraces the consideration of the results of observations of men of eminence during the past few years; honorable, in that it is a subject of the deepest significance and requiring the most patient scientific investigation; and pleusant, in that it shows the confidence reposed in me as an individual in exemplifying the work of others.

Allow me to reverse the order in which the subject was presented upon the programme and first take up the subject of the mosquito as a transmitter of disease. Within less than a decade this subject has assumed the greatest importance, as up to that time, in fact, even to a later period, the transmission of diseases now recognized as being conveyed by the mosquito was laid down as one of those puzzling problems, the pathology and etiology of which were incapable of explanation.

In a body of this character it is unnecessary for me to say that diseases for the transmission of which the mosquito at the present time is held responsible are: First, malarial diseases; second, filariasis; and, third, yellow fever; with a new candidate for consideration as represented by the trypanosomes, the importance of which has only been recognized since the acquisition of territory in the Far East as a result of the war closed within the last few years. Naturally malaria must occupy most of our attention. This is perfectly natural, not only from the widespread existence of malaria, but from the influence which malaria has had upon the history of the civilized world. There is probably no influence so potent in preventing the extension of explora-

*Read at the meeting of health officers of Ohio, Columbus, Ohio, January 29-30, 1903. Reprinted from "Public Health Reports" by permission.

tions and the opening up of new regions as the prevalence of this disease, which we have always with us in more or less mild form and which in certain sections of the world assumes a virulence that to the uninitiated is simply terrific. No one influence, it may be again remarked, has so militated against the successful opening of the Tropics to commerce as this ever-present scourge. African explorers have found no enemy so dangerous as the terrible fevers that exist in the interior of the country, and it is only within the past few years, aided by the researches of men such as Laveran. Bignami, Marchiafava, Ross, Manson and a host of others too numerous to mention, that there appears to be a probability of the stumbling-block being removed.

No one is free from the danger of malaria in almost every section of the world, and Koch justly says:

"Malaria is met with everywhere. The officer in his bureau, the traveler in the interior, the soldier upon the march, all must recognize that sooner or later they are to become the victims of malaria."

No more important discovery stands as a milestone upon the road to progress than the original discovery by Laveran of the malarial parasite, removing the disease from that vague, indefinite sphere of an unknown entity combating human happiness, which is well intimated in its name derived from the Italian of "bad air" and signifying that it was an emanation of miasm, insidious in its methods of entrance and potent for evil in its effects upon human beings. Even after the discovery of Laveran of the nature of the infecting agent in malaria there remained much doubt as to the way in which it effected entrance into the human economy.

Malaria has been regarded for centuries as an air-borne disease, as indicated by its name. When general recognition had to be given tothe almost axiomatic fact that for every disease there is a tangible cause, the plasmodium of Laveran answered to the causative agent; but there was no solution to the question for a long time as to how this parasite was conveyed from its ordinary habitat into the body of the unfortunate victim who became the subject of his chill, his paroxysm of fever, and of his stage of sweating. It was thought for a long time that the parasite was borne upon the miasm arising from swampy districts, thus effecting an entrance into the economy through the respiratory tract. This theory failed of scientific demonstration. Again, it was believed, and for a long time seemed susceptible of proof, that the parasite was ingested along with the water drunk, and passing, into the intestinal canal there underwent multiplication and entered the great circulating fluid-the blood-and by its cycles of maturation caused the outbreaks.

Thus the matter rested until attention was directed to researches of Dr. Patrick Manson, who took the advanced position that an intermediate host in the shape of a certain gnat or mosquito was necessary in transmitting the disease from man to man and was also an inevitable portion of the cycle of the development of the parasite. No subject has been more carefully and elaborately worked out; in no research. known to modern science have fanciful or theoretical deductions been the subject of more careful scrutiny; and to-day the "mosquito theory" of the transmission of malaria is no longer a theory, but an accepted fact, and while it is impossible to say that it is the only responsible agent for the entrance of the malarial parasite into the human economy, it certainly answers all of the indications required by the most critical scientific mind and bears every test applied to it.

The Italian observers several years ago demonstrated the fact that it was perfectly possible to convey malaria from one individual to another by an injection into the circulation of the subject to be experimented upon of blood from a person suffering with malarial paroxysms; but it was immediately demonstrated that such paroxysms, while typical, soon passed off and did not have that virulence and persistency that characterizes the disease when acquired through natural channels. It would be a matter of too much time to reiterate here how, step by step, Manson, Ross and others were led up to the deduction that for the maturation of the malarial parasite in full virulence an intermediate host was necessary. No more interesting chapter of scientific literature could be laid before you for consideration at this time; but even to enter into the alphabet of the subject would demand an amount of time which would impose upon your good nature. To follow out the question thoroughly you must be referred to the literature upon the subject, which now has become historical. Suffice it to say that it would appear that for the perpetuity of malaria it is necessary that the parasites should be introduced into the body of an insect host and there undergo elaboration and multiplication, and at a certain period of the cycle of development should be injected by their intermediate host into the circulation of the human being, there to undergo further modification and to acquire their full virulence in the unfortunate individual who has been the subject of the bite of the insect host.

Experiments have demonstrated beyond cavil that not only is the mosquito the responsible agent, but that one single genus of the mosquito family is the host, by election, for the maturation and proliferation of the malarial organism. The ordinary mosquito of the genus *Culex* is quite harmless in this respect. These mosquitoes are a pest, a nuisance pure and simple, but their occurrence in a locality is without pathological or etiological significance. For the successful propagation and transmission of malaria a certain family of mosquitoes—the genus *Anopheles*—is necessary. Many varieties of *Anopheles* are known —the *Anopheles claviger*, *Anopheles maculipennis* and the *Anopheles nigripes*; but it may be said in general terms that one of the family of "spotted-winged mosquitoes" must be present to constitute an essentially malarial neighborhood or environment.

The mosquito doctrine is not a new one. Nuttall states that nearly 2,000 years ago the Roman writers Varro, Vitruvius and others indicated that mosquitoes bore a casual relation to malaria. Knott referred to it in 1848, and King in 1883 wrote an elaborate argument in its favor. But it is to Manson, of England, that the credit belongs for a

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reawakening of an interest in the subject, and in his Goulstonian lectures, of 1898, he followed the hypothesis which, after much discussion, much work, much acrimonious and polemic theorizing, has now been acepted as true; and it is not too much to hope that with a thorough knowledge and acceptance of the dictum as laid down by all these investigators, the names of some of whom have been given to you in the early part of this address, the suppression of malaria, the deadly foe of mankind, will be a matter of accomplished fact and that the march of civilization will proceed without encountering the terrible difficulties which have heretofore beset its path.

I will detain you for a few moments only to give you a very brief outline of the course of development of the malarial parasite within the body of the mosquito, taking the aestivo-autumnal form as a type.

The process of the development of the malarial parasite in the mosquito is evidently a sexual one, and takes place in the middle intestine of the insect; and, being sexual, there must be two agents concerned in it, which are, respectively, the crescentic body and the passive nonflagellated female elements known as macro-gametes. The crescents themselves are known as gametes, and the male elements or active flagellated bodies as micro-gametocytes and the nonflagellated or female elements as macro-gametes. Let us suppose that a person suffering with malaria in whose blood the crescentic organism is demonstrable has been bitten by one of these mosquitoes. If the middle intestine of a mosquito is examined within forty hours after she has bitten, the intestinal wall will be found to contain numerous spindle-shaped bodies identical in appearance with those observed in the human blood, but slightly larger in size. The bodies are pigmented, but the pigment, instead of being formed in a clump, or scattered as in the case of human blood cells, is ranged round the periphery. The bodies are situated on the outside of the epithelium and basement membrane of the intestine, between it and the muscular wall; that is to say, they are within the substance of the intestine.

From the second day developmental changes become very rapid and by the third or fourth day it will be seen that the bodies have very much increased in size and that the protoplasm has become granular. On the fifth day the increase in size has proceeded to a remarkable extent, the parasites becoming so large that they project from the intestinal wall like processes which contain numerous minute bodies that are nuclei, and shining particles resembling fat. On the seventh day the interior of the parasite contains an immense number of very delicate filaments which contain at the center a small amount of chromatin and are arranged like rays about a central mass, which may or may not contain some black pigment. These filaments are the sporozoites. After the seventh day it will be found that the capsule has ruptured, setting free the sporozoites, which now make their way into the tubules of the salivary glands, which will be found to be crowded with the parasites, and these, inoculated into man by the biting of the mosquito, undergo certain and as yet undetermined changes and become the hyaline, intracellular malarial parasite.

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The cycle of the malarial organism may, therefore, be summed up into two great stages—the human cycle and the mosquito cycle—which may be described as follows:

The human cycle in five stages:

- 1. Sporozoite.
- 2. Hyaline body.
- 3. Pigmented body.
- 4. Segmenting body.
- 5. Crescentic body.

Taking up the study where we left it, therefore, we pass into the mosquito cycle, which also has five stages, viz:

1. The crescentic body, or gametes.

2. The round passive body, or macro-gametes.

3. The round, active flagellated body, or micro-gametocytes.

4. The encapsulated cystic body.

5. The sporozoite, again ready to enter the human economy through the instrumentality of the bite of the mosquito.*

I am conscious, gentlemen, that this is the barest outline, so bare a skeleton that I am almost ashamed to present it; but, as has been before remarked, the time at the disposal of this gathering will not permit a more elaborate exemplification of this most interesting process.

It may be asked: What bearing does this have upon the question of malaria as it affects us as county, city and village health officers, almost all of whom are practicing physicians? What influence do the description given and the reasearches enumerated have upon the wellbeing of the communities and the patients entrusted to our charge? What practical deductions are to be drawn from these highly interesting philosophical demonstrations? The reply is that, as surely as night follows day, so surely will the destruction of mosquitoes of the genus *Anopheles* in a given locality be followed by a marked diminution of the malarial disease and with the entire destruction of the insect pests by an entire disappearance within a short time of cases of malarial manifestations.

Therefore, what has been presented to you is not simply a scientific discussion of historical interest, but it affects physicians, their patients and communities under their charge in an eminently practical way. The lesson to be drawn is, that in a malarial community the main object should be to strike at the root of the evil by the destruction of the mosquito responsible for the transmission of malarial disease from man to man. When it is remembered that a single female *Anopheles* may, after biting an individual affected with malarial fever, set free millions and millions of sporozoites and may infect with malaria every individual whom she bites, that she lays a large number of eggs and that a large proportion of these eggs come to maturity, thus producing a new crop of mosquitoes ready to bite other individuals, it will be seen that the process is like the endless-chain letter system, which, begin-

*The Estivo-Autumnal Fevers, New York, 1901, by Chas. F. Craig, Assistant Surgeon, U. S. Army. ning with one individual, will in time unless checked reach an almost countless number.

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Mosquitoes should be destroyed wherever found, and no surer way exists of destroying them than to prevent the ovidepositing of the females. Water is the essential element required in this ovidepositing. The female must have a larger or smaller body of water upon which to deposit the wonderful canoe-shaped mass of eggs that she lays. Therefore the filling up of all stagnant pools of water, the drainage of large bodies of water, the abolition of water barrels, the screening of cisterns, even the emptying of the old tin can about premises which may contain rain water, are all essential steps in the mosquito campaign, and it is by a campaign against the mosquito that we must arrive at the suppression of malarial disease. Should the ovidepositing of the female have taken place, means must be adopted for the destruction of the ova or the larvæ and the pupæ, should they have passed into these stages. No other agent is probably so effective in this direction as the use of petroleum upon ponds or bodies of water, should it be impossible or not feasible to drain them thoroughly or fill up with fresh sand their original site.

Remember, that, taken in conjunction with each other, a person afflicted with malarial paroxysms in a locality where any variety of the genus *Anopheles* prevails is reasonably certain to spread the malarial' disease throughout the community.

This most interesting and vital branch of the subject, gentlemen, has been dwelt upon at such length that but little time remains to take up the other disease for the transmission of which the mosquito is responsible. Therefore, I omit any mention of filariasis or trypanosomes and pass on to briefly discuss the mosquito theory of the transmission of yellow fever.

Unfortunately, unlike malarial disease, the parasite of yellow fever has not been demonstrated, and until this is done we can not approach the subject with that certainty with which we can describe malarial fevers. This only is known: That, unlike malarial diseases, the genus *Anopheles* of the mosquito family is not responsible for its transmission; but the transmitting agent is the female of that family, known as the *Slegomyia fasciata*. Possibly it is that time and further study will develop the true parasite of yellow fever, and that its life history and method of transmission may at some future time be described as minutely and as accurately as has been done in the outline which has been laid before you.

The theory originally propounded by Finlay, of Havana, lay fallow until taken up by that quartet of earnest workers—Reed, Carroll, Lazear and Agramonte. Lazear fell a victim to his enthusiasm and may be said to have laid down his life for the cause in which he was so deeply interested. Reed has joined the silent majority, and when, in the future, the hypothesis so ably maintained by him shall have acquired all the force and dignity of a doctrine, the subject can not be approached or written on without a tribute of love and reverence to his memory. With the full knowledge that the subject has been very imperfectly touched upon, and spurred on by the lapse of time, we must rapidly pass on to the consideration of the second branch of our subject, viz, diseases transmitted by flies. The subject, while not as complex as the one of the mosquito, is still full of interest; but we will limit our consideration to two diseases, potent in vastness and fraught with the direst calamities to humanity. One of the two diseases will be that great epidemic pestilence which, from time to time, devastates whole regions of the Orient and from which in times past the United States itself has not been free, viz, cholera.

As far back as 1890 it was demonstrated that the ordinary house fly could carry within its intestinal tract live cholera vibrios; that they could there multiply and could be deposited in the fecal excreta of the fly either upon water or upon the food and thus, under favorable conditions, become the responsible agent for the spread of the infection. The matter has an obvious practical bearing for the consideration of a gathering of health officers, for it may be taken as practically evident that cholera is not alone a water-borne disease, but that our measures of precaution and safety are not completed until we have effectively assured ourselves that flies do not have access to the discharges of a cholera patient; or, if such be impossible, that these discharges are rendered innocuous by efficient disinfection. Therefore, the disinfection of the discharges of the cholera patient not only is demanded in order that the water supply may not become contaminated, but having the further end in view that, should the domestic house fly feed upon them, it may not through its intestinal canal contaminate the food and drink of others.

Let us rapidly pass on to a consideration of the fly in the dissemination of typhoid fever. During the Spanish war a committee of medical officers was appointed by the Surgeon-General of the Army to investigate the subject of enteric fever in the military camps, and in an admirable report they arrived at certain conclusions which were the specificity of the Eberth bacillus, the influence of infected water in spreading disease, and the great danger attending the instrumentality of flies in disseminating the Eberth bacillus by feeding upon typhold dejections and thus contaminating food and drink upon which they might alight. The lesson borne in upon us, therefore, is the same as in the consideration of cholera; The absolute disinfection of all discharges, alvine, urinary and buccal, of the typhoid patient, for these discharges all do at one time or another during the occurrence of a case of typhoid fever contain the responsible Eberth bacillus and, subjected to contact with flies, may through the instrumentality of this disgusting pest be responsible for the spread of the malady to persons at greater or less distance. In this, as in every other communicable disease, eternal vigilance is the price of safety.

No more serious subject can occupy the attention of a careful health officer, and the health officer who simply guards the water supply from contamination, great though his results may be, can no longer be

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regarded as having performed the full measure of his duty. He must look after the fly. It should be excluded from the rooms of the sick; it should not be permitted to gain access to any of the discharges of the typhoid patient. Though in guarding the water supply the health officer may have closed the most important opening, the neglected minor precaution leaves a gap, and, to use a well-worn axiom, "the strength of a chain is the strength of its weakest link," until he has paid as much attention to one source of danger as to another his chain of defense is not perfect, but may give way at the weakest point.

At a meeting of the Association of Military Surgeons of the United States recently held in Washington, D. C., the writer had the honor of presenting a paper upon "The prophylaxis of certain diseases incident to camps in time of war," in which he took the position that, to guard against the appearance of typhoid fever in the future, certain points should be taken into consideration, which were as follows:

1. Early recognition and positive diagnosis.

2. Absolute disinfection of the discharges of all hospital febrile cases.

3. Rigid policing and disinfection of all camp latrines.

4. Guarding of water supplies from infection, not only by careful prevention of direct contamination, but by foresight in the location of latrines in relation to the sources of water supply.

5. The employment of every possible means to prevent the multiplication of flies, and the infection by them of kitchens and messing places.

It was also suggested that in future it would be wise to consider every case of enteric fever as an "infectious case" and to treat them in a special hospital provided for the purpose and not in the general wards of a military hospital.

So important, gentlemen, is this subject of the transmission of enteric fever that it would seem in the future we should lose no opportunity of profiting by the terrible lessons that have been taught in the past. This applies not only to military operations. In the future it would seem wise that where there is to be any large aggregation of persons for a long period of time, a preliminary period of observation under conditions approaching those obtaining in camps of detention should be practiced before the individuals be allowed to assume the new duties which may devolve upon them. This period of time, it is suggested, should be for the period of the incubation of the disease and every case of illness or indisposition should be thoroughly investigated with a view of excluding possible cases of enteric fever and enabling us to take the proper precautions in handling them. This period of observation completed, the individuals may then pass from detention camp conditions to conditions and environments as are necessary for the object in view, be these objects military, civil, political or social.

Another point which has been suggested by Surgeon-General Wyman and which does not seem as yet to have been mentioned, or if mentioned has not as yet been printed, is that in future in all such large gatherings the latrines or other provisions for the disposal of personal dejecta should be rendered fly-proof by screening with wire netting. This may appear a stupendous task; but were the difficulties even greater than they really are, it is believed that the end would justify the means and that we would reap an abundant harvest of good. In camps the capacity of latrines is carefully calculated upon the basis of the number of persons for whose use they are intended. It would seem that large supplies of wire netting upon wooden frames should accompany the camp equipage and that at the time when the latrine is dug the screen frames should be erected and the latrine thus rendered fly-proof from its very inception. This "fly-proofing" should be carried to the most rigid extreme, even to the extent of rendering entrances impermeable to flies by an arrangement of vestibules or double doors. Having accomplished this end of excluding flies, the most rigid precautions should be taken to insure the covering and disinfection of the dejecta, and when the trench or pit is filled to the depth determined upon the screen can be taken down and removed to a new site.

In the disinfection in camps against typhoid fever attention is invited to a procedure mentioned by Major Griffiths, who states that much good resulted in his practice in such disinfections from disinfecting not only the tent or temporary habitation where a case of enteric fever had occurred, but in extending this disinfection rigidly to three or four tents upon each side of the one represented to be infected. This would seem to be based upon the prsumption that the fly does not indulge in long flights, but having selected a locality agreeable and suitable to himself, he never departs far from it. In this way it would certainly seem that there might be a certain limitation to the dissemination of the infection of enteric fever.

I feel, gentlemen, that I have presented to you in a very imperfect way, views upon the topics which form the subject of this paper. Much more could be said; little has been said in comparison with the amount of material at the command of one looking up the subject. While I may have conveyed to you nothing original, it may be that the subjects presented will lead one of you to research and to an endeavor to secure better results. If such be the case, the time spent by you in listening to these remarks of mine, and the labor expended by me in presenting them to you, will indeed have been a source of pleasure for me and, I trust, a source of some profit to you.

XIX

INEBRIETY AND ITS MANAGEMENT*

That inebriety is a fruitful cause of disease is a universally admitted fact. Profane and sacred history alike chronicle not only its demoralizing but its disease-and-death-producing effects.

DISEASES PRODUCED BY INEBRIETY

It may be well, first, to consider briefly this phase of inebriety. The term alcoholism will be used as applying to all diseases directly or indirectly due to the use of alcohol. Dr. Huss, of Stockholm, the originator of this term, divides it into acute and chronic alcoholism—the former drunkenness and its immediate consequences and the precursor and cause of the latter. Chronic alcoholism is a condition of serious mental and physical disorder, and produces pathological results that are not only serious but are very diverse in their manifestations. These diseases have been classified as follows:

1. Disorders occasioned by strain imposed on the system by alcohol.

2. Diseases traceable to general system-degeneration produced by alcohol.

3. Diseases which but for alcoholic system-degeneration might have been averted or restricted.

Prof. Christinson, of Edinburgh, said in a letter to the Massachuset's state board of health:

"I recognize certain diseases which originate in the vice of drunkenness alone, which are delirium tremens, cirrhosis of the liver, many cases of Bright's disease of the kidneys and dipsomania or insane drunkenness. Then I recognize many other diseases in regard to which excess in alcoholics acts as a powerful prediposing cause, such as gout, gravel, aneurism, paralysis, cystitis, premature incontenence of urine, erysipelas, spreading cellular inflammation, tendency of wounds and sores to gangrene and inability of the constitution to resist the attacks of diseases at large. I have had a fearful amount of experience of continued

*Read by J. F. Kennedy, Secretary State Board of Health, before the State Board of Control. (249)

fever in our infirmary during many an epidemic, and in all my experience I have only once known an intemperate man of forty and upwards to recover."

He further claimed that three-fourths, or even four-fifths, of Bright's disease in Scotland is produced by alcohol. I might quote from Murchison, Richardson and scores of other Europeans as well as American authors, showing a greatly increased list of functional and organic diseases as being caused, directly or indirectly, by the use of alcohol—diseases affecting the brain, lungs, heart, kidneys, liver and digestive and reproductive organs. Before such an audience, however, this is unnecessary.

You, gentlemen, are only too familiar with the different forms of alcoholic insanity—such as acute alcoholic mania or mania-apotu, acute alcoholic delirium, or delirium tremens, and alcoholic epileptiform mania.

DUTY OF THE STATE

If so many serious physical and mental diseases result from the use of alcohol, what is the duty of the State in the matter of preventing, 30far as possible, so much sickness, insanity and moral wreckage, and in properly caring for those thus diseased and stranded? The State has given the State Board of Health a general supervision of the lives and health of the people and has authorized it to make rules and regulations. for the protection of the public health, which, when made and promulgated, have practically the effect of legislative enactment-the statute providing penalties for the violation of these rules and regulations, or for refusal or neglect to comply with them. But here is a large class of acquired and preventable diseases patent not only to the physician and sanitarian but to the layman as well; and yet the State Board of Health has not discovered any effectual, if possible, way of prevention; nor has the legislature, the press or the forum been more successful. Moral suasion, legal suasion, education, the teaching in our public schools of the evil effects of alcohol, the daily exhibition by its unfortunate victims of its dangerous results have all been tried and are still on trial, and yet, as the ranks of the inebriates are thinned by death there seems to be an on-coming army to take their places.

TOBACCO AND INEBRIETY

I do not know whether my observations and the deductions based thereon are unique, or not, but I here deliberately declare that during a professional life extending over nearly forty-five years I have never known a confirmed inebriate that was not, or had not been, addicted to the use of tobacco. In a number of cases of physicians with whom I talked I have been told that in their own personal experience they found a remarkable relationship between their use of tobacco and their attacks of inebriety, and they were only able to overcome their habit of strong drink by first discarding the use of tobacco. I would not for one moment say that all tobacco users also use alcohol, but I do believe that the ranks of the inebriates are largely recruited from those using tobacco. 1903]

Many take to stimulants to drown sorrow; to supplement their strength in physical and mental labor; to conform to the social amenities of life and as a therapeutic agent with, or more commonly without, the advice of the physician. It matters not what the motive is, however, in a large number, a frightfully large number, the occasional glass becomes the habitual glass and the tippler becomes the inebriate.

PREVENTION

I am led to believe that fully seventy-five per cent of those who become inebriates begin the use of alcohol, by which I mean all beverages containing alcohol, before they have reached the age of twenty-one. While proper precept and example in the home and in the public and private schools will do a great deal, and could do vastly more, to prevent inebriety, there is much that can be done, and is being done, by the great corporations refusing to employ or to keep in their employ any men or women who to any extent indulge in alcoholic drinks. There is a vast proportion of boys and young men who have a noble ambition to succeed who could not be induced to enter upon a course that would shut up so many avenues to success.

I believe the State should not only enforce rigidly the statutes forbidding the sale of cigarettes, tobacco and intoxicants to minors, but make the use of intoxicants a cause for the dismissal from office of any State employe or official. The legislature has given the State Board of Medical Examiners the right to revoke the certificate of physicians given to habitual intoxication.

Knowing the causes of inebriety so well, the best measures of prevention are at once suggested. Successful vaccination is the most reliable, if not the only reliable, means of protection against smallpox. Of course all will concede that a more reliable, indeed, and absolutely reliable safeguard against inebriety is total abstinence from the use of alcohol. Whatever will lead to a larger number of total abstainers will, just to that extent, reduce the number of inebriates, since all inebriates come from the ranks of non-abstainers.

Hence there should be redoubled efforts in the home, in the school, in society, in the pulpit, in the public press, in literature everywhere, to present to the young the dangers of even the occasional use of alcohol, and the further fact that the use of tobacco may lead to inebriety. The law should supplement these efforts by making it as hard as possible for minors, especially, to procure tobacco and alcoholic drinks.

HEREDITARY INFLUENCES

There is no doubt that a tendency to inebriety is inherited, and hence confirmed inebriates should not be granted by law the right to beget a tainted offspring.

On this point the very distinguished superintendent of the Royal Morningside Insane Asylum at Edinburgh, Scotland, in his Eighty-eighth Annual Report says: "Only a few of us preach tectotalism to all men,

or total prohibition, or any other such strong measure. But from our experience in practice, our knowledge of human nature in its dual relationship of body and mind, and its hereditary weaknesses. coctors are able to speak with authority in regard to the disease—potential and actual, present and future—which the excessive consumption of drink is causing in our population. A consumptive race might conceivably be absolutely cured in two generations, or even in one, by good conditions. I don't think a drink-sodden race could be fully cured in a hundred years."

While the use of alcohol as a beverage is a fruitful cause of disease, and it has been so regarded from remote antiquity, yet it is not so generally conceded that inebriety is itself a disease. By many it has been regarded, and is still regarded, as a vice, and penal codes are invoked and enforced against its victims. I find in looking up the literature of the treatment of inebriety that two theories as to the character of this condition prevail—the one regarding it from a moral and the other from a physical standpoint, and adapting their treatment to their respective theories.

The most prominent and pronounced advocate of the moral theory and treatment is Dr. C. J. Gibbons, Supercontendent of "The Franklin Reformatory Home for Inebriates," located in Philadelphia; and of the physical is Dr. T. B. Crothers, president and superintendent of Walnut Lodge Hospital, Hartford, Connecticut.

Dr. Gibbons, of the Franklin Home, in his twenty-ninth annual report (1901), says: "When we recall the labored attempts to class intemperance among the physical diseases, despite the demonstrated inability of science to cure it or to diasnose its symptoms, it is not surprising that there should exist confued ideas on the subject. * * * As soon as the Home was opened the managers were confronted by two problems. Should its beneficiaries be treated as the victims of a disease, transmitted through father or grandfather, or regard the inebriates as the slave of an appetite, created and fostered by the use of alcohol? They determined to consider the drinking man and his drunkenness as presented in every-day life, rather than from the conclusions of scientists. Some of the latter boldly advanced the theory that the passion for alcoholic drinks is a disease, over which the victim has no control. This conclusion was eagerly adopted by physicians, whose patients would refuse to hear unpalatable truths, but not to being treated for 'dipsomania.' The Home rejected this theory. It makes the inebriate a subject only for the hospital or insane asylum. It is a pernicious and dangerous fallacy, destructive of man's free will by its release from moral obligation and responsibility.

"Teach the drunkard that he is the victim of heredity and you make of him a weakling who untruthfully prates upon the physical infimities of his ancestors as the source of his own downfall. Teach him that his way towards reclamation is through a medicine chest and you place him on a flimsy pedestal of strength which makes him only strong enough to get drunk again. But teach him that he has sinned, that his diseased condition is the result of that sin, and to remove this diseased condition he must assert, through faith, the manhood with which God has endowed him, and you have placed the drunkard on the first step of the only ladder which leads to complete and lasting reformation."

Dr. Gibbons says further, however, in modification of the foregoing: "The Home does not deny that drinking men develop a diseased condition of mind and body, to meet which we have our medical department. * * * After, however, a man is restored to a healthy and normal condition, neither physician nor medicine can restrain him. At this point his reformation begins."

The Doctor gives the following summary of thirty years' work along this line: "Number of inmates received, 6,820; number of men permanently reformed, 3,079."

Speaking of this result Dr. Gibbons says: "This average of permanent reformation, being forty-five per cent of the total number of men received, is believed to be greater than can be shown by any other institution in the country."

I may say that so far as I could obtain data relative to such institutions, this Franklin Reformatory, in the position above taken, stands almost alone.

It is a well settled conviction, however, that inebriety is not only a disease, but a difficult disease to permanently cure. The hospitals that exist today are but the practical outgrowth of truths centuries old. Ulpian, a noted Roman lawyer in the second century of the Christian Era, strongly advocated the treatment of inebriates as diseased. In 1747 Condillac, of France, advocated special hospitals for drink maniacs. In 1790 Dr. Benjamin Rush, of Philadelphia; in 1802, Dr. Cabanis, of Paris; in 1809, Dr. Platner, of Leipsic; in 1817, Dr. Salvator, of Moscow; in 1818 Dr. Esquirol, of France; and in 1822 Bruhl Cranmer, of Berlin, all urged the need of physical restraint and treatment of the inebriate as sick and diseased in hospitals and asylums. In 1809 Dr. Benjamin Rush, of Philadelphia, published a work entitled "Medical Inquiries," in which he declared "that intemperance was a disease and that hospitals for its exclusive treatment should be established in all the principal cities of the land."

In 1830 the Connecticut Medical Society appointed a committee to report on the need of an asylum for the medical treatment of inebriates. In 1833 Dr. Woodward, of the Worcester Insane Asylum in Massachusetts, urged that inebriates be regarded as insane and sent to the asylum for special treatment. In 1844 the English Lunacy Commission urged that inebriety be regarded as a disease, and that special hospitals be provided for its treatment.

Dr. T. D. Crothers, superintendent of Walnut Lodge, above referred to, says: "It is a curious fact that inebriety was recognized as a disease long before insanity was thought to be more than spiritual madness and a possession of the devil. This fact has escaped the attention of persons who assert that inebriety is always a vice and that the disease theory is only an extravagant view of enthusiasts peculiar to our times. For over a century the disease of insanity was denied and contested. Inebriety passed the same ordeal of ignorant opposition and criticism, although it has been recognized by a majority of the leading physicians of the age.

"Once the fact that inebriety is a disease became fully established the asylum method of treatment came to be regarded with favor, and the first institution for the treatment of this class of unfortunates was at Binghamton, N. Y. To Dr. J. E. Turner, of Maine, belongs the credit of securing the first such asylum in the world. He was so thoroughly convicted of the need and benificence of such an enterprise that in 1846 he began an enthusiastic agitation of the subject. After eight years of persistent effort, amid great opposition and many discouragements, he succeeded in enlisting the co-operation of a number of eminent medical men, who formed a stock company and proceeded to raise funds to build and equip an incbriate asylum. The company was incorporated as the United States Inchriates Asylum. Only subscriptions of \$10.00 could be obtained. The eminent Dr. Valentine Mott, of New York City, was chosen its first president. The city of Binghamton, N. Y., donated two hundred acres of land and the asylum was located there. Dr. Crothers says: "The asylum at Binghamton began on the most advanced principles of receiving none for less than one year and having absolute restraint over them during this time. It asked no pledges or promises from the patient; it aimed to give each one positive protection and medical treatment. The patients were locked in at night and only allowed out under the strict care of attendants. Each case was considered a suicidal case of insanity, requiring long medical care and restraint. These methods were far in advance of that time and today are recognized as the latest teachings of science."

As this institution afterward became a state asylum it affords the most conspicuous example of such an experiment. Its subsequent history will therefore be interesting. Upon this point Dr. Crothers says: "The principles, plan of organization and treatment were new, and although endorsed and supported by its distinguished presidents, Drs. Valentine Mott and George W. Francis, of New York, and Chancellor Walworth, of Saratoga, created much difference of opinion.

"The patients themselves, after the immediate recovery from the effects of spirits, protested against the confinement and doctrine of disease, and sought in every way through their friends to break up the methods of treatment. As many of them had been influential men, and had influential friends, a storm of the most bitter opposition began against the founder and superintendent, Dr. Turner.

"The points of difference were these: The asylum and management insisted that each case was more or less diseased and should be under absolute control and restraint long enough to effect a permanent cure. The patients and their friends insisted that while the case might be diseased his recovery depended largely on his liberty and promise to get well; that restrain was irritation and injury, and that appeals to his honor and mannood were the real agents for final cure. In brief, one plan proposed long restraint; the other no restraint except nominal care at first, then persuasion and advice.

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"The board of management changed, and Dr. Parker, of New York, became president. They adopted the free and easy plan, and turned Dr. Turner out. The central object was to make the asylum popular with the patient. The bitter controversy which gathered about the management of this asylum attracted politicians, and the noted Wm. M. Tweed, of New York City, and others became directors. In 1867, three years after it was opened, the board of managers deeded the property to the state of New York for one dollar, without the advice or consent of any authority. From that time a series of misfortunes followed during which seven superintendents were in charge in eleven years. Then the state changed the asylum to an insane hospital, and the political governor, in justification to the act, called the inebriate asylum a failure."

Commenting upon the declaration that this institution as an inebriate asylum was a failure, Dr. Crothers further says: "The enthusiasm which had centered about this work at different times reacted and the idea of failure and condemnation of asylum treatment for inebriates was spread far and near. Had the physical treatment of the inebriate been a theory only this would have been its final death, but, like all other great enterprises of the world, the death of the Binghamton marked the birth of a large number of similar asylums, some of which are doing grand work in the world."

This comment was uttered by Dr. Crothers in 1888. In a letter received from the Doctor, dated January 9, 1902, he says: "I was assistant at Binghamton from 1874 to 1878 and knew of its work and the statistics which can be relied upon. It was wrecked in a political scramble. All the institutions suffer for want of proper laws giving them control over the patients; also from incompetent managers. It is more difficult to care for the inebriate than the insane. Good men in charge of inebriate asylums have resigned in disgust at the annoyance and unsatisfactory results. Hence in many institutions there are frequent changes of managers, making it impossible to master the subject thoroughly by any one man. The Masachusetts state asylum at Foxborough is successful. Many private asylums have proven the curability of the inebriate, under proper treatment. Keeleyism is rapidly declining, and it has made but little difference with the regular institutions except to increase the number of chonic cases."

I wrote to Dr. Charles E. Woodbury, superintendent of the Massachusetts Hospital for Dipsomaniacs and Inebriates, located at Foxborough, and received from him the following letter:

I send you, under separate cover, a copy of our hospital report for 1900 and hope within a few days to forward you one for 1901, which is now in the printer's hands. In these reports you will get most of the information you seek.

From lime to time since the opening of this hospital there has been considerable agitation by our legislature as to the advisability of continuing the work; this year the question is still under advisement by a committee of the legislature as to just what the future policy of the hospital shall be; I have no question but what it will be continued, but I also

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think that the line will be drawn much closer as to the kind of cases to be treated.

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Formerly the magistrates thought it a good place to put cases which were continually coming before them and for whom a jail or house of correction was not exactly applicable. In this way a great number of undesirable cases were admitted. If we can draw the line and confine the hospital work simply to cases which are susceptible of cure or improvement we shall attain our object. To quite an extent we have already reached that point, as our cases are improving in quality and lessening somewhat in quantity.

I have no doubt about the advisability of hospital treatment for inebriates, but I think it should be supplemented with the probation system; we have made a beginning and the problem now before us is to so extend that work that a patient may establish at home and about his business a cure begun here, provided such patient is needed to support his family or attend to neglected business.

The cases we have disposed of in this manner have thus far shown most excellent results, but unfortunately it is at present a labor of love with our probation officers, who have no legal authority over patients. whom we discharge, nor any recompense for their work, but without exception I have found them very ready and willing to assist. I am in hopes that we shall have some legislation which will give legal authority and pay to these officers

On page 19 of the report for 1900 you will find a list of cases regularly discharged, who were seen afterwards, they having been absent from the hospital from three to sixteen months; the average of cases remaining abstinent is higher in 1900 than last year, and the yearly average is considerably higher than a record running back five years, which I hope to obtain before another twelve month; you can readily understand that this is a work of considerable magnitude, as our discharged cases are scattered over a wide territory and many of them are difficult to reach. I think if we reach 20 per cent who have remained abstinent from three to five years we shall be doing well.

This hospital is no place for the criminal or chronic drunkard; the first can properly be taken care of in any of our penal institutions, and the second, who are not criminals, but hopelessly degenerated, should be cared for in some other place. Just what that should be is a question we are now considering, but certain it is that the three classes—criminal, chronic inebriates and the curable type—should not be toegther in one institution.

Our methods are all remedial and not punitive, and only such deprivation of freedom is required as is necessary up to the point when we think a patient may be allowed to exercise his self restraint, when he is given parole of the hospital grounds.

For medical treatment such tonics, etc., are given as the case requires, also physical training in the gymnasium, supplemented by an excellent and unique system of tonic needle spray baths, and we also have a special bath system known as the "Baruch." These baths aid largely in a restoration to a normal physical condition. Mentally he is encouraged by books, entertainments and amusements of various kinds. I also keep the men employed as much as possible upon the farm or in our workshops and about the different work which an institution always has—the kitchen, dining room, laundry, etc.

I have found that the more readily a man works, and especially out of doors, the more rapid is his recovery and the surer I feel that he will not return to old habits after discharge.

The trustees discharge on probation when they think a patient has been here a sufficiently long time to warrant it.

Any further information that I can give you will afford me much pleasure. Very truly yours,

CHAS. E. WOODBURY, Superintendent.

According to Dr. Crothers there are over fifty inebriate asylums in active and successful operation at the present time in England. Scotland, Australia. New Zealand, Germany, Switzerland, Norway. Sweden. France and this country. The results of treatment in these institutions have been very encouraging. I do not know how the number of permanent recoveries compares with those in cases of insanity. It seems, however, to me, that a perfectly cured insane person can never regain the position formerly held in the social, intellectual and commercial world that a perfectly cured inebriate can and does. Hence the cure of the latter is more important to the community than of the former. In inquiries made by the Binghampton asylum in 1874, it was found that in one thousand cases who had been dismissed as cured at the end of five years sixtytwo and a half percent were temperate and total abstainers.

Dr. Day, of the Washingtonian Home, Boston, in two thousand cases. after ten to eighteen years found over thirty-four per cent sober.

Dr. Mason, Kings County Home, Brooklyn, in six hundred cases after ten years found thirty-four per cent. As stated before in this paper, the Franklin Home, of Philadelphia, claimed over forty-five per cent. The most careful authorities in this country and Europe claim that fully one-third of all their cases treated were permanently cured. Certainly this is a very encouraging, if not remarkable, showing and would fully justify the philanthropist or the State in adopting and enforcing such methods.

I may be pardoned for laying before you in brief the practical methods suggested and used by Dr. Crothers in the treatment of these cases, believing that to a large extent they are applicable everywhere.

He says: "In a hospital conducted upon scientific, common-sense principles, the patients are received for periods of not less than three or six months. He signs a commitment paper, and is examined by the physician and all the facts of his present and past condition noted. If intoxicated he is placed in charge of a nurse and baths and remedies are given for his special condition. If sober he is given a pleasant room and placed upon a regular diet, exact conditions of living, and required to take such medicines, baths, exercise and general treatment as may be needed in his case. Mental occupation, amusement, change of thought

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and life in every particular are sought for. He is treated as one who has a profound disease of the brain and nervous system, requiring rest, care and removal from every source of irritation and excitement. The asylum is a quarantine where he can recover, and his liberty or restraint is governed by his condition. Wherever congenial work can be added to the amusements it is done as a medicinal aid. Every condition of life is controled and regulated, and every surrounding arranged to aid recovery. Daily religious exercises, rides, walks. Turkish baths and exact, methodical living most naturally results in a degree of strength and vigor that is very promising for the future. The use of alcohol is abandoned from the start, and its danger is taught every way. The return of the drink paroxysm is anticipated and prevented by medicines and special care, and the patient is thus enabled to outgrow the drink craze and to recover a degree of health (which will give strength) to abstain in the future. In a certain number of cases the drink impulse, or symptom, seems to be permanently exhausted after a time, like the exhaustion of the germ soil of some diseases, and no exciting causes will develop the drink symptom again. Other defects may appear, but he never again uses spirits. The germ soil has gone; it may be forever, or after the lapse of years it will return.

A period of six or twelve months in an asylum will remove the states of delirium which have kept up the use of alcohol, and reveal an exhausted brain and nerve soil that will not tolerate alcohol in any form thereafter. The person suddenly realizes that alcohol is both poisonous and repelling to his system. This may be so intense that should he take any form of spirits by mistake it will produce intense nausea and depression. In other cases this drink exhaustion dies out after long years of abstinence, and should the patient relapse late in life death follows soon after. A careful study in an asylum often relieves these cases, and the expert can safely predict a total or partial cure of the drink symptom and disorder, or its temporary suppression. Another fact, not generally known, appears to the asylum physician, namely the great uniformity of the symptomology and progress of these cases. Beginning at a certain point, or from a certain range of causes, they follow a uniform line of progress, which can often be seen, traced and predicted with certainty."

The general conclusions arrived at by Dr. Crothers, as based upon the most recent teachings of science and experience, are as follows:

"1. Inebriate hospitals must take the place of jails and station houses. Such places are dangerous in their mental and physical surroundings, by intensifying the degeneration and removing the patient beyond hope of recovery. They are in many cases literal training stations for mustering in armies of chronic maniacs that never desert or leave the ranks until crushed out forever.

"2. The inebriate hospitals should receive the incurable inebriate and make them self-supporting, and build them up physical and mentally. They would relieve the tax payer and relieve society of untold burdens of sorrow and misery. "3. Inebriate hospitals should receive the recent cases and place them in the highest condition of enforced health and vigor, and thus return a large number to health and sobriety again.

"4. Inebriate hospitals can and should be self-supporting when once established. They should be managed on scientific business principles, like military training schools.

"5. Inebriate hospitals should be built from the money raised by taxes on the sale of spirits, on the principle that every business should be obliged to provide for the accidents that grow out of its use.

"6. The inebriate hospitals of today are only in the infancy of their work, contending with great opposition and prejudice. misunderstood, condemned. and working against innumerable obstacles.

"7. The work of the present inebriate hospitals, notwithstanding all the difficulties and imperfections, has the grandest promises for the future and encouragement for further effort in this field, along the line of scientific research.

"8. Inebriate hospitals and their work is the great new land which only a few settlers have reached. They are calling us to come up and occupy, and thus help the race on in the great march from the lower to the higher.

"9. Lastly, there is an intense personality in inebriate hospitals to each one of us. They may bring salvation and restoration to some one near and dear. They may be fountains of healing whose influence shall cross and influence our pathway in many ways."

I compile the following additional facts from letters received touching the matter under consideration:

Dr. Amos J. Givens, of the sanitarium at Stamford, Connecticut, says: "We have always a large number of the better class of patients who can afford to pay for comfortable, home-like surroundings, and who do not wish to go to a state institution. The state institutions, in my opinion, are not intended for inebriate asylums; they are rather intended for patients or persons who are mentally unsound, and it is my observation that it is not desirable to combine the two classes of patients in one instituion. It is not helpful to alcoholic patients, at least."

Dr. Wm. P. Spratling, superintendent of Craig Colony for Epileptics, says: "In an accurate analytical study of the causes of epilepsy in 1,070 cases at the colony, we found that 15 per cent of these were due to alcohol in the parent."

Dr. Charles G. Wagner, superintendent of the Binghamton, New York, State Hospital, writes thus concerning the institution when it was used as an inebriate asylum: "It appears to have been quite popular for a time, and had a considerable number of patients, but the management of the asylum had no legal control of the patients, and consequently they left the place at will and obtained liquor to satisfy the cravings of appetite. For several years after 1870 the existence of the institution was precarious, and I think it was about 1875 that it was closed.

"After that two fires did extensive damage. In 1879, the state having contributed more than \$100,000.00 to the construction of the asylum, satisfied other interests and took over the property for the purpose of an asylum for the insane."

Dr. V. A. Ellsworth, of the Washingtonian Home, Boston, Mass., says: "I am very much in favor of state institutions and private asylums for the cure of inebriates. * * * About 37 per cent which come under our care are curable and are restored back to society well, healthy men."

A. C. S. S. S.

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THE MEDICAL INSPECTION OF SCHOOLS

BY HENBY MATTHEY, M. D., DAVENPORT, MEmber State Board of Health

It is one of the most laudable duties of the State to care for and protect the health of its citizens. For this purpose there has been established our State Board of Health, which has for its object the suggestion of laws and regulations which shall control or eliminate those conditions and causes which scientific investigation have proven injurious to the welfare of the people. That the State should add constantly to the number of its sanitary regulations is not only of enormous importance but of great practical value as well, for it is due to these manifold hygienic measures that a large number of diseases which are prone to develop because of the social communion of mankind is either entirely prevented or their extension limited.

In order to demonstrate the magnitude of the field of activity of the State Board of Health it is only necessary to point out the following matters which receive its attention and consideration:

The prevention of the adulteration of foods; prophylaxis against epidemics; disinfection; vaccination; hygiene of commerce; e. g., inspection of oil for the use of miners, regulations for the employment of petroleum and gasoline; inspection of milk and drinking water; inspection of live stocks and meats; prevention of the transmission of diseases from the lower animals to man; medical statistics, including records of births and deaths; and rules concerning the burial, unearthing and transportation of corpses.

It will be seen to how great an extent the State is mindful of the health of its people, but further problems still confront us, to which insufficient consideration has heretofore been given.

The inspection of schools by regularly appointed and salaried medical inspectors is a subject as yet in its infancy, but one which must be regarded as second to none in the vastness of its possibilities, in the incalculable value of its results when efficiently carried out, and in the financial saving to the purse of the State. It need hardly be said that the school room is frequently the hot-bed of epidemics; the source of perSTATE BOARD OF HEALTH

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nicious habits detrimental to health; the operating cause of physical deformities and the incubator and distributor of parasitic affections. Certainly these facts are too patent to require emphasis. The experience of every physician has taught him to appreciate their truth and significance.

Let us labor under no misunderstanding. If we believe that the abolition of school-room evils is a light and pleasant task to be accomplished with the utmost facility, let us undeceive ourselves promptly.

It is essential, among other things, that the teacher should be sufficiently trained in this particular respect to enable him to co-operate with the medical inspector for the good of the school and the community. It might, with propriety, be suggested that this branch of knowledge be introduced into the curriculum of the training school and into the examination for the license to teach.

The duties of the school physician are manifold. It is for him to determine the condition of health of teacher and scholars, and to execute all necessary precautions and measures to maintain a sanitary school. It is his duty to diagnosticate all existing afflictions and to direct the attention of parents or guardians to the disease with a view toward its proper treatment by the family physician. His services will be particularly valuable in connection with the early detection of acute infectious and contagious diseases; chronic constitutional infectious diseases (tuberculosis); local communicable affections (cutaneous disorders, parasites, inflammatory eye troubles); epidemics, with especial reference to the source of infection, the duration of the contagious period and the method or means of communication, as well as the prompt isolation of the sick and the protection of the exposed.

The skill of a physician is requisite also in the recognition of such bodily infirmities, deformities or malformations as will need special consideration during actual attendance upon school duties, as ocular, aural or nasal disorders, spinal curvatures, phimosis, anaemia, etc. All children, on entering an institution of learning, should undergo a thorough physical examination by the medical inspector, barring from this measure only those who present a certificate from the family physician, which shall explicitly state the condition of the child's organs as determined by a reasonably recent examination, carefully made.

The medical inspector shall furthermore devote himself to the question of the child's actual environment; the school building, its heating and ventilation, its water supply and sewage disposal, the kind and character of the benches with relation to the posture habitually assumed by the child; the play-ground, its soll and drainage; the water-closets, their cleanliness and ventilation; and even the games and athletic exercises indulged in by the children with regard to their abuse by those affiicted with cardiac or pulmonary defects.

The closing of schools, which has in times of past epidemics become a public necessity, will, by virtue of a medical inspector's watchful control, be forever abolished.

It requires nothing more than this incomplete enumeration of the subjects which lie within the province of the inspector to convince us how inadequate are our present methods. In Boston, New York, Chicago and other larger cities a thorough system of medical inspection of schools is already in force, and the results achieved are nothing less than marvelous. The report of the medical inspector in Boston for the year 1902 shows that 18,285 children were examined, and only 3.793 found free from disease. Of the balance 326 were afficited with specific infectious diseases, 1.924 with oral and respiratory disorders, 105 with diseases of the ear, 547 with diseases of the eye, 3.795 with diseases of the skin, and 7,795 with miscellaneous diseases.

Minnesota, Pennsylvania and some other states have already made considerable strides in the direction of improvement in school-hygiene, and in no instance have the results been otherwise than satisfactory.

In order to make the office of medical inspector of schools worthy the ambition of well qualified and conscientious men, an adequate salary should be connected therewith. It is evident that the entire time and activity of the physician are necessarily involved in the proper execution of his duties, and his salary should be compensatory to a maximum degree, the more so since the State will retain in its coffers the moneys now too frequently expended for those very conditions and circumstances which a system of school inspection would obviate. Able men, conscious of their responsibility, and impressed with the importance of care and skill in their labors, would thus stand as a living credit to their State and a blessing to the community.

We trust that the great commonwealth of Iowa will awake to a full realization of its needs in this respect, and that from its State Board of Health may emanate carefully prepared suggestions to be made into laws by the legislature at its next session, whereby every county within the State's confines is obliged to inaugurate a systematic medical inspection of its public schools. It will remain for the near future to behold the unfailing benefits of such a measure, and to thank the cause of medicine for its efforts in behalf of it.

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PLAN AND PLANT*

BY PROFESSOR THOMAS H. MACBRIDE, PRESIDENT OF THE ASSOCIATION.

I assure you I highly appreciate the privilege which by your courtesy is mine this evening. It is always pleasant to voice the mutual congratulations of people who meet to rejoice in the progress of a good cause. It is pleasant to tell of success, to record encouragement, to point the way for wider effort and even to go over again the old arguments which determine for us, at least, the line of duty.

And surely we have tonight great encouragement, and our successhas it not been conspicuous in every way? What public movement ever met more cordial welcome at the hands of an appreciative public? Who is there who understands our effort who does not bid us God-speed? We have the unanimous support of the newspapers of our State. One enthusiastic friend declares our present endeavor "the most important now before the people of Iowa." The effort to make our cities, our towns, our homes. wherever they are, clean and beautiful, and thus sane and healthful and happy, is something that commends itself to every citizen in the mere statement of the case. Iowa is so fertile, its soils lend themselves so easily to the horticultural and arboricultural interests of men that we may more speedily here than elsewhere transform to noble purposes the face of nature. The people have already tried it and are therefore the more ready to push forward.

In the matter of membership we have every reason for encouragement. So far as can be learned, not a man invited to become a member of our association has refused, and it is certain that could the matter be brought individually to the attention of people our membership would reach a thousand in a day; would reach thousands at once could we but appeal to but a fraction of those whose sympathy and interest are at this moment ours. Instead of one meeting a year we should then have not less than four, one in each quarter of the State; our report, instead of appearing once in a year, would be a quarterly, would be in the hands

• The annual address before the Iowa Park and Forestry Association.

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of every councilman, every county supervisor in the State of Iowa and the streets and highways of these prairie counties would come forth like the paradise of the king! Our people are eager for information; the schools are not giving it, perhaps cannot, it remains for voluntary effort to carry everywhere those simple suggestions and first principles on which all rational civic improvement rests. We must have at least ten members in every county in Iowa; we can easily have them, if some one will only act in every town as promoting agent of this association.

There is also progress in the matter of parks in all our towns. I know of no town that does not manifest increased interest in the subjeet. Better streets, better paving, better planting, wider outlook and purpose may be noted in every town in Iowa today. As for parks, something is certainly doing. Des Moines will one of these days, notwithstanding high water and all sorts of discouragements-thanks to the energy of her commissioners and the spirit of her people-have one of the finest park and boulevard systems in this country. I am one who believes that we are all interested in Des Moines. The State should certainly make a park of this whole Capitol Hill. Burlington will never forget the philanthropy of one of her citizens, our lamented friend, Philip Madison Crapo, whose public spirited beneficence in library, park and public hall will bless the people of the Tremont City in the long years of the future-long after the names of those who live for the fame and fireworks of the present have been utterly forgotten. Muscatine, Davenport, Sloux City, Council Bluffs all report encouraging progress. Nor are smaller cities lagging. Waterloo and Cedar Falls have between them what will one day be one of the beautiful parks of the west; Waterloo's great storm-sewer is famous, but its bridge across the Cedar river is deservedly more famous still, since it is the first, as far as I can learn, constructed on the true principles of beauty and permanence at one and the same time. Estherville, in the canon of the School-house creek, has one of the most romantic natural parks along the valley of the Des Moines. Village improvement societies are springing up in every county and town; in Perry, Hawarden, Tama, Iowa City:-we have a constituency, there is no doubt of it, and the time is opportune. It is for this society to so plan and devise as to be able to reach out toevery community and lend a helping hand. In every community arcenthusiastic friends of parks and fine streets and beautiful public grounds, of fine setting for the school buildings, of better and cleaner homes for the working people, of flowers for the miner and the factory hands; there are plenty of such people; nowhere, relatively, as many as in Iowa; the only question is how to get started, how to help them carry into effect their own noble and generous impulses. Once let people learn that outdoor beauty is easy of attainment, that the fair face of nature shines for the asking, it is free as the gifts of God, that proper outdoor conditions make for public order, public health, public happiness and serenity, which means sound mental and spiritual health -let our people see this once and Iowa will rank first in more things than corn and the produce of the field.

Concerning progress in forestry there is less this evening for me to say. Our people have pretty well used up the original stock of native trees and have not yet felt the need of a new supply. Our old oaks and walnuts stood in primeval beauty for years, while the forests of Minnesota and Wisconsin furnished forth pine for less money than it reguired to convert our century-old trees into lumber. Within about fifteen years, however, these conditions have changed; pine lumber has become more and more expensive and it has at last become profitable to use the hard woods of our own ravines and river plains. The result has been the almost absolute destruction of the original forest of Iowa. In the meantime the occupancy of the prairie and the easy success of maple groves, planted for shade and protection only, have taught our people tree-planting and have lent every encouragement to the belief that we shall win once more when iowa farmers plant trees for forest purposes. This, too, is coming. We might, under wise management, have had for our children cheap lumber and cheap fuel forever; but that opportunity is gone. We must pay the penalty now in dearer supply, i. e., in more of toil and labor. But if lumber trees will speedily come anywhere to perfection it will be here; indeed I shall show you presently what has been done in a single experiment at Iowa City.* The time is coming when every farmer will raise trees as a crop as certainly as he does corn. Probably the crop of timber will characterize certain parts of Iowa rather than others, as the crop of corn does, because some parts are less suited for other forms of agriculture, but trees will be one day one of the crops of this State and our people are beginning to realize the fact. Groves we must have; nobody disputes that; they are essential to the well-being of every creature on the farm, and the forestry problem of our immediate future rests upon the question of the amount of wisdom we shall henceforth display in making our plantings. It would seem that western Iowa surpasses eastern Iowa in this particular. The Whiting walnuts are famous over this whole country. There is also a grove in Ida county concerning which the Ida County Pioneer gives most glowing accounts.* The very high price of walnut lumber tempts people everywhere to plant this species. As a matter of fact this is only a premonition. The price of hickory is almost or quite as great. Hard maple and cherry are following close, and it is but a question of a few years when white oak will be in the same list. All these trees grow in Iowa. The better the care and the more suitable the soil, the faster will they come to value. Once started they care for themselves; the owner may sleep and rise, night and day; the trees will presently come to their glory. But there are many other features in the situation which this evening make for our encouragement. People are learning that dirt and disorder are not only unbeautiful and unsanitary, but they are, as a matter of fact, unprofitable. It pays to plant trees, to plan streets, to lay out parks, to beautify the farm; it pays, pays in every way, in money, in health, in happiness, pride, satisfaction, joy. Unthrift, disorder, untidiness does not pay. I have here-

* This address was followed by a series of stereopticon slides illustrating this and other points in the argument.

a telegraphic dispatch from the Chicago Record-Herald under date of September 23, 1903.

"J. H. Kerwin, president of the Oelwein improvement club, has received a letter from President Stickney of the Chicago, Great Western in which he severely criticises the town. He claims that he was greatly disappointed in the manner in which the streets were kept, that in many places in the best parts of the city the sidewalks are almost hidden by weeds. The letter was received in response to a letter asking his assistance in securing new industries for the town."

Was ever such an arraignment of an Iowa town as that? What could Mr. Stickney have been thinking about? As if any town in Iowa were not good enough for the great railway king! Has he not heard of the "lowest amount of waste land," and "highest amount of corn," the smallest number of paupers and the greatest number of pigs and chickens, and kine? the finest delegation in Congress and the choicest lot of statesmen elected to stay at home?--has Mr. Stickney never heard of these things? Yea, verily; but at the same time he seems somewhere else to have read: "A man's life consists not in the abundance of the things which he possesses." It is not possession, evidently, but the ability to use, that in Mr. Stickney's view counts for real excellence and worth. Iowa is wealthy, no doubt, but what are we doing with it? Are you making it every day more beautiful and fair, are its streets and highways every day more orderly and attractive, its homes neater and cleaner and more healthful, better nurseries for the great people that is yet to be? If not, in Mr. Stickney's view, added wealth and multiplied factories can avail us little. Our communities have, some of them, yet to learn that the prosperity of a people doesn't always hang upon the gifts of great corporations. The long-distance telephone crosses our State, but what return does it make to the farmer for the shade trees that once adorned his holding, now mutilated and destroyed? What return to the village homekeeper, for the unsightly poles that vex his street? What return to the people themselves for the long file of poles that blocks the highway? Many a village has factories, but what compensation to the resident for the filth and squallor and barbarism that so far seem to be the inevitable concomitant of the factory guarter? It is not a question whether our towns are suitable places in which a few men may make fortunes in order to spend them in luxury elsewhere, but it is a question whether our towns and villages are suitable places for the homes of the thousands of our people, where they may live in quiet and happiness and physical, intellectual and moral health; whether, in fact, the physical conditions in our towns are such as promise the perpetulty or the republic.

"Zierlich denken and suss erinnern, Ist das Leben in tiefsten Innern."

To feed the mind on that which is fair, and fill the hall of memory with imagery sweet and pure, this is to live in sense profound!

• See ida Grove Pioneer, July 4, 1901.

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Such was the wisdom of Goethe; such must be our wisdom if we continue as a people. It is for reasons such as these that rural living has always possessed a special charm in every age. Towered cities and the busy uproar of the darkened street please us only because these are a necessity of commercial life. The homes of the people, if the people are to be sane, must be far remote from all this. Fancy the condition of thousands of people in such places as the First ward of Chicago, where the children of the republic are bred in cellars, in dungeons, in garrets, behind and over shops and stores and all unholy places. The mere mention of the situation condemns it instantly. All experience, all history, proves that no people can remain sound, and healthful, and happy, into whose lives come not largely the spirit and the breath of rural peace and purity. The drift toward the city is for commercial gain; the drift toward the country is for life and health.

Now our Iowa towns are practically all rural. Most of them are open to all the world. The wind of the prairie sweeps through them from side to side, and it is to our great encouragement that our larger towns, even many not large, are rapidly building out and establishing at the same time such sanitary conditions—waterworks and sewerage systems—as shall make them comfortable beyond all places in the world. It remains for us only to insist upon open-air living, and the constant fostering of that which makes for natural beauty and cleanness, and we shall have gone far to recover a lost Eden. Eden was and has been, in all the traditions of men, a terrestrial paradise, and a paradise is an open park.

But, says one, you would have us all lapse into some patriarchal era; you make of Iowa a sleepy hollow, fit residence only for the Van Bummels and Rip Van Winkles. Not so, at all. We would simply apply to our physical surroundings the same good judgment and skill and science which we devote to the development of other resources of this fortunate country. Streams and groves and birds and landscapes are just as much a part of the natural wealth of Iowa as are mines of lead and coal, quarries of rock and prairies of fertile soil. We should justly condemn the man who in his haste to secure the rock for building himself a house should so fill the quarry with debris as to make it thenceforth unserviceable to men; and in the same way and for the same reason we condemn the wrong use of spring and grove and river and forest, or even of a single splendid tree. We plead the rights of the many as against the thoughtlessness and selfishness of the individual or the few. No man has the moral right to blot or mar or destroy that which brings comfort or pleasure to his fellow men, even though his legal rights in the case be perfectly clear. On the other hand, for each noble soul the joy of true living lies in witnessing the happiness of others, especially where to contribute to that happiness has been in any way his own high privilege.

The movement for better country highways, the good roads movement, so-called, is to our aid and along the lines of our endeavor. In most parts of Iowa there is at hand material for road-making; rock in the east, gravel in the north and west, but in all ordinary seasons, even

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well shaped roads will be usable in a high degree. Could traffic be limited to the graded and finished center of our sixty-six-foot roads the sides would soon be parked with blue grass and, where not turned over to the telephone lines, planted with trees to the great adornment of our country drives and landscapes. But there is still another encouraging feature in the present situation, as I view it. For some years it has been constantly asserted that civic improvement in Iowa was destined to be very slow progress because of the instability of our people in the matter of habitation. Those who have hitherto owned farms and have brought them to a certain pitch of improvement have been leaving them in large numbers to find home and residence in the neighboring village and town, and have thus given place to people less zealous in caring for the artistic appearance of farmstead and country lane. Strangely enough, it has at the same time been the fashion to complain of "farmers who move to town," that they are non-progressive and stand in the way of the creation of parks and boulevards. The two statements refute each other, but I intend to refute this last assertion, in part at least, by showing presently what our farmers, even now, are doing; and I believe that in any event the migration spoken of is no longer likely to be anything like so general as heretofore. The ebb has begun already. The beauty and healthfulness of open rural life has by no means gone unappreciated of our every-day farmers and residents in the country generally, but there have been hitherto several manifest disadvantages in rural living-the isolation of it, the absence of many modern conveniences, such as the daily mail, public transportation, public light and water. Now by our telephones, interurban railways and artesian waters, all this is changed. Isolation is a thing of the past; the mail service is almost as good as in the residence parts of the city and better than in smaller villages and towns. The gasoline plant, with the Welsbach mantle, lights the farmhouse better than city homes are ordinarily illuminated by the public system; so that as a matter of fact our farms are fast becoming suburban, and the same tendencies that have in all the years tended to make beautiful the homes and streets of the suburbs of our better cities will hence forth operate to make better our country highways and farms. When the street car passes the door the man five miles out is quite as much in town as if he lived in a ward and was ruled by ward politics, paying in extreme taxation the highest sort of a price for what is often the sheerest tyranny and oppression. The farmer will no longer complain of isolation; rapid transit rectifies all this, so that we may expect to see in the passing years more and more the habits of our people becom. ing stable and the whole landscape brightening by reason of the increased comfort and convenience of what we call our rural population. The beauty of California as a place of residence lies largely in this; that everybody lives on a farm and yet no one lives remote from the principal street. The cultivated area is comparatively small, but the highways are wonderfully kept and the people vie with each other to make beautiful lawn and garden and park. Now Iowa always was and always will be tenfold as rich in resources that are inexhaustible as Cali-

fornia, even though her mountains teem with forest and hide, all precious

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metals in their scarred and glaciated valleys. The wealth of these prairies has never yet been tested. When once we begin to realize the returns, the imperial returns of which our soils are capable and see a population of millions where we now count hundreds of thousands, many of the difficulties of our present situation will have passed away. Let us hope that those millions may come to homes of happiness and beautybecause of the wisdom of those who toil and plan today.

You will observe that in all that I have set forth so far the argument is philanthropic. Our encouragement in this work lies also in the very fact that in every community are those who sincerely seek the welfare of their fellow men. Heretofore we have striven to give to our people-to all comers. indeed-lands and homes and schools. These possessions our institutions secure to all who are worthy. This was well. All things in their order. There is no use talking about a beautiful street until we have a good street and a clean street; then we go on to make it beautiful. Fortunately the first two almost insure the third. There is no use talking of parks until we have homes and streets by which we may reach them. There is no use of talking of gardens and plantings until the children are housed; but, now that in Iowa we have all these things, we are simply inexcusable if we go not forward along the path, the shining path of human progress. Considerations of profit, health, patriotism, civic pride, philanthropy, personal comfort, all summon us and bid us forward.

It is not for me at this time and in this particular place to suggest the work of the coming year for this society. I will simply say that inasmuch as our whole present effort is the stirring of public sentiment, each member of this association becomes in his own community an agent to forward our purpose. There should be a village improvement league in every town in Iowa, and in every rural community sufficiently enlightened to support a church or school, and the member of this our Iowa Park Association should, if need be, organize and head that league.

Ladies and gentlemen, the one pre-eminent accomplishment of the age in which we live is the rediscovery of the natural world. For centuries men turned away from Nature as with a shudder. They peopled her dim recesses with the spirits of darkness and stood in awe at the more sublime manifestations of her power-the black forests, the mountains unscaled and unapproachable, the tossing of the majestic sea as it roars about its boundaries forever. For thousands of years men shunned what we now love. Only within a century have men looked with complacency upon the woodland and the desert. Indeed the history of all human culture would indicate that man was first of all enamored with himself, so interested in his own perfection of form, his own virtues, struggles, passions, vices even, that art was for all the years almost entirely anthropomorphic. Men, almost without exception, were blind to the glories of the natural world as Nature spreads them forth. They knew how to carve in marble each linament of the human body, to paint the face of kingly triumph, to delineate the furrows of despair, but no Grecian or Roman artist seems ever to have discovered the gladness of a forest, the pencillings of a flower or the soft whiteness of a lotus

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breathing out its fragrance beneath the moon^{*} and the stars. Only the Master saw the beauties of the lily, but his disciples never thought of obeying him when he bade them consider it; only the Hebrew shepherds saw the glory of the nightly heavens as filled with song. But in all thecenturies art, which in every age is the highest expression of human attainment, art has never until our own times lurned to the external natural world in any real appreciation. We have reared our temples and palaces and wrought our tapestries and covered the walls of our galleries with color, and carved our marbles, all unmindful of the greater glory of the domes and palaces of God; we have been children satisfied with toys. For surely never was painting equal in color or in richness to that landscape by the river, whether at dawn, when the sun gilds the fleeing mists, whether at noonday, when the light pours in silent splendor, touching with glory every stick and humblest thing, whether it flood the new voiceless grove or spread on the motionless bosom of the water, where the lone kingfisher from his dead-tree perch watches his azure image-no painting can match such splendors spread over all the world. No altar in the east, with lighted tapers tall, and vaulted ceiling, can rival for a single moment the sun when he rises above our Iowa prairies; no rose window in the west burns with the colors of our sunset sky; no temple-arch like those that span our woodland aisles, no columns likethe shafts of rooted trees.

But these pictures of Nature are visible from the hills of Dubuque, of Burlington, of Sioux City, of Des Moines, and by all the rivers and streams of this, our happy State. To summon people to their appreciation and enjoyment is the present function of this association. Plan. and Plant!

XXII

A COMPEND ON MILK

BY G. A. JOHNSON, D. V. M., SHOUX CITY, IOWA

MR. PRESIDENT AND GENTLEMEN:

It is not without considerable embarrassment that I present for your consideration a few thoughts upon the subject of milk. My misgivings are because of my inability to treat the subject in a manner commensurate with its importance.

Milk! how familiar the word sounds. How common an article of food it represents. In fact it is so common that its value and importance are rarely fully appreciated. It is important because it is the most commonly used article of food in the world. It is practically the only food of all young mammals. It enters largely into the dietry of all eivilized and many barbarous people, and no other article of food is productive of more good or greater evil, according to its condition, than this God-given food, milk. As the fond mother caresses her babe to her breast she lovingly gives of herself for its support and development as much as though it remained *in utero*, yet how many appreciate that she may be at the same time sowing seeds that may cause untold misery or death.

The subject milk is of such magnitude and made up of so many phases that a paper suitable for an occasion such as this must of necessity either be confined to one particular phase or to very briefly consider a few only, of the more important ones. I have chosen the latter, and while I do not anticipate presenting any new facts I hope that I may be able to present some of the old ones in such a manner as to form a basis of discussion, and thereby awaken a new interest in this field. From the vast number of phases of the question I have chosen the following:

1. Milk as a secretion.

- 2. Milk as a food.
- 3. Milk as a medium for germs.
- 4. Pure milk.
- 5. The commercial production of milk,
- 6. The handling of milk,
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7. Milk as a factor in disease.

8. Sterilization and pasteurization.

9. Milk inspection.

As cows' milk is the only kind that is handled to any great extent commercially in this country, it will be the only kind considered, unless otherwise stated.

MILK AS A SECRETION

Milk is as purely an animal product as is the flesh, and its secretion is a complex vital function, performed by the mammary gland. It is termed a secretion with the idea that the cells of the gland take only certain substances from the blood and, putting these together, pour them out into the lacteal ducts as milk. But the very act of secretion also implies the act of excretion. This phase of the question is very often, in fact usually, overlooked, yet it is easy of demonstration. It is a commonly known fact that milk will contain the odor of such plants as garlic, onions, turnips and many weeds when they are fed to the milking animal. Prof. Lindsay says:

"(1) It is clear from our experiments that food does influence to a noticeable degree the composition of the butter fat and the body of the butter.

"(2) From a quart to a quart and a half of linseed, or cotton seed oil, added to the regular feed will slightly increase (.004 per cent) the percentage of the fat of milk, with the result that the butter product from such milk is softer and more yielding than that from standard food. You are all aware that nursing mothers frequently cause digestive troubles in the child by eating certain foods, though they agree with and are relished by the mother; they so alter the milk that it does not agree with the child. In certain diseases the milk is more or less altered in character and appearance, as in aphthous fever, (3) it has a yellowish white coloration and a mucous consistency similar to that of colostrum, and a very disagreeable taste."

In the practice of veterinary medicine it is not uncommon to successfully medicate the young through the milk of the dam.

These facts would seem to demonstrate beyond question that the mammary acts as an excretory gland to a greater or less degree.

The function of the mammary gland is quite sensitive to nervous impulses, or any disturbances of the equilibrium of the animal produce more or less marked changes in the milk secretion. These are very important questions in the production of good, wholesome milk, especially is this true as regards the question of food. Yet it is one that receives comparatively little consideration by the public.

The milch cow should be considered simply as a machine (complex though it is) for transforming raw material (food) into a finished product (milk). And it is unreasonable to expect that the finished product will be first-class in quality when the raw material is of poor quality, or the machine is defective. In other words, no cow can produce first-class milk from poor food; neither can an unhealthy cow produce healthy milk from the best of food. And the point that I wish to emphasize is that in order for a cow to produce pure, wholesome milk she must be healthy, she must be handled cleanly and carefully and receive good, pure, wholesome food.

MILK AS A FOOD

Normal milk is an "opaque whitish liquid secreted by the mammary gland of female mammals for the nourishment of their young." It (4) contains all of the ingredients needed for nourishment, that is, it furnishes the materiais which build up the body and keep it in repair, and also those which supply it with fuel to keep it warm and to furnish the animal machine with power needed to do its work. It is not practical, if possible, to rear young animals without milk in some form. And it is customary among man and the domestic animals, whenever a mother cannot suckle her young, to substitute some other milk for hers. For, as yet, no other substitute has been found that will successfully take the place of good, pure milk in the rearing of the young, or in the sick room.

The constituent parts of milk differ more or less with the different species of animals, and at different stages of the lactiferous period, also in the same animal at different times, and all tables of milk analysis differ more or less, but for practical purposes the following table may be taken as a standard:

COMPARATIVE (5 COMPOSITION OF VARIOUS KINDS OF MILK

	2 Water.	Total Solids							-
Kinds of Milk.		5 7 9 9 9	Protein				ate.	4	per
			1.0	ujunql V 3	c Total c protein	8.8 Fat.	9 Carbohydr 8 milk, sug	O Animal me cc ter, ash.	5 Fuel value pound, c
Con	87.2	12.8	3.0	.5	3.5	3.7	4.9	0.7	313
Dog	75.4	24.6	6.1	5.1	11.2	9.6	4.9	0.7	671
Fure	80.8	19.2	5.0	1.5	6.1	6.9	4.9	0.9	503
Duffalo	Q1 4	18.6	5.8	0.3	6.1	7.5	4.1	0.9	506
Cat	01.1 091	17.9	3 1	6.0	9.1	3.3	4.9	0.6	400
Cat	04.1	14.2	3 2	1.1	4.3	4.8	4.4	0.8	365
Goat	00.1	125	3.0	0.9	3.9	3.2	5.6	0.8	312
Liama	0.00	10.0	10.7	1 6	2.3	1.6	6.0	0.5	222
Ass Mare	89.6 91.5	8.5	1.2	0.1	1.3	1.2	5.7	0.3	180

Thus it is seen that milk is composed of about 87 per cent water and 13 per cent are solids, of which protein forms about 25 to 30 per cent; fat, 30 to 35 per cent; carbo-hydrates (sugar), 35 to 45 per cent; and ash, 2 to 3 per cent. A brief comparison between woman's and cow's milk may not be out of place at this point.

According to the above table it will be seen that the per cent of water and solids in the two kinds are about the same, but the composition of

the solids is quite different, the greatest difference being in the casein, woman's milk having but one per cent and cow's has 3 per cent, while the curd of cow's milk is quite firm and solid, that of woman's is lighter and floculent; these two conditions will possibly account for the fact that cow's milk in its pure state usually does not agree with the infants; the curd that forms is too large and too firm for them to digest. Again, woman's milk contains more albumin, which would probably render it more laxative. It also contains more milk sugar, which makes it more productive of heat. To render cow's milk approximately the same as woman's, take one pint of pure, wholesome cow's milk and add twentyseven ounces of sterile water, one ounce commercial lime water, two ounces by weight of milk sugar, one to one-half ounces of pure cream and one-half ounce of albumin; the white of an egg beaten up with the Eugar so as to m.x with the fluid may be used for the albumin. This will make three pints of milk. This should be put into bottles plugged with cotton, a separate meal in each bottle, and pasteurized, and then kept on ice until ready for use, when it can be brought to the desired temperature by setting the bottle in warm water. If the cream has risen it may be mixed by gently rotating the bottle from end to end. Too violent agitation might cause more or less of the fat to collect in chunks. This method gives better results than to make the mixture fresh at each meal time. In such a combination there will be a very small per cent less of casein and albumin and more of fat and sugar than given in the table, but on the whole it will be quite similar to woman's But these proportions could easily be modified according to the indication. The use of the small quantity of lime water renders the casein more floculent, consequently more readily digested; besides it furnishes an unusual amount of bone producing material. The custom of adding two parts of sweetened water to cow's milk makes a compound defficient in albumin, fat and ash; consequently it is lacking in the nutritive and bone producing properties that are so essential constituents of foods for the young. A combination of cream, sugar and water would lack the normal amount of casein, albumin and ash. Normal milk being a natural food, may be termed a typical balanced ration. And it varies in the different species to correspond to the natural requirements of the species obtained, when necessary to substitute one kind for another, that such substance be made as near the natural as practical.

The relative food value of milk is not fully appreciated by most people. Few, indeed, realize that one (6) quart of good milk contains about as much nutrition as three-quarters pound of beef steak, and at the present current prices, five cents worth of milk is equal to ten to fifteen cents worth of beef.

The great objection to milk as a food for healthy adults is its bulk, but with the infant and the sick, where only a limited amount of food can be taken at a time, and where large quantities of water are necessary, no substance has been found that successfully fills the place of milk, for it furnishes the water and the nutrition. There are several prepared foods that are advocated as substitutes for milk, among which are: Horlick's matted milk, which is reported to be a mixture of dessi1903]

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cated milk 50 per cent: wheat flour 26¼ per cent; barley malt 23 per cent, soda bi-carbonate three-quarters per cent. It contains no unaltered starch when mixed. "Nestle's milk food." a mixture of dessicated swiss milk, baked wheat flour and cane sugar 30 per cent. More than a third of the total amount of carbo-hydrate is in the form of starch. Mellin's food is a completely malted food, all the carbo-hydrates are in a soluble form. It may be regarded as a dessicated malt extract. The analysis of these foods as compared with human milk is as follows:

	Water.	Proteid.	Fat.	C rbo- bydrate	Mineral matter.
Dried human milk	0.0	12.2	26.4	52.4	2.1
Horlick's malted milk	3.7	13.8	3.0	76.8	2.79
Nestle's milk food	5.5	11.5	4.8	77.4	1.30
Mellin's food	6.3	7.9	trace	82.0	3.8

These foods are composed very largely of carbo-hydrates and are quite deficient in fats and proteids, except Horlick's, which has more proteid than dessicated milk. Their chemical composition is certainly very different from that of milk.

MILK AS A MEDIUM FOR MICRO-ORGANISMS

The nutritive value of milk is not confined to the larger animals for it is equally as good a food for a very large number of vegetable microorganisms, which for convenience will be designated as bacteria, in fact nearly if not all bacteria grow well in fresh milk, and there are something over 200 (7) species of bacteria that infect milk so commonly as to be termed dairy bacteria, the majority of these are rarely found except in milk or milk products. Then add to these a considerable number of the pathogenic germs that too frequently find their way into milk, such as the tubercle bacillus, the bacillus of anthrax diphtheria, typhoid fever, cholera, scarlet fever, etc., and you may form some conception of the vast number of these pests that have been found in milk.

During the last few years much attention has been given to dairy bacteriology and it has been found that some of these species are rare while others are almost universally present. The toxines produced by the vast majorities of these bacteria are practically harmless, while in others it is exceedingly dangerous, as tyrotoxicon. Again some species may be harmless in small quantities but detrimental or harmful when present in large numbers. It has been ascertained that certain species produce a better flavor especially in the butter and cheese and some butter and cheese makers inoculate their cream or milk with pure cultures of these species to assist in the ripening process and give them special flavor. It has also been ascertained that the ordinary commercial milk contains from 50,000 to as high as 35,000,000,000 bacteria per c. c. According (8) to German authority (Bitter) milk becomes unwholesome when it contains more than 50,000 bacteria per c. c., yet it]No. 21

is a fact that a majority of the milk that is sold by milk venders contains from 50,000 to 500,000 or over bacteria per c. c. "For (9) instance Sedwick & Batchelder report 5. samples of Boston milk which contained from 30,000 to 4,220,000 bacteria per c. c. Loveland & Watson of Middleton, Conn., found the milk to contain from 11,000 to 85,500,000bacteria per c. c. At Madison, Wis., milk was found to contain from 15,000 to 2,000,000 per c. c." Of 32 (10) samples of commercial milk examined in the city of Washington by E. A. de Schweinitz, the bacteria ran from 2,500 in one sample (only) to over 115,000 per c. c. in several, with an average of 61,886, or practically 62,000 per c. c. Later Dr. W. H. Park (11) of New York City working along similar lines carried out a series of investigations to show the effect of cleanliness and low temperature upon bacterial infection of milk, samples were taken under various conditions, kept 48 hours, then examined with following results:

1st. When very reasonable means of cleanliness were observed and the milk cooled to 45 degrees Fahrenheit in one hour averaged 11,000 bacteria per c. c.

2nd. Dusty barns, cow's side and udder casually brushed off and the milk cooled to 45 degrees Fahrenheit in two hours averaged 75,000 pacteria per c. c.

3rd. Dirty cows in ordinary barns, udders casually brushed, etc., in winter 210,000, and in warm weather 680,000 bacteria per c. c. respectively.

The influence of temperature was well shown by the results obtained by allowing portions of the same specimen to stand for 24 hours and 48 hours at different temperatures. The specimen contained 3,000 bacteria per c. c., at the beginning of the experiment. Specimens kept at temperatures below 50 degrees Fahrenheit presented no marked changes, but at higher temperatures most astonishing growths occurred at the end of the 24 hours, that at 60 degrees Fahrenheit, 180,000; at 68 degrees Fahrenheit, 450,000; at 86 degrees, Fahrenheit, 1,400,000,000, and at 95 degrees Fahrenheit, no less than 25.000.000.000. At the end of 48 hours the specimen kept at 60 degrees Fahrenheit had increased its bacterial content from 180,000 to 28,000,000, and at 68 degrees Fahrenheit from 450,000 to 25,000,000,000. Of 20 samples of commercial milk taken on its arriving in the city he found that they contained from 52,000 to 35,200,000,000 bacteria per c. c., and samples obtained from the poor tenement districts they averaged in midwinter 1,977,692, and in September 15,163,600, and from the more well-to-do districts in midwinter 327,500, and in September 1,061,400.

What contrasts! What volumes these figures speak in favor of cleanliness and a cool temperature in handling milk. Thus we see that in 19 of the Washington and all of the New York samples of commercial milk the number of bacteria ran above 50,000 per c. c. And according to the German standard 60 per cent of the Washington and all of the New York City milk was unwholesome.

Did it ever occur to you that the number of bacteria in commercial milk often runs higher than it does in ordinary city sewage (12) which ٠

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Sedgwick found to be from 100,000 to 4,000,000 bacteria per c. c.? But it is a fact nevertheless, yet people often wonder why milk will not keep its normal state for a longer time. Among some of the more common changes that are produced in milk by bacteria may be mentioned (13) souring caused by the lactic acid forming groups, ropy and slimy milk caused by the viscous group, fermentive changes caused by the rennet or triptic group, colored or pigmented as red, yellow and blue milk caused by the chromogenic group, and others that changed the odor and flavor as sweetish, bitter, tainted, etc. And often the effect of one bacillus is counteracted by another so that the milk may be more or less deteriorated and yet not present the characteristic changes of either group.

PURE MILK

Strictly speaking pure milk would imply that it should be free from foreign substances, and from healthy, we'l kept and properly fed cows That it should be sweet, of pleasant odor and free from germs. But owing to the manner in which cows must be kept and the method of milking it is found very difficult if not impossible to get it germ free, yet with care and cleanliness the extent of contamination may be limited but care must be given to the surroundings of the cow or the udder may be invaded by dairy bacteria. as demonstrated by Professor Ward (14) in a recent set of experiments. The bacteria probably gain an entrance to the udder through the teats of cows that are kept in foul dirty barns, or of cows that are allowed to stand in stagnant water that covers the udder. These conditions could be obviated by a little care.

THE COMMERCIAL PRODUCTION OF MILK

The production of commercial milk is a business of vast proportions in this country. The majority of dairymen are fairly honest as the term goes today, and the fact that they deliver an impure article does not signify that they are maliciously dishonest, but rather that they are not well informed regarding the scientific principles governing the production of milk. It may be said that the public are more or less to blame for this condition. Milk is such a common commodity that the majority of people do not give it the attention that its importance demands. A great many demand the largest quantity for the price and are satisfied if it produces a reasonable amount of cream and will keep sweet for 24 to 48 hours in the kitchen or an old ice box, and what are the results; the dairyman, ignorant of the principles of milk production will try to produce the largest quantity of milk possible for the least amount of cost by using the cheapest feed, get along with as little help as possible, keeps his cows in close, warm, dirty stables, has no milk room, sets his cans around the barn while milking, has his wife wash and take care of the utensils in the kitchen. If the milk produced under such conditions does not keep well (and it is not likely to, especially in warm weather) the unscrupulous dairyman will add a little or more preservative, and if it is too deficient in cream he can add a little from the milk that he has left from the day before. If the color is not good

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he can add a little annoto or other coloring preparation. This will satisfy many and is much cheaper than it would be to have sufficient help to properly care for the cows and do the other work, to build suitable buildings and supply good food, and competiton compels others to follow more or less along the same lines. If the public would willingly pay a discriminating price for good milk one great advancement would be accomplished, and it is reasonable to believe that they would if they had any guarantee that they would receive a superior article.

THE HANDLING OF MILK

Sanitary dairying is, as yet, in its infancy, although vast strides have been made in the knowledge of milk and its products during the last few years. Next to having healthy cows the handling of the milk is the most important point, and when it is considered that a majority of the cows are healthy and that a majority of the dairymen and milk venders know little or nothing of the principles of milk infection and are careless in their methods of handling milk, it may be a question if diseased cows rank first in importance, though it is certain that the milk from a diseased cow is diseased milk and it is almost as certain that healthy milk improperly handled will become contaminated. On the other hand it is cited that milk from diseased cows is much more likely to prove deleterious to its consumers than milk contaminated with ordinary dairy bacteria. But the consumer will not be so much interested in how milk is contaminated as he should be that it be not contaminated. What the consumer should demand is pure milk, and he should take no other. And the principle point for the sanitarian is to educate the public to a just appreciation of the importance of buying and using none but a wholesome article. It will be admitted by all that in order to produce wholesome milk the cows must be healthy and the milk must be properly handled. In order that milk be kept as free as possible from germs the stable should be well lighted and ventilated, any work that will raise a dust should not be performed in the barn just before milking. The stable should be as free as possible from dust at the time of milking, the floor should be clean and comparatively dry. The cows should be cleaned with a damp cloth or a milking sheet put on before milking, the milker should be clean, likewise his clothing. The milk should not be allowed to stand in the barn after milking, but should be immediately strained through a cloth and wire strainer and placed on ice in a clean dust-proof room or cooling vat that is properly ventilated and quickly brought to and kept at a temperature of 40 to 45 degrees Fahrenheit. When ready for delivery it should be put into small cans or better glass bottles and these should not be opened more frequently than possible. The milk should be kept at a low temperature while being delivered; during hot weather it should be carried on ice. If cans are used they should be so constructed that no dust or dirt could get into the milk. The delivery wagons should be so constructed as to allow of regular and thorough cleaning. Wooden corks for cans should not be used. All utensils should be thoroughly boiled or steamed every day. If such precautions were followed milk would reach the consumer in a

comparatively pure state. But the dairyman is not responsible for all of the bad qualities of milk, for often these are largely the result of the care which milk receives after it has been delivered to the customer. Many housekeepers will allow milk to remain in an open dish on a table in a hot kitchen where it will absorb more or less of unsavory odors while germ-laden dust is continuously settling into it, and the obnoxious germ-covered flies are free to feed on or drop into it. Under such conditions good milk will rapidly deteriorate, and poor milk will soon spoil. The milk should receive as good if not better care after it is delivered than before.

But let us briefly consider the conditions that frequently prevail at the dairy. The stables are dark and damp, practically without ventilation, and very often filthy. The cows are fed just before milking, thereby getting the stables full of dust, the cows are never cleaned, excrement often hanging all over the hind quarters in chunks from one to two inches in diameter. The large cans are set in the barn and often carried and set along behind the cows. The milker whose clothes and han's are often anything but clean sits down to the cow, and milks without attempting in the least to even brush off the sides or udder of the cow, and during the whole time of the milking dust and dirt is dropping from the sides and udder of the cow and the milker's clothes, into the pail. Added to this a good many of the milkers practice the filthy habit of frequently wetting the teats by dipping their dirty fingers into the milk. When the milking is finished or the pail is full, as the case may be the milk is put into the large can; sometimes it is strained in and the strainer used for a cover, or it may be strained later. After the milking is finished the larger cans are often set into the common water tank to cool and left there until ready for delivery, in which case the cans are lightly covered, consequently most of the animal odors are retained. In such dairies the milk utensils are rarely boiled and never steamed. The delivery wagons are never washed or disinfected and the inside of many are a sight to behold. Ice is never used and the milk rarely, if ever, gets below a temperature of 65 or 70 degrees Fahrenheit, unless the weather is colder than that degree. Any old kind of can that does not leak, wooden corks and all are used. The milk is usually put into large cans, and a small one that will hold about one gallon is used to carry the milk from the wagon to the houses, and as it is emptied it is re-filled from the larger cans and the milk again exposed to such dirt and germs as may be floating in the air. Again, the measure is not cleaned, or dried, but is thrown in on the cans or carried in the hand from house to house, and being damp it will retain all germs that it might come in contact with, which will be washed out with the next party's milk. Frequently open rigs are used in delivering the milk and often an old dirty, yes filthy, horse blanket is thrown over the milk cans. "Such a sketch can of course but very imperfectly convey to your mind an idea of the carelessness, the filth and unsanitary condition under which more or less milk is produced and handled," but it may possibly afford a framework whereon your imagination may produce a

picture of the condition that a written representation fails to make clear.

MILK AS A FACTOR IN THE CAUSATION AND SPREAD OF DISEASE

While the records do not show that milk is such a formidable factor in the causation and spread of disease in man, yet they do show positively that it may cause disease and that it may be the medium through which pathogenic germs are conveyed from one person to another, and often long distances. And the more the subject is investigated the more evident this fact becomes. It is quite generally agreed by those who have given the subject close attention that the records on this question are very incomplete. The milk may become infected through the cow being diseased, or it may become contaminated after being drawn through a number of well known channels.

Among the diseases that may be transmitted from the cow through the milk may be mentioned aphthous fever (foot and mouth disease), anthrax and tuberculosis, notwithstanding Professor Koch's assertion to the contrary. The (15) milk of cows suffering from paranchymatous mastitis, may cause gastric intestinal catarrh in man. Milk may be contaminated with the germs of any contagious disease of man, and the records show that a number of outbreaks of typhoid and scarlet fever, diphtheria, cholera, smallpox, etc., have been traced to infected milk. Professor Ravenel, M. D., touching on this subject says, (16) Mr. Earnest Hart gives statistics of 50 epidemics of typhoid fever with 3,500 cases; of 15 epidemics of scarlet fever with 800 cases; of 7 epidemics of diphtheria with 500 cases. Taking up the work where Mr. Hart left off Dr. Freeman of New York has collected statistics of 53 epidemics of typhoid fever with 3,226 cases; 26 of scarlet fever with 1,593 cases; 11 of diphtheria with 501 cases, besides two epidemics of foot and mouth disease, 3 of throat trouble, 2 of acute poisoning and 1 of Asiatic cholera, in all about 736 cases. These figures are too low because in many of the epidemics the number of cases were not given, while on the other hand many cases and epidemics are never reported. Usually the milk becomes infected by some diseased person working around the dairy or handling the milk utensils, but it may result from having the utensils washed in an infected house, or from using infected well water to rinse the cans. But probably the greatest amount of disease caused by milk is digestive troubles in infants and invalids, resulting from the injestion of milk badly contaminated with dairy bacteria. It has been estimated (17) that one-third of all children die under three years of age, and that contaminated milk is one of the leading causes of these deaths. In order to overcome the bad effects of milk contamination three methods are in

1st. The use of preservatives by the unscrupulous dairyman to make his milk remain sweet longer.

2nd. Sterilization, and

3rd. Pasteurization where heat is used to destroy or attenuate the bacteria, or in other words cooking the milk.

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MILK PRESERVATIVES

Milk preservatives are such substances that when added to milk will prevent the development of germs. Germicides that are not too actively poisonous and will not too materially change the appearance, taste and odor of the milk. may be used as preservatives. The drugs most frequently used for that purpose are formaldehyde, boracic acid, borax, salicylic acid and some of its compounds. It is quite generally conceded that such drugs are injurious even in small quantities when taken for any considerable length of time, hence their use in milk should be condemned.

Again, the careless dairyman is likely to think that if a little is good more is better, and such a person is quite liable to use such quantitles as to be dangerous, especially to infants and invalids.

STERILIZATION AND PASTEURIZATION OF MILK

Sterilization means heating the milk to a temperature of 212 degrees Fahrenheit or more, that is, boiling it for a period of ten to fifteen minutes so as to destroy all germs and spores that may be present at the time; while pasteurization means only heating it to a sufficient degree (165 degrees to 170 degrees for ten to fifteen minutes) to destroy or attenuate the germs, but not to kill the spores. While the processes differ in degree rather than kind, the effects on the milk are quite different. The boiling necessary to sterilization coagulates the albumin and the sugar is likely to be precipitated. This changes the flavor of the milk and renders it less digestible, thereby destroying a greater or less per cent of its nutritive value. On the other hand the amount of heat necessary to pasteurize milk is not sufficient to cause any perceptible changes in it. There is at present more or less controversy regarding the effects that pasteurization has on the milk. A number of investigations claiming that it destroys digestive prements, and thereby reduces its nutritive value fully 2 per cent. If the degree of heat is not sufficient to produce chemical changes in the milk but leaves it practically in a natural condition why should it affect the nutritive value? If such are the facts it would seem that this position is not well taken. Of course this would not hold true in case the bacteria had been at work long enough to have affected changes in the milk or produced considerable amounts of ptomaines.

In order to obtain the best results from pasteurization it should be done soon after the milk is drawn. As soon as it has been freed from the animal odors the milk should be put into small receptacles, glass hottles with tight seals of the pint and quart size, are probably the most practical, and these placed in the water bath and brought to the proper temperature for ten to fifteen minutes. Then they should be rapidly cooled to 45 degrees Fahrenheit and kept there until ready for use. If subjected to such a process the milk will be in practically a natural state and should be of normal digestibility and nutritive value. But milk protected by either of these processes will become re-infected

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upon exposure, therefore it is necessary to keep it tightly sealed until ready for use. But if pasteurized milk cannot be procured on the market it should be subjected to this process in the home as soon as possible after being received, especially such as is to be used in feeding infants or invalids. And it would be good prophy-laxsis to re-pasteurize all milk intended for such food just before using so as to destroy such germs as may have survived previous pasteurization. To be sure some will object to such a procedure, pleading unnecessary expense and labor. But sufficient apparatus can be procured at a very small cost, and the labor should be that of love rather than a duty. And the physician who neglects to urge his patrons to take some such precaution falls short of his full duty to those entrusted to his care, and humanity in general. From the preceding it might be inferred that I wish to discourage the use of milk, nevertheless such is not the case. I sincerely believe that the use of milk should be much more general under proper conditions. I would much prefer a glass of good wholesome milk at meal time to a cup of tea or coffee. But I, like a vast horde of others, do not use the milk because I cannot often get a good quality. We have in milk, when in its normal condition, a natural wholesome, nutritious, easily-digested food, that ought to largely take the place of many of our stimulating beverages. But its most commendable features render it easy of contamination and very susceptible of deteriorative changes. There is much more danger in the use of milk of an unknown origin than other animal food products, because of the ease with which it may become contaminated, and from the fact that it is largely used in the uncooked or raw state, while most of the other animal food products are cooked.

In the foregoing I have attempted to present for your consideration some of the abnormal conditions under which milk is too commonly found, and in conclusion I will offer a few thoughts relative to methods for correcting such evils. In continental Europe sterilization of the milk is largely practiced, but in this country no such a method is in vogue, and it would require much time to sufficiently educate people to generally adopt this method.

INSPECTION

The most feasible scheme is that of inspection whereby the health of the cows, the character of the feed used, the care of the barns, the methods of handling the milk, the care of the utensils, are under the direct supervision of some competent person, authorized by law or otherwise to enforce such regulations as may be deemed advisable. A system of meat inspection is maintained by some local and the federal government at an annual cost of many thousands of dollars, and a few cities maintain a fairly good system of milk inspection. In fact, the statutes of the State of Iowa are adorned with a law relative to milk inspection. It provides for the inspection of milk relative to the per cent of butter fat, and practically this alone. It may prevent to a certain extent the watering of milk, but on the whole it is productive of more harm than good, for it has a tendency to lead people to believe that the milk is properly inspected, and again, it allows the unscrupulous vender to use preservatives, etc., and yet assure his patrons that his milk passed inspection.

Upon the whole, this most important branch of sanitary science is woefully neglected. At the present time two systems of inspection are in vogue in this country. The first compulsory, as carried out under state or municipal law, and voluntary as carried out under direction of some society, as a medical association. Of the two methods, I believe that the highest standard and best results may be obtained in certain localities under the second method, where a few dairymen would furnish milk of the required standard. But a more general, but lower standard result could be secured through the compulsory method, where the regulations would apply to all of the dairymen of that particular municipality or state.

With the first method funds with which to carry on the work are secured through taxation, while with the second method, they are paid by the dairyman who is re-imbursed by receiving a larger patronage or an increased price for his milk, usually both. Under the first method, the public receives the benefit, and they pay for it, while under the second method, only those who derive the benefit have to pay for it.

Under the first method, the standard, which is likely to be low, is fixed by law, while under the second, the standard is fixed by interested individuals, who are likely to make it high and who can easily change it as occasion demands. The first method must of necessity be more or less tainted with ward politics, while the second should be free from whatever baneful influences such conditions involve; being under control of persons who are better qualified by virtue of their special training to direct such work, but until such times as we can have some good reliable system of milk inspection, people should be urged to use pasteurized milk, especially for feeding infants and invalids, and no others are so well qualified to carry on this work as are the practicing physicians.

With these few and somewhat disconnected statements, I present the theme to you for consideration.

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XXIII

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There is herewith presented some court and attorney-general decisions upon questions relating to the Chapter 16, Title 12 of the Code, and to the Rules and Regulations of the State Board of Health and their practical application, which have been made during the biennial period recovored by this report:

THE RIGHT OF A TOWNSHIP OR TOWN TO QUARANTINE AGAINST OTHER TOWNSHIPS OR TOWNS

VAN BUREN DISTRICT COURT

THEODORE JAMES ET AL

Chancery No. 10684.

VS. A. L. RATCLIFF ET AL

This matter was submitted on plaintiffs' application for a temporary injunction to restrain the local board of health of Village township, Van Buren county, Iowa, and its officers from enforcing certain quarantine regulations, whereby persons coming from Eldon, Iowa, were prohibited from entering said township. The matter was very ably and fully presented. There is but little controversy as to the facts, so that it becomes largely a question of the application of the law to facts conceded.

The evidence shows that within the last thirty days there has been in the town of Eldon 51 cases of smallpox. Eldon is a town of about 2,000 inhabitants. That would indicate that about one in 40 of the citizens of Eldon has had the smallpox within the last 30 days. In view of this situation the defendants' local board of health, in compliance with the law established a rule which prohibited persons from Eldon entering the limits of the defendants' township. The question is, was that a reasonable regulation under the circumstances?

The law, of necessity, gives to boards of health a large discretion in cases of this kind, because public policy demands it; and in such cases private rights, however sacred, must give way. If the board of health has not abused its descretion, then the courts can not interfere with the laws established by such board.

(287)
Under the law, I think there can be no question but that the board of health had the power, if the necessity existed for its exercise, to prohibit persons from Eldon from entering the defendant's township. Whether or not a reasonable necessity existed for the enforcement of such a rule, was a matter left largely in the discretion of the local board.

It is not necessary for the court to determine what it would have done as a matter of policy, in view of the situation, had it been acting as the board of health. It is clear to the court that the board of health acted in good faith, and did not abuse the discretion which the law gave it, and for that reason the application for temporary injunction must be denied.

I have entered on the back of the petition an order denying the request of the plaintiffs for a temporary writ of injunction, and giving them an exception to said ruling, and have provided that they shall have 20 days to prepare and have signed a bill of exceptions.

M. A. ROBERTS, Judge.

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Upon a hearing had on the application for a temporary writ of injunction in the within case on July 10, 1901, before the undersigned judge of the district court of Iowa in and for Van Buren county, Iowa, the said application is denied to which plaintiffs except and are given 20 days to file bill of exceptions.

July 11, 1901.

M. A. ROBERTS, Judge.

THE AUTHORITY OF THE STATE BOARD OF HEALTH, AND OF LOCAL BOARDS OF HEALTH AND SCHOOL BOARDS TO EXCLUDE UNVACCINATED CHILDREN OR TEACHERS FROM THE PUBLIC OR PRIVATE SCHOOLS OF THE STATE

IN THE DISTRICT COURT OF LUCAS COUNTY, IOWA

DESSIE GIFFORD ET AL.

VS. Two Cases, Nos. 5800 and 5801 CHAS. DRAKE ET AL. Opinion

These two cases, by the three minor children of C. B. Gifford, by their father as next friend are—the one a mandamus proceeding to compel the defendants, as the board of school directors, to admit the plaintiffs to school, the other to recover damages for the alleged wrongful exclusion of plaintiffs from school. In each case it is alleged in the petition that the father is a resident land owner and taxpayer of the district, and that the plaintinffs live and reside with their parents in the school district, and are respectively 11, 8 and 6 years of age, and that they were in perfect health and had not been exposed to contagion of smallpox, or other infectious disease and no epidemic of smallpox was prevailing or inticipated in said locality, and that the plaintiffs were denied admission to the school of the district, and the only reason for their exclusion from school was that they had not been vaccinated.

To these petitions the defendants demurred for the reason that the defendants, as the board of directors of the school district, had the right 1903]

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and it was their duty, under the laws of the state and the rules, orders and regulations of the State Board of Health, to deny plaintiffs the privilege to attend the said school for the reason that plaintiffs had not been vaccinated against smallpox, whether plaintiffs had been exposed to the ravages of smallpox or not, or whether there was an epidemic of smallpox existing in the vicinity of said school or not at that time, and that under the facts stated in the petition it was the duty of the defendants, as such board of directors, under the laws of the State and the orders, rules and regulations of the State Board of Health to deny the plaintiffs the privilege of attending school. This may not be the exact language of either demurrer, but it sufficiently indicates the point relied on.

Counsel agree that the question thus presented should be considered without regard to the technical objection that the rules, orders and regulations of the State Board of Health relied on by defendants are not in the record. While doubtful of this concession, particularly in the light of the statement of counsel for plaintiffs that it shall not prejudice plaintiffs at any subsequent time, yet, in view of the elaborate and able arguments of the case on both sides, the question shall have such consideration as I am able to give it.

There is no statute of this State requiring vaccination as a condition of admission to the public schools. There is a rule of the State Board of Health providing that "every person entering any public or private school of Iowa must give satisfactory evidence of protection by vaccination" and also further rule providing that "all persons in this State over the age of one year, who have not been vaccinated or who * * * do not furnish satisfactory evidence of protection from smallpox are hereby ordered to be vaccinated," and by similar order it was made the duty of the officers of the school district to require the enforcement of the rule so far as it applies to the pupils of the schools.

These are the "orders, rules and regulations" relied upon to support the demurrer, and it must be conceded that if they are valid and enforceable as they read they are a complete justification for the alleged acts of the defendants. For by the first rule quoted vaccination is plainly made a condition of admission to the schools, and this without regard to the facts of exposure to contagion, or the presence or danger of an epidemic of smallpox in the community. The same may be said of the other rule applying to the entire population of the state over one year of age. All such persons must either show satisfactory evidence of protection or be vaccinated, whether exposed to contagion or not, or whether the danger be imminent. This is compulsory vaccination.

There are some questions that can well be eliminated in discussing the proposition in hand as only indirectly bearing upon it. It may well be conceded that the legislature, in the exercise of the police power could make vaccination a condition of admission to the schools, without regard to conditions existing at any particular time or place. It might also be that the legislature, by the same authority, could require all the citizens of the state liable to contract smallpox to be vaccinated, without regard

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to the imminence of the danger in the individual case. But the legislature of Iowa has not seen fit to do either of these things and the only *legislative* authority for the "rules, orders and regulations" in question is to be found in Section 2565 of the Code defining the powers and duties of the State Board of Health, which is as follows:

Sec. 2565. Powers-regulations-reports. The board shall have charge of and general supervision over the interests of the health and life of the citizens of the state; matters pertaining to quarantine, registrations of marriages, births and deaths; authority to make such rules and regulations and sanitary investigations as it from time to time may find necessary for the preservation and improvement of the public health, which, when made, shall be enforced by local boards of health and peace officers of the state. It shall prepare and furnish, through its secretary, to the clerks of the several counties such forms for the record of marriages, births and deaths as it may determine upon, and by its secretary make biennial reports to the governor, which shall include so much of its proceedings, such information concerning vital statistics, such knowledge respecting diseases, and such instruction upon the subject of hygiene, as it may be thought useful for dissemination among the people, with such suggestions as to further legislation as may be thought advisable.

This statute confers no express authority on the State Board of Health to require vaccination as a condition of attendance at school.

That it would be within the power of the legislature to confer such express authority is another proposition that may be conceded without, therefore, directly affecting the question in hand.

Nor can it be doubted that under the general powers conferred by the statute—"to have charge of and general supervision over the interests of the health and life of the citizens of the state" and "to make such rules and regulations * * * as it from time to time may find necessary for the preservation and improvement of the public health" the Board of Health would have power to require vaccination of certain persons exposed to contagion, or of numbers of persons under certain conditions, as of exposure to contagion, or in certain localities infected with the disease. In other words, in the face of an emergency, the power conferred would authorize the Board of Health to compel vaccination as a condition of attending school.

All of the propositions so far stated will be found supported by some of the authorities cited below, and, I believe, denied by none. But with these propositions established we have still undetermined the question raised by the demurrers in these cases which may be stated thus:

Under the general authority conferred upon it by Code Section 2565, has the State Board of Health the power, by a general regulation applying at all times to all communities in the state without regard to the presence or threatened presence of smallpox, to make vaccination an absolute and general condition of admission to the public schools?

This question might be determined upon considerations of principle, involving the discussion of what powers may and what may not be delegated by the legislature to administrative boards and the manner of such delegation, but while there is a lack of adjudication of the precise question in this state. it is believed the question is capable of a correct determination upon a view of precedents well considered and grounded upon correct principles as announced by the courts of other states.

One of the earliest cases upon the subject is that of *Duffield vs. Williamsport School District*, 162 Pa. 476, 25 L. R. A. 152, decided and reported in 1894. The case is decided without citation of authorities by the court, and the briefs of counsel reported show that only general principles were presented. An editorial note cites but one American case as bearing directly on the question, that of *Abeel vs Clark*, 84 Cal., 226,

With this view of the situation let us turn to the opinion. The case was an action of mandamus to compel the admission of a minor son to the schools of Williamsport. Five facts are said to appear in the answer of the school district, and the first four may be briefly stated thus: (1) By an ordinance of the city it is provided that no pupil shall be permitted to attend school without vaccination. (2) That smallpox now exists in Williamsport and is epidemic in near by cities and towns. (3) That in this situation the board of health requested the school board to see that no pupil attend the public schools except they be vaccinated. (4) That upon considering this request and the general alarm the school board adopted a resolution in conformity with the recommendation of the board of health.

The answer was demurred to and the questions raised were over "the power of the school board to adopt reasonable health regulations for the benefit of their pupils and the general public, and over the reasonableness of the particular regulation."

It is to be noted that while the ordinance of the city was general in its operation no question is made as to its validity, but that the action of the school board was with reference to existing conditions of emergency. The discussions of the questions raised was along the line of what the school board might legally do in an emergency, and it was held the answer was good.

In the same year the Supreme Court of Connecticut in *Bissell vs. Davison*, 65 Conn., 183, 32 Atl. 348, 29 L. R. A. 251, held that under a statute by which the school committee was "invested with the power to require that every child shall be vaccinated before being permitted to attend the public schools" the school committee rightfully excluded a pupil who refused to be vaccinated as required by a vote or rule of the committee passed in accordance with such statute, holding: (1) That the rule in question was an objectionable way of exercising the power conferred, and was proper in the absence of an epidemic, because the statute imposed no such restriction; and (2) that the statute was constitutional.

The Duffield case, supra, and Abeel vs. Clark, 84 Cal., 226, are referred to and concerning the latter it is said:

"In California a statute gave to the trustees of the general common school districts the power to exclude from the schools scholars who had [No. 21

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not been vaccinated, and this was upheld as a valid exercise of the police power."

In the following year in the Court of Appeals of New York, Re Smith, 146 N. Y. 68, 40 N. E. 497, 28 L. R. A. 820, was decided. The city charter of Brooklyn provided that—

"In the presence of great and imminent peril to public health * * * by reason of impending pestilence it shall be the duty of the health commissioner to take such measures for the preservation of the public health from such impending pestilence as he may in good faith declare the public safety and health to demand."

The general law provided for isolation of persons infected or exposed to contagious disease and that the local board of health should at all times provide thorough and safe vaccination for all persons in need of, the same. Under this authority the commissioner declared in the presence of an epidemic of smallpox that every citizen should be vaccinated, and that any person refusing should be quarantined. Concerning this the court says:

"That the powers conferred upon the health commissioner by the provisions of the city charter give to him the right to compel the vaccination of every citizen in the city of Brooklyn, if he would escape quarantine, seems an unnecessary, and it is an unwarrantable inference from the language. It is difficult to suppose the legislature would invest local officials with such arbitrary authority over their fellow citizens and the language of an act would have to be very plain before the court would be warranted in giving it such a construction."

In Wisconsin in 1897, in the case of *State vs. Burge*, 95 Wis., 390, 70 N. W. 347, 37 L. R. A. 157, in a mandamus case such as we have here, it was sought to justify the exclusion of children from the public schools, because not vaccinated, under a rule of the state board of health, passed, as alleged, under authority of a statute conferring just such general powers as are conferred by Section 2565 Code. There was no epidemic of smallpox in, near or approaching the vicinity of the school, and the children excluded from the school had not been exposed to smallpox. The court says:

"There is no statute in this state authorizing compulsory vaccination, nor any statute which requires vaccination as one of the conditions of the right or privilege of attending the public schools, and in the absence of any such statute we think it cannot be maintained that the rule relied on is a valid exercise of the rightful powers of the state board of health. The state board of health is a creation of the statute and has only such powers as the statute confers."

The rule is further held to be unreasonable in the absence of an epidemic of smallpox. The precise question we have here arose in Illinois, later in 1897. in the case of *Potts vs. Breen*, 167 Ill. 67, 47 N. E. 81, 39 L. R. A. 152. The children there excluded from school had not been exposed to infection by smallpox, and there was no epidemic of smallpox prevailing or apprehended in the vicinity of the school and the only reason for their exclusion was that they had not been vaccinated, and the action was sought to be justified by a rule of the state board of health. The powers of that board are defined, in all essential respects in the very language of Section 2565 of the Code. The rule of the state board was "that no pupil shall be admitted to any public school in the state without presenting satisfactory evidence of proper and successful vaccination."

It was held (1) that the rule was beyond the power of the board to make, and it is in that connection said:

"Without a law making vaccination compulsory, prescribing it, upon grounds deemed sufficient by the legislature as necessary to the public health as a condition of admission to or attendance upon the public schools, neither the state board nor any local board has any power to make or enforce a rule or order having the force of a general law in the respects mentioned."

(2) That the rule was not a reasonable one where smallpox did not exist in the community, and when there was no cause to apprehend that it was approaching the vicinity of the school or likely to become prevalent there.

In the last two cases the authorities at that time existing are cited and discussed, particularly the cases from Pennsylvania, Connecticut and California, cited above, which are distinguished either by the existence of an emergency or by the presence of express legislative authority.

The Potts-Breen case, supra, is expressly followed in Labaugh vs. Board of Education, 177 III. 572, 52 N. E. 850, the court saying, "We adhere to the principles announced in that (the Breen) case and decline to further discuss the guestions there determined."

The case of *Morris vs. City of Columbus*, 102 Ga. 792, 30 Pac. 850, 42 L. K. A. 175, decided in 1898, is relied on by defendants as sustaining their position. A very important and vital distinction between that case and the one at bar is indicated in the first sentence of the opinion which is as follows:

"In 1890 the general assembly conferred upon the mayor and aldermen of the city of Columbus authority to declare by resolution that vaccination shall be compulsory upon all persons living in the county of Muscogee or any part thereof."

Resolutions, under authority of this act, were passed, and it was for a violation of these resolutions the case arose. The first question discussed, that bears on the issue here, is that there was no necessity for the enforcement of the ordinances, and upon this the court says:

"The right to enforce vaccination (assuming for the present that its enforcement is constitutional), is derived from necessity, and although the authority conferred upon the municipal corporation of Columbus is very broad, still, we cannot assume that the legislature intended that they should exercise this authority save in cases of necessity. Did the necessity for the enforcement of the ordinance against plaintiff in error exist? We think there can be no question under the facts appearing in the record, but that the municipal authorities had reasonable grounds for apprehending that an epidemic of smallpox was imminent." 294

It is further said in the opinion: "That municipal authorities have carried into execution the power conferred upon them by the general assembly. They have, it would seem, in no way transcended that power."

Upon the question raised as to the constitutionality of the law the court concludes:

"We hold that the legislature has power to pass an act compelling vaccination and that it may delegate this authority to a municipal corporation. But while this is true, municipal corporations must have express authority from the legislature, as no such power will ever arise by implication."

The Illinois and Wisconsin cases above referred to are cited in support of this doctrine. In Indiana it is held to be the rule that under general powers granted by statute, boards of health have power to exclude unvaccinated children from the public schools when there is an emergency on account of danger from smallpox. *Blue vs. Beach*, 155 Ind. 121, 56 N. E. 89, 50 L. R. A. 64. The opinion in this case is of considerable length, well reasoned and supported by numerous authorities. Most of the cases here referred to are considered at length, and the rule of the Illinois and Wisconsin cases is said not to militate against the rule announced, under the facts. Speaking of the order of the local board of health the court says:

"The order was the offspring, as we have seen, of an emergency arising from a reasonable apprehension upon the board's part that smallpox would become epidemic or prevalent in the city of Terre Haute. The rule or order could not be considered as having any force or effect beyond the existence of that emergency, and Kleo Blue, by virtue of its operation could only be excluded from school upon his refusal to be vaccinated until after the danger of an epidemic of smallpox had disappeared. Any other construction than this would render the rule or order absurd and place the board in the attitude of attempting to usurp authority."

In Horn vs. Beil, 157 Ind. 25, 60 N. E. 672, the rule announced in the Blue case is affirmed.

In North Carolina, State vs. Hay, N. C. —, 49 L. R. A. 588, it has been held that there is no provision of the constitution which forbids the legislature from authorizing county commissioners to make such regulations and provisions for the vaccination of the inhabitants of the county as they may deem necessary to protect the public health, and that they may provide for compulsory vaccination. The opinion of the learned judge is chiefly remarkable for the wealth of citations from such distinguished lights of ancient and modern times as Grotius, Montesquieu, Lord Hale, Lord Bacon, Broom and Macauley. But coming down to more recent

"The power of the legislature to authorize county and municipal authorities to require compulsory vaccination has been exercised in nearly every state, and has been recently sustained by the highest courts of two of our sisters states." contrary."

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He cites only the Morris case from Georgia and the Blue case just referred to, with the naive remark: "and there are no decisions to the

In July. 1901, the supreme court of Michigan, in *Mathews vs. Board* of *Education*, Mich., 86 N. W. 1036, 54 L. R. A. 736, quote approvingly the language herein quoted from the opinion in the Burdge case from Wisconsin. And the conclusion of the majority of the court is thus expressed:

"What I do say is that the legislature has not undertaken to give them (school boards) the power, when no epidemic of contagious disease exists, or is imminent in the district, to pass a general continuing rule which would have the effect of a general law excluding all pupils who will not submit to vaccination."

The latest expression on the subject is the case of *Freeman vs.* Zimmerman, Minn., 90 N. W. 783, decided June, 1902, and cited by defendant. It is there expressly stated that there was an emergency prompting the action of the respondents in requiring vaccination as a condition of admission to the public schools. The charter of the city of St. Paul provides for the office of health commissioner and he was expressly authorized by the charter of the city to require all persons in the city to be vaccinated, and to require a certificate of vaccination as a condition to the admission of children to the public schools. It is said if the general statutory provisions be insufficient the authority so granted is ample to sustain the regulation of the commissioner ordered enforced.

A few other cases are found cited upon the question, which have not been accessible. The case of Abeel vs. Clark, 84 Cal., 226, already referred to, is said in several of the cases here cited to involve the constitutionality of a statute requiring that all children attending the public schools should be vaccinated.

Re Rebenack, 62 Mo. App. 8, is several times cited and would seem from the comments made upon it by the Indiana supreme court in the Blue case, to sustain the proposition that under general powers, without express authority, an administrative board could make vaccination a condition of admission to schools. None of the references to the case indicate whether the regulation was sought to be enforced during an epidemic or not.

The case of *Hagan vs. Strong*, 2 Vt., 427, is said in the Morris case to hold that the municipal authorities of a town in Vermont had authority under a general power "to take the most prudent measures" to prevent the spread of smallpox, to levy and collect a tax to defray the expenses of having the inhabitants vaccinated, and that it was conceded by both sides the town would have the authority when the danger of an epidemic of smallpox was imminent.

Re Walters, 84 Hun. 457, 32 N. Y. Supp. 322, is also cited, and is said in the Potts-Breen case to involve the constitutionality of statutes requiring all children to be vaccinated before being admitted to the public schools. The case is digested in the 10th General Digest, p. 529, as follows:

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"N. Y. Laws, 1893, Chap. 661, Sec. 200, providing that no unvaccinated child or person shall be admitted into any of the public schools, and commanding the officers in control of such schools to enforce the prohibition. is a valid exercise of the police power."

From these cases, which are believed to be all there are bearing directly upon the question, it is not difficult to deduce the rules already announced:

(1) That the legislature, in the exercise of the police power, could make vaccination a condition of admission to the public schools.

(2) That the legislature might confer express authority upon the board of health to require vaccination as a condition of admission to the public schools.

(3) That under mere general powers, such as are now conferred upon the State Board of Health by statute, a regulation of the Board making vaccination a condition of enjoyment of school privileges during an epidemic, or imminent danger of an epidemic of smallpox, would be valid.

But there is an utter lack of authority—except, possibly, the Rebenack case, in Missouri—for saying that in the absence of express legislative authority, a board of health—or other administrative board ——can require vaccination as a general condition of admission to the schools when no epidemic of smallpox exists or is threatened.

The authorities, almost without exception, recognize that to give validity to such a regulation of a board of health there must be (1) either a statute to the same effect, which the board is called upon to enforce, or (2) express statutory authority to make the regulation, or (3) an emergency justifying the enactment and enforcement of the rule under general powers.

Perhaps the strongest announcement of the last proposition is found in Indiana, but in the Blue case, cited, the court carefully guards against announcing a doctrine that might be construed to authorize a permanent exclusion from school of an unvaccinated child.

"The rule or order could not be considered as having any force or effect beyond the existence of that emergency, and Kleo Blue, by virtue of its operation, could only be excluded from school, upon his refusal to be vaccinated, until after the danger of an epidemic of smallpox had disappeared."

If the pupil cannot be excluded after the danger of an epidemic is past, he cannot, in reason, be excluded before such danger arises.

The holding of the Illinois and Wisconsin courts are directly in point, being based not only upon similar facts, but upon statutes identical in spirit and meaning, if not, indeed, in language, and are not only well supported by authority, but have been in turn recognized in subsequent discussions of the subject as announcing correct principles of law. It would require very considerable weight of authority to the contrary to justify a holding against rules of law so announced, and to my mind such contrary authority is entirely lacking. Attention is called to an opinion of Attorney-General Remley which is said to sustain the position of defendants. The learned attorney general skillfully avoids the rock that proves the stumbling block in this case. He is speaking of "The power of a state to require all persons to be vaccinated, when danger threatens"—and he is "thoroughly convinced that every reasonable order made by boards of health will be upheld by the courts, even to the extent of requiring all persons not immune in a community threatened with the dread scourge to be vaccinated. The reasonableness of any order depends, of course, upon the necessity for it, the provinity of the danger."

These are just the propositions upon which stress is laid by all the authorities. For the reasons then (1) That the State Board of Health had no power to require vaccination as a condition of admission to the public school, in the absence of an emergency, such as a threatened invasion of the community by smallpox, and (2) That the regulation relied on is, under the facts pleaded in these cases unreasonable, the demurrers will be overruled.

In so holding, however, it is not intended to say that the rules and regulations of the State Board of Health in respect to vaccination are not valid and enforceable in an emergency such as calls for their exercise, but only that under the facts pleaded in these cases no such emergency existed.

The rules in question, considered as general regulations of universal application throughout the state, without regard to the existence of an emergency requiring such measures, are in the nature of general laws imposing a permanent and unyielding condition upon the enjoyment of public school privileges, and a restriction upon the personal liberty of all citizens, which are beyond the power of the board of health to enact. But considered as applicable only in an emergency requiring prompt and effective administrative action to check an existing epidemic, or avoid a threatened one, and as having no application to pupils or citizens not affected by such conditions, and as having no force either before the occasion for their operation arises or after it subsides, they are valid regulations.

In the one case they would be considered an exercise of legislative power which the board of health does not possess, and in the other as an administrative process within its power as defined by statute. This distinction is recognized by practically all the authorities referred to and many others.

"The legislature cannot delegate its power to make a law, but it can make a law to delegate a power to determine some fact or state of things upon which the law makes, or intends to make, its own action depend."

Locke's Appeal, 71 Pa. 491, 13 Am. Rep. 716; Blue vs. Beach, supra; Hurst vs. Warner, 102 Mich. 238, 26 L. R. A. 484-491.

"The true test and distinction is between the delegation of power to make the law, which necessarily involves a discretion as to what it shall be, and conferring authority or discretion as to its execution to be exercised under and in pursuance of the law. The first cannot be done. To the latter no valid objection can be made."

Railway Co. vs. County Commissioner, 10 St. 88; State vs. Burage. supra.

"It is a principle not questioned that, except when authorized by the constitution, as in respect to municipalities, the legislature cannot delegate legislative power, cannot confer on any body or person the power to determine what shall be the law. The legislature alone must determine what it shall be."

State vs. Young, 29 Minn. 476, N. W. 737-754; Potts vs. Breen, supra. The clerk will in each of these cases enter an order overruling de. fendants' demurrer to the petition, noting defendants' exception, and giving defendant till the first day of the next term to plead.

January 3, 1903. C. W. VERMILION.

THE AUTHORITY OF LOCAL HEALTH BOARDS TO DETAIN THE U. S. MAILS FOR SANITARY PURPOSES

The following communications are interesting and will be helpful to sanitary authorities everywhere. In several parts of the State similar questions have arisen and we are glad to have so clear a statement from one in authority.

The Secretary of the State Board of Health received the following letter October 11, and referred it to Mr. N. J. Miller. Superintendent of Mails at Des Moines, who returned it with the request that it be laid before Captain E. L. West, Superintendent Railway Mail Service, Chicago, which was done. His reply thereto follows the letter of Dr. Thomas:

RED OAK, IOWA, October 10, 1901.

Dr. J. F. Kennedy, Secretary State Board of Health, Des Moines, Iowa:

Dear Doctor-Will you please give me an opinion as to what authority we have to detain United States mails for disinfection in cases where we suspect they have been infected with smallpox. I was notified by the railroad authorities last night that a mail clerk on the Keokuk branch had broken guarantine and arrived here last night with his car. He is the same man of whom I wrote you last week, and according to the evidence I have he was only under quarantine a period of twelve days. and his wife and child are at the present time affected with the smallpox. I therefore had him detained and telegraphed to the health officer at Keokuk to inquire if he had been properly disinfected and legally released. I at once had the mails disinfected, and detained the car until this morning. At about 3 o'clock A. M I received a telegram from Dr. Bailey, health officer at Keokuk, which said that the man had been disinfected and released on the 8th inst. I therefore released the man this

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morning. Now, according to the state regulations, the Keokuk authorities had no right to release the man under any conditions in less than seventeen days, but in this case the man was only quarantined for a neriod of twelve days, and I am not satisfied that desquamation had entirely ceased. However, it seemed to me that I had no choice but to release him after I received the telegram from the Keokuk authorities. As it is quite probable that we may have other cases of a similar nature. I would like to know if we have full power to detain United States mail for a sufficient time to disinfect it. I have talked with the postmaster here in regard to this matter, and he seems to doubt our authority on the ground that a state officer cannot interfere with United States business, and he knows of no regulations of the Postal Department allowing him to detain the mail for the purpose of disinfection.

Will you kindly let me have your opinion or that of the Attorney General at your earliest convenience, and oblige.

> Yours respectfully. LOUIS A. THOMAS. Health Officer.

RAILWAY MAIL SERVICE, OFFICE OF SUPERINTENI ENT, SIXTH DIVISION

CHICAGO, ILL., October 16, 1901.

Respectfully referred to Mr. J. F. Kennedy, Secretary State Board of Health. Des Moines. Iowa:

The rules of the various state boards of health are supreme in matters of this kind.

It was only recently that we had a case occur on the U. P. System in our Omaha & Ogden R. P. O. One of the clerks who was a member of the crew on duty was found to be infected with smallpox while en route. The two postal cars in this train were set out, quarantined and the entire mail, contents of postal cars, clothing of clerks are in fact every piece of furniture in the cars fumigated by the sulphur process, and upon the arrival of the cars and crew at Cheyenne, all of the members of the crew, including the infected clerk, were taken to the isolation hospital and held there for the time specified by the rules of the state board of health of Wyoming.

In other words, to sum the matter up, the department places the health of the community and public as paramount to everything else.

I send these papers through you to Dr. Thomas, so that you may see my reply and then forward them to him with such remarks as you may E. L. WEST. Superintendent. desire to make.

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WHO PAYS THE BILLS?

Local Boards of Health—city, town and township—have been puzzled greatly to determine from Chapter 16, Title XII of the Code, who pays the bills incurred by such boards in the discharge of their duties as guardians of the public health. Section 2570 has been regarded as ambiguous and obscure as well as conflicting with other declarations in this chapter.

The following correspondence relative to this subject will be interesting:

CHARLES CITY, IOWA, June 23, 1902.

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J. F. Kennedy, Secretary State Board of Health. Des Moines, Iowa:

Dear Sir.-About April 18, 1902. James D. Watson, who claimed that his home was in Kansas City, Mo., came to this city and put up at the Hildreth Hotel, sick, when a physician was called and he was found sick with smallpox. The city removed him to a small house just outside the city limits, furnished a nurse and all necessary medical attendance and provisions, until May 12th, when he was discharged as cured. The health board of the city certified the bills of expense to the county. At the June session of the board of supervisors the board rejected all the bills under Section 2571 of the Code, claiming that Charles City was not a township, and therefore if they paid the bills there was no law to recover from the city. Please examine Section 2570 and 2571 of the Code of 1897, and give your opinion as to the liability of the county in such cases. The board of health contend that the county is liable for all such bills, and not the city. If you are not certain about the construction of the law, you will do this city a great favor by submitting the question to the Attorney-General, for his decision.

An early reply will be highly appreciated by the board of health of this city, as well as by Yours truly,

W. W. DENNIS, Secretary Board of Health.

This communication was referred to the attorney general as shown by the following letter:

Iowa State Board of Health, Office of the Secretary.

DES MOINES, IOWA, June 23, 1902. Hon. Charles W. Mullan, Attorney-General, City.

Dear Sir,—The enclosed letter was received this morning and you will note that a question is asked that has been a source of a great deal of dissension ever since the law was passed in 1880. Hon. Mr. Hern in the last legeslature attempted to have the law so amended as to remove this conflict, but I think his bill did not pass. If you will kindly give your version of the law on this matter and send me a copy of the same I will be greatly obliged. I am,

> Very respectfully, J. F. KENNEDY.

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The following is the reply received from the Attorney-General and sent to Mr. W. W. Dennis:

Sir.—Your request of the 23rd inst, for an opinion as to whether the county is liable in the first instance for the expense incurred in providing nurses, needful assistance and supplies to a person infected with smallpox, where such person, or those liable for his support, is unable to pay the same, and where such person has been quarantined by a local board of health, has been referred to me.

Section 2570 of the Code provides that when any person shall be infected, or shall have been recently infected, or sick with smallpox or other disease dangerous to the public health, whether a resident or otherwise, it may make such provisions as are best calculated to preserve the inhabitants against danger therefrom by removing such person to a separate house, when it may be done without injury to his health, and provide nurses, needful assistance and supplies, which shall be charged to the person or those liable for his support, if able. If unable, it shall be done at the expense of the county.

Here the local board of health is given full power to make such provisions as are best calculated to preserve the health of the public, and is authorized to remove the person infected with such infectious disease and isolate him from other inhabitants, and is authorized to provide nurses, assistance and supplies for him while so isolated.

This section further provides that such person, or those liable for his support, shall be liable for the expense incurred for such nurses, assistance and supplies, if he or those liable for his support are able to pay the same; but if unable to pay, the statute then specifically provides that this shall be done at the expense of the county.

In City of Clinton vs. County of Clinton, 61 Iowa, 205, the question arose as to the liability of the county for expense incurred in providing for certain persons infected with smallpox while under quarantine by the local board of health. The court said:

"If we are correct, then the sick person is properly chargeable with all the expenses which may properly be incurred under either section, including the expense of removal, if that is adopted, and the expense of isolation, if that is adopted; and we think the county is ultimately liable for the same if the sick person and those liable for his support are unable to pay."

In Gill vs. Appanoose County, 68 Iowa, 20, this section was under consideration, and it was held in this language:

"This provision will bear no other interpretation than that the county is liable for the care of the sick persons contemplated in the statute only in case they, or the persons liable for their support, are not able to make compensation therefor. It plainly provides that the county shall be liable only upon the conditions specified. Upon these conditions the county's liability depends, and it cannot be established until it is shown that the facts exist which are contemplated by the statute."

I therefore conclude, and it is my opinion, that the county is liable for the expense incurred in a quarantine of this character when the person, or those liable for his support, is unable to pay such expense. Respectfully submitted,

June 27, 1902.

CHAS. A. VAN VLECK. Assistant Attorney-General. DR J F KENNEDY.

Secretary State Board of Health.

A CORRECTION.

Since this report has been in press the SECRETARY has had his attention called to the fact that the conflict between certain sections of the Code relating to the organization of local boards of health, as cited in his article entitled "Duties and Responsibilities of Local Boards of Health" and found on page ---- and following is more apparent than real. Sections 1024 to 1046 relate to cities under special charters. Chapter 16, Title XII of the Code, to towns and cities under general charter and to district townships. With these facts in view the criticism of the SECRE-TARY was uncalled for.

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CHAPTER 16. TITLE XII. THE CODE

Relating to State Board of Health

MEMBERS

Section 2564 The State Board of Health shall consist of the attorneygeneral and the state veterinary surgeon, who shall be members by virtue of their offices, one civil engineer and seven physicians, to be appointed by the governor, each to serve for a term of seven years and until his successor is appointed; vacancies to be filled by the governor for the unexpired term. But no one of the seven physicians hereafter appointed shall be an officer or member of the faculty of any medical school, and the governor shall have the power to remove any member of said board for good cause shown. It shall meet semi-annually in May and November, and at such other times as it may decide upon, such meetings to be held at the seat of government; suitable rooms (office supplies and furniture, except postage and stationery*) therefor to be provided by the custodian of the capitol. At the meeting held in May, a president from their number, and the Secretary who shall be a physician not of their number, shall be elected, and the latter have an office in the capitol.

DUTIES

Sec. 2565 The Board shall have charge of and general supervision over the interests of the health and ITe of the citizens of the state: matters pertaining to quarantine, registration of marriages, births and deaths; authority to make such rules and regulations and sanitary investigations as it from time to time may find necessary for the preservation and improvement of the public health which when made shall be enforced by local boards of health and peace officers of the state. It shall prepare and furnish, through its Secretary, to the clerks of the several counties such forms for the record of marriages, births and deaths

(1) * As amended by the Twenty-seventh General Assembly.

as it may determine upon, and by its Secretary make biennial reports to the governor, which shall include so much of its proceedings, such information concerning vital statistics, such knowledge respecting discases , 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.

Sec. 2566 It shall be the duty of all assessors, at the time of making assessments, to obtain and report to the clerk of the district court, upon blanks adopted by the State Board of Health and furnished by the county auditor, such registration of births and deaths as occur within their respective districts for the year ending December 31st immediately preceding.

VITAL STATISTICS

Sec. 2567 The clerk of the court in each county shall keep a book in which shall be recorded all marriages occurring within the county, together with such data respecting the same as shall be required by the State Board of Health, and shall report to the Secretary the State Board of Health on or before the first day of June in each year such data respecting such marriages for the year ending December thirty-first immediately preceding. The clerk of the district court of each county shall keep a book in which shall be recorded all births and deaths occurring within the county as shown by the returns filed in his office by the assessor, as provided in Section 2566; and on or before the first day of June in each year shall furnish to the Secretary of the State Board of Health a report of such births and deaths.

LOCAL BOARDS

Sec. 2568 The mayor and council of each town or city, or the trustees of any township, shall constitute a local board of health within the limits of such towns, cities or townships of which they are officers. The town, city or township clerk shall be clerk of the local board, which board shall appoint a competent physician as its health officer, who hall hold office during its pleasure. It shall regulate all fees and charges of persons employed by it in the execution of health laws and its own regulations and those of the State Board of Health; have charge of all cemeteries dedicated to public use not controlled by other trustees or incorporated bodies, and the burial of the dead; make such regulations as are necessary for the protection of the public health respecting nuisances, sources of filth, causes of sickness, rabid animals and quarantine, not in conflict with any regulations of the State Board of Health, which shall also apply to boats or vessels in harbors or posts within their jurisdiction; to proclaim and establish guarantine against all infectious or contagious diseases dangerous to the public, and maintain and remove the same, as may be required by regulations of the State Board; may, when satisfied upon due examination that any cellar, room, tenement building, or place occupied as a dwelling or otherwise has become, or is by reason of the number of occupants, uncleanliness or other cause, unfit for such

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surpose, or a cause of nuisance or sickness to the occupants or the nublic issue a notice in writing to such occupants, or any of them, requiring the premises to be put in proper condition as to cleanliness, or requiring the occupants to remove or quit such premises within a reasonable time to be fixed; and, if the persons so notified or either of them neglect or refuse to comply therewith, may by order cause the premises to be properly cleaned at the expense of the owner or owners, or may forcibly remove the occupants and close the premises, and peace and police officers shall execute such orders, which premises so closed shall not be again occupied as a dwelling place without written permission of the Board. The quarantine authorized by this section in case of infectious or contagious diseases may be declared or terminated by the mayor of any city or town, or the township clerk outside of such city or town, in cases required by regulations of the State Board of Health, upon written notice given by any practicing physician of the existence of such disease, or termination of the cause for quarantine, as the case may be,

INFECTED PERSONS

Sec. 2569 The local board may with its physician when of the opinion it is necessary for the preservation of the lives or health of the inhabitants, enter a building, vessel or place for the purpose of examining into, preventing, removing or destroying any nuisance, source of filth or cause of sickness, and in case its members or physician shall be refused such entry, make complaint through any member under oath to any magistrate of the county, whether a member of the board or not. stating the facts so far as known, and the magistrate shall thereupon issue his warrant, directed to any peace officer of the county, commanding him between the hours of sunrise and sunset, accompanied by two or more members of the Board, to prevent, remove or destroy such nuisance, source of filth or cause of sickness, which shall be executed by the officer under the direction of such members of the Board, and it may order the owner of any property, building or place to remove at his own expense, within twenty-four hours, or such other time as may be fixed by it, after notice has been served upon such owner, occupant or other person in charge thereof, any nuisance, source of filth or cause of sickness found thereon, and if such person fails or neglects to comply with the order and make such removal, it may cause the same to be done at the expense of the owner or occupant.

EXPENSES-HOW PAID

*Sec. 2570-a When any person shall be sick or infected with smallpox or other infectious or contagious disease dangerous to the public health, whether a resident or otherwise, the local board of health shall make such provisions as are best calculated to protect the inhabitants therefrom, and may remove such person to a separate house, or to a pest house, or detention or other hospital, and shall provide needful assistance. nurses, medical attendance and supplies. If in the judgment of sajd

* As amended by the 28th G. A. 19 board such person cannot be removed, then he shall be cared for at the place where he resides in the same manner as above provided. In case of the removal of more than one person to the same house, or to any pest house, or detention or other hospital, it shall provide needful assistance. nurses, medical attendance and supplies necessary for their proper care. All bills for expenses incurred in carrying out the provisions of this section shall be filed with the clerk of the local board of health, which board shall examine the same and act thereon at its next regular meeting after the same have been filed with the clerk, and certify the amount allowed thereon by it to the county auditor and the county board of supervisors shall act upon said bills as thus certified at its first regular meeting thereafter. The local board of health shall allow an amount on such bills as shall be reasonable and the certificate of the local board of health shall be prima facie evidence of the correctness of such bills, but the board of supervisors may revise the amount so allowed and fix the same. The expenses paid under the provisions of this act and the chapter of which it is amendatory shall in no case exceed the reasonable value of the property furnished or services rendered and the county shall not advance such expenses until the same snall have been audited and allowed by the board of supervisors. When one or more persons shall be confined in a house, or pest house, or detention or other hospital, the local board of health shall ascertain the total amount of expense incurred for the care of such persons, which amount shall be equitably apportioned by the local board of health between the several persons cared for, and when so apportioned the president, and the clerk of said board shall certify to the county auditor the name of such person or persons and their proportionate share, and the county shall recover the same in any court of competent jurisdiction within the state, and the certificate of the president and clerk of said board shall be prima facic evidence of the amount furnished such person or persons. In case of the inability of any person or persons, or those liable for their support, to pay for the expenses incurred as provided in this section, such expense shall be paid by the county, and the board of supervisors of said county shall, at the time it levies the general taxes, levy on the property of the city, town or township, from which such expenses were certified a sufficient tax to reimburse the county to the extent of one-third of the amount paid by it under the provisions of this act.

In the event that any of expenses made as aforesaid shall be collected from private individuals after said tax has been levied on the property of the city, town or township, said city, town or township shall have credited to them one-third of the amount so collected. It is further provided that nothing herein contained shall be construed to prevent any person quarantined, as herein provided, from employing at his own expense the physician or nurse of his choice, and no part of the expense of the physician or nurse employed by the board of health shall be apportioned to him under the provisions of this act. The forcible removal of infected persons, as herein provided, shall be effected by an application made to any civil magistrate, in the manner provided for the removal and abatement of nulsances, who shall issue the warrant as directed in

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such cases, to remove such person or persons to the place designated by the local board of health, or to take possession of the condemned or infected houses or lodgings, which warrant shall be executed under the direction of the local board of health, and such officer shall receive a reasonable compensation to be determined and allowed by said board.

QUARANTINE, DISINFECTION AND PEST HOUSES-HOW PAID

*Sec. 2570-b. All expenses incurred by the local board of health in establishing, maintaining or raising a quarantine, including fumigation, and the building and providing any pest house, detention or other hospital shall be by it certified to and paid by the county in the first instance and the board of supervisors shall at the time of the levy of the taxes for general purposes levy a tax upon the township, town or city, to reimburse the county for the amounts paid by it under the provisions of this section. All acts or parts of acts conflicting with this section are hereby repealed.

LOCAL BOARD MEETINGS-REGULATIONS-REPORTS-EXPENSES-TAX

*Sec. 2571. Local boards of health shall meet for the transaction of business on the first Mondays of April and November in each year, and at such other times as may seem necessary. They shall give notice of all regulations adopted by publication thereof in some newspaper printed and circulated in the town, city or township, or, if there is none, by posting a copy thereof in five public places therein, and through their physician or clerk shall make general report to the State Board at least once a year, and special reports when it may demand them, of its proceedings and such other facts as may be required, on blanks furnished by and in accordance with instructions from it. All expenses incurred in the enforcement of the provisions of this chapter, when not otherwise provided, shall be paid by the town, city or township; in either case all claims to be presented and audited as other demands. In the case of townships, the trustees shall certify the amount required to pay such expenses to the board of supervisors of the county, and it shall advance the same, and, at the time it levies the general taxes, shall levy on the property of such township a sufficient tax to reimburse the county, which, when collected, shall be paid to and belong to the county.

REGULATIONS AND SPECIAL POWERS OF THE STATE BOARD OF HEALTH

*Sec. 2572.—Local boards of health shall obey and enforce the rules and regulations of the State Board; and peace and police officers within their respective jurisdictions, when called upon to do so by the local boards, shall execute the orders of such board. If any local board of health shall refuse or neglect to enforce the rules regulations of the State Board of Health, the State Board of Health may enforce its rules and regulations within the territorial jurisdiction of such local board, and for that purpose shall have and may exercise all the powers given

*As amended by the 28th G. A.

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by statute to local boards of health; and the peace and police officers of the state, when called upon by the State Board of Health to enforce its hules and regulations, shall execute the orders of such board. All expenses incurred by the State Board of Health in determining whether its rules and regulations are enforced by a local board of health, and in enforcing the same when a local board has refused or neglected to do so, shall be paid in the same manner as is now provided for the payment of the expenses of enforcing such rules and regulations by local boards of health.

PENALTIES

Sec. 2573. Any person being notified to remove any nuisance, source of filth or cause of sickness, as in this chapter provided, who fails, neglects or refuses to do so after the time fixed in such notice, or knowingly fails, neglects or refuses to comply with and obey any order, rule or regulation of the state or local board of health, or any provision of this chapter, after notice thereof has been given as herein provided, shall forfeit and pay the sum of twenty dollars for each day he refuses such obedience, or for each day he knowingly fails, neglects or refuses to obey such rule or regulation, or knowingly violates any provision of this chapter, to be recovered in an action in the name of the clerk of the board, and when collected, to be paid to the clerk of the town, city or township, as the case may be, and for its benefit; and, in addition thereto, any one so offending, or knowingly exposing another to infection from any contagious disease, or knowingly subjecting another to the danger of contracting such disease from a child or other irresponsible person, shall be liable for all damages resulting therefrom, and guilty of a misdemeanor.

Sec. 2574. The secretary of the State Board of Health shall receive such salary as the Board shall fix, not to exceed twelve hundred dollars yearly, payable upon the certificate of the president to the state auditor, who shall issue his warrant for the amount due upon the state treasurer. Each member of the Board shall receive only actual traveling and other necessary expenses incurred in the performance of his duties, such expenses to be itemized, verified, certified, audited and a warrant drawn therefor in the same manner as the secretary's salary.

LOCATION OF PEST HOUSES-CONTROVERSY, HOW SETTLED

*Sec. 2575-a. That when a controversy arises between municipalities or between boards of health thereof, respecting the location of pest houses or hospitals for the treatment of infectious or contagious diseases, such matter shall be referred to the president of the State Board of Health, who shall forthwith appoint a committee of three (3) members thereof, which committee shall upon two days' notice to the parties interested, investigate the matter and make such order in the premises as the facts warrant, and such order shall be final.

*As amended by the 28th G. A.

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APPENDIX

JURISDICTION OF PEST HOUSE OR HOSPITAL

*Sec. 2575-b. 'The health officers of the municipality which is allowed to maintain a pest house or hospital for patients affected by infectious or contagious diseases outside the limits of said municipality, shall have exclusive jurisdiction and control of such pest house or hospital for the enforcement of All sanitary and health regulations.

ANNUAL APPROPRIATION

Sec. 2576.—The sum of five thousand dollars, or so much thereof as may be necessary, is annually appropriated to pay the salary of the secretary, expenses off the board, contingent expenses of the Secretary's office, and all costs of printing; all such contingent and miscellaneous expenses to be itemized, verified, certified, audited and paid as other expenses of the board.

*As amended by the 28th G. A.

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