

AMERICAN ASSOCIATION
FOR
STUDY AND PREVENTION
OF
INFANT MORTALITY

FIRST ANNUAL MEETING
BALTIMORE, MD.
1910

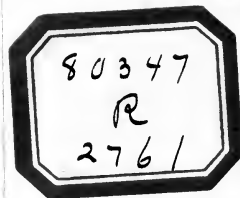
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AMERICAN ASSOCIATION
FOR
Study and Prevention
OF
Infant Mortality

TRANSACTIONS

OF THE

First Annual Meeting

Johns Hopkins University, Baltimore

November 9-11, 1910

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FIRST ANNUAL MEETING
of the
AMERICAN ASSOCIATION FOR STUDY AND PREVENTION
OF INFANT MORTALITY

The first annual meeting of the American Association for Study and Prevention of Infant Mortality was held at McCoy Hall, Johns Hopkins University, Baltimore, November 9, 10, and 11, 1910.

The meeting was opened by a general session on "The Duty of a Nation to its Potential Citizens." The president, Dr. J. H. Mason Knox, Jr., was in the chair, and the speakers were Cardinal Gibbons, Ambassador Jusserand, Prof. Irving Fisher, Dr. Abraham Jacobi and Dr. Wm. H. Welch.

Other special sessions were held as follows:

- Philanthropic Prevention of Infant Mortality, Thursday, Nov. 10, 10.30 a. m. Dr. Hastings H. Hart, chairman
- Municipal, State and Federal Prevention of Infant Mortality, Thursday, 8.15 p. m. Dr. Wm. H. Welch, chairman
- Medical Prevention of Infant Mortality, Friday, Nov. 11, 10.30 a. m. Dr. L. Emmett Holt, chairman
- Educational Prevention of Infant Mortality, Friday, Nov. 11, 2.30 p. m. Dr. Helen C. Putnam, chairman

Two meetings were held by the Board of Directors, the first on Wednesday afternoon, November 9, and the second, Friday morning, November 11. At the former the term of office of the directors elected since the formation of the Association, November 13, 1909, was determined as follows:

FIVE YEARS

- | | |
|------------------------------------|---|
| Dr. W. W. Butterworth, New Orleans | Mr. Charles Ford Langworthy, Washington |
| Dr. W. H. Carmalt, New Haven | Mr. Harold F. McCormick, Chicago |
| Dr. F. S. Churchill, Chicago | Dr. Herbert C. Moffitt, San Francisco |
| Dr. J. F. Edwards, Pittsburg | Rev. Beverly Warner, New Orleans |
| Dr. Caroline Hedger, Chicago | Dr. Wm. H. Welch, Baltimore |

FOUR YEARS

- | | |
|--------------------------------|------------------------------------|
| Mr. Robert W. Bruère, New York | Dr. J. S. Neff, Philadelphia |
| Dr. John S. Fulton, Baltimore | Miss M. Adelaide Nutting, New York |

Dr. G. W. Goler, Rochester	Mr. Chas. A. Otis, Cleveland
Prof. Chas. Richmond Henderson, Chicago	Dr. Lillian Welsh, Baltimore
Mr. Austin McLanahan, Baltimore	Dr. Cressy L. Wilbur, Washington

THREE YEARS

Dr. John M. Connolly, Boston	Dr. Clemens von Pirquet, Breslau
Dr. E. F. Cushing, Cleveland	Dr. Thomas Morgan Rotch, Boston
Dr. H. J. Gerstenberger, Cleveland	Dr. Mary Sherwood, Baltimore
Dr. J. H. Mason Knox, Jr., Baltimore	Mrs. Letchworth Smith, Louisville
Dr. Linnaeus E. La Fetra, New York	Dr. R. A. Urquhart, Baltimore

TWO YEARS

Dr. Henry L. Coit, Newark, N. J.	Dr. E. W. Saunders, St. Louis
Mr. Homer Folks, New York	Rev. Wm. F. Slocum, Colorado Springs
Dr. F. H. Gerrish, Portland, Me.	Dr. H. Merriman Steele, New Haven
Dr. L. Emmett Holt, New York	Prof. C.-E. A. Winslow, New York
Dr. Chas. P. Putnam, Boston	Dr. Kenelm Winslow, Seattle

ONE YEAR

Mrs. W. N. Boyd, Atlanta	Dr. J. Morton Howell, Dayton
Dr. Thomas Darlington, New York	Dr. Charles G. Jennings, Detroit
Dr. W. A. Evans, Chicago	Dr. H. T. Marshall, Charlottesville, Va.
Prof. Irving Fisher, New Haven	Dr. Helen C. Putnam, Providence

The following Committee on Resolutions was appointed by the president:

Dr. John S. Fulton, Baltimore, <i>Chairman</i>	Dr. Wm. H. Welch, Baltimore
Dr. Helen C. Putnam, Providence	

Business meetings of the Association were held Thursday afternoon, November 10, and Friday afternoon, November 11. Both were presided over by Dr. Knox. At the former brief reports were presented by representatives of the affiliated societies, as follows:

American Society of Superintendents of Training Schools for Nurses, Miss E. P. Crandall, N. Y.

Associated Alumnae of Graduate Nurses of United States, Miss M. E. Lent, Baltimore.

Babies' Dispensary and Hospital of Cleveland, Dr. H. J. Gerstenberger.

Babies' Milk Dispensary of Buffalo, Dr. Nelson G. Russell.

Babies' Hospital Milk Dispensary of Newark, N. J., Dr. Henry L. Coit.

Berlin Mills Company's Instructive District Nursing Fund, Berlin, N. H.

Bureau of Municipal Research of Philadelphia, Mr. Jesse D. Burks, Director.

California Branch of the Association of Collegiate Alumnae—exhibit and report.

Babies' Milk Fund Association of Louisville, Ky.—exhibit and report.

Cheraw Association for Study and Prevention of Infant Mortality, Cheraw, S. C.

Children's Aid Association of Indianapolis, Ind., Dr. W. D. Hoskins.

Children's Aid Society of Pennsylvania, Philadelphia, Mr. E. D. Solenberger.

Committee on Infant Social Service of the Women's Municipal League of Boston, Mrs. W. L. Putnam.

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- Connecticut Children's Aid Society, Hartford—by report.
- Children's Mission, Boston, Mass.—by report.
- Christian Service League of America, Wichita, Kansas—by report.
- Committee on Prevention of Blindness of the New York Association for the Blind, New York city, Miss C. Van Blarcom.
- Department of Health, Baltimore—by exhibit.
- Graduate Nurses Association of Cleveland, Miss Harriet L. Leet.
- Health Bureau, Rochester, N. Y.. Dr. George W. Goler.
- Hull House, Chicago, Ill.
- Instructive District Nursing Association, Columbus, Ohio, Miss Jennie L. Tuttle.
- Maryland Association for Study and Prevention of Infant Mortality, Dr. Mary Sherwood.
- Metropolitan Life Insurance Company, Industrial Department, New York city, Dr. Lee K. Frankel.
- Milk and Baby Hygiene Association of Boston, Mr. Walter Kruesi.
- Milwaukee Visiting Nurse Association, Miss M. B. Zimmerman.
- New York Diet Kitchen Association, New York city, Miss. M. L. Daniels and report.
- Providence District Nursing Association, Miss Alice Hall.
- Public Library, Minneapolis, Minn.
- Visiting Nurse Association, Cleveland, Ohio, Miss Harriet L. Leet.
- Waterbury Visiting Nurse Association, Waterbury, Conn., Miss Jessie L. Clauson.

The following new directors were unanimously elected by the Association for terms of five years:

- Miss Jane Addams, Chicago.
- Mrs. Elise Graupner, San Francisco.

The following whose terms of office had expired were unanimously re-elected for terms of five years:

- Mrs. Boyd.
- Dr. Howell.
- Dr. Darlington.
- Dr. Jennings.
- Dr. Evans.
- Dr. Marshall.
- Prof. Fisher.
- Dr. Helen C. Putnam.

At the meeting of the Board of Directors, Friday morning, November 11, the following officers were elected:

- President—Prof. Chas. R. Henderson, Chicago.
- Vice-presidents—Dr. Henry L. Coit, Newark, N. J., Mr. Harold F. McCormick, Chicago.
- Treasurer—Mr. Austin McLanahan, Baltimore, Md.
- Secretary—Dr. Frank S. Churchill, Chicago.

The Board of Directors elected the following Executive Committee:

- Dr. F. S. Churchill.
- Dr. J. S. Neff.
- Dr. John S. Fulton.
- Dr. Helen C. Putnam.
- Prof. C. R. Henderson.
- Dr. Mary Sherwood.
- Dr. J. H. Mason Knox, Jr.

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At the closing business session the following resolutions were reported favorably by the Committee and were unanimously adopted by the Association.

Whereas the registration of *all* births and of *all* deaths is most essential for the study of infantile mortality and the prevention of the deaths of infants and children from avoidable causes; therefore be it

Resolved, That the American Association for Study and Prevention of Infant Mortality approves of the model law for the registration of births and deaths, as recommended by the American Medical Association, the American Public Health Association, and the United States Bureau of the Census, and urges the thorough *enforcement* of such laws by the officials charged with the responsibility of their execution, with prosecution of physicians and midwives who neglect their duties to their clients and to the public health by failing or neglecting to register births as required by law.

Resolved, That the American Association for Study and Prevention of Infant Mortality urges State Boards of Health together with State Boards of Education to provide, in the rural schools, for conferences of mothers and for home instruction of mothers and expectant mothers in maternal and infant hygiene.

Resolved, That the American Association for Study and Prevention of Infant Mortality endorses the movement for a National Department of Health, believing that the establishment of such a department will lead to a great reduction of infant mortality, not only through improved regulation of interstate commerce in milk, infant foods, and medicines, but also through wider dissemination of information and more rapid improvement in our knowledge of the causes of infant mortality and the methods of prevention.

Whereas healthy parents, right customs and wholesome environment are essential factors in preventing infant mortality; therefore be it

Resolved, by the American Association for Study and Prevention of Infant Mortality, that boards licensing teachers for schools should give as detailed tests in elementary hygiene, sanitation, and biology as are given in mathematics or in language.

Resolved, That the Secretary of Agriculture be requested to consider the advisability and the feasibility of establishing official standards and requirements for milk branded as "Certified," "Inspected," or "Pasteurized," and, if found feasible and advisable, to establish such standards.

Resolved, That the thanks of the Association are hereby offered to President Remsen and the Board of Trustees of the Johns Hopkins University for the use of McCoy Hall for the meeting and the exhibition. The Association is sensible of the inconvenience endured by the University, its professors and its students for the sake of adding another to the many previous examples of the University's fostering interest in movements for the public good.

Resolved, That the thanks of the Association are due, and are hereby expressed, to the retiring president, Dr. J. H. Mason Knox, Jr., who has guided the Association successfully through the first year of its existence, has developed a volume of valuable proceedings, has presided with admirable courtesy and patience, and, in a word, has served the aims of the Association with distinction.

Resolved, That the Association hereby expresses its indebtedness and thanks to the speakers who have contributed so largely to the success of the meeting.

Whereas the Association feels that the exhibition marks an epoch in the presentation of the problems of infant mortality; therefore be it

Resolved, That the thanks of the Association are hereby offered to Dr. Marshall L. Price, the secretary of the Maryland State Department of Health, and to Dr. J. W. Schereschewsky, of the United States Public Health and Marine Hospital Service, chairman and medical officer in charge of the exhibition, respectively, to whom the success of the exhibition is chiefly due.

Resolved, That the Association records its appreciation of the services of the chairman and members of the local and other special committees; or the members of the exhibition committee; and of the chairman and members of the sub-committee on finance.

Resolved, That the Association hereby records its indebtedness to the United States Public Health and Marine Hospital Service, through Surgeon-General Walter Wyman, for its aid in detailing Dr. Schereschewsky to serve as medical officer in charge of the exhibition; that it also records its appreciation of the valuable contribution to the exhibition made by the Bureau of the Census of the United States Department of Labor, Bureau of Chemistry of the United States Department of Agriculture, Hygienic Laboratory of the United States Public Health and Marine Hospital Service, by other Departments of Federal, State and Municipal Government; by institutions, associations and by individuals.

Resolved, That the thanks of the Association are hereby offered to the State of Maryland; the City of Baltimore, for financial and personal assistance; the City Council of Baltimore for the passage of a joint resolution commending the work of the Association and the exhibition; and for the assistance rendered by the Commissioners for Opening Streets in detailing Mr. August Christhilf to co-operate in preparing and installing the exhibition.

Resolved, That the thanks of the Association are hereby offered to the clergy of the city, for announcements of the meetings and exhibition, to their congregations; to the Consolidated Railways for their generous exploitation of notices of the exhibition; to Rife and Houck for bill posting; and to merchants who have loaned articles or given personal services to the exhibition.

Resolved, That the thanks of the Association are hereby offered to the press of the city for the generous space given to the preliminary plans for the meeting, and to reports of the meeting and descriptions of the exhibition; to the Associated Press, United Press, and International News Service for carrying the reports of the meeting.

Resolved, That the Association hereby expresses its appreciation of help rendered by Mr. Louis Christhilf, superintendent of buildings of the Johns Hopkins University, and his assistants throughout the weeks of preparation for the exhibition and during the meeting and exhibition.

Resolved, That the Association hereby records its sense of obligation to its Executive Secretary whose intelligent and devoted work throughout the past year have been largely instrumental in bringing the Association safely through its period of infancy and to the threshold of a productive future.

At the close of the business meeting, the chairman introduced Prof. Chas. Richmond Henderson, the incoming president, who outlined the plans for 1911. (See address page 17.)

An exhibition arranged under the chairmanship of Dr. Marshall L. Price, Secretary of the Department of Health of Maryland, assisted by Dr. J. W. Schereschewsky, of the United States Public Health and Marine Hospital Service, was held in connection with the meeting. The exhibition was opened on the night of November 9, and remained open for a week. (See report, page 319.)

Addresses were given during the week by the following:

November 12—Birth Registration. Dr. C. Hampson Jones,
Assistant Health Commissioner, Baltimore

November 14—Infectious Diseases of Children. Dr.
W. P. Morrill, Baltimore.

November 15—Preventive Activities in Other Countries.
Dr. Charles Mitchell, Baltimore

November 16—Maternal Nursing. Dr. Charles O'Donovan,
Baltimore

The Second Annual Meeting of the American Association for Study and Prevention of Infant Mortality will be held in Chicago, November 16-18, 1911.

GREETINGS BY THE PRESIDENT FOR 1911

C. R. HENDERSON, Ph. D., University of Chicago

I wish to express as strongly as possible my profound sense of appreciation and gratitude for the honor this Conference has shown me. I esteem it one of the highest privileges of my life to succeed in this office a man of the eminent ability of my predecessor, Dr. Knox. I shall try to act in accordance with the good traditions of this Conference as far as lies in my power. The discussions already sent out to the world are of the highest value and of enduring worth. Perhaps you expect of a new presiding officer, in view of the progress made by the Conference, some variety of method in the organization of the next Conference. Subject to the suggestions from leaders of this movement I propose tentatively the following plan for the programme of 1911:

Since the aim logically determines the order of treatment, it may be wise to mark out somewhat sharply:—(1) the results of the investigations of specialists; (2) the measures and methods for the application of accepted teachings of the medical profession to particular methods of relief or prevention through private and public organizations, with practical conclusions for immediate action; (3) the awakening of popular interest and securing the attention of the public to our cause; and finally, (4) the publication of valuable articles to instruct and move the nation to appropriate action.

These four objects of our Conference suggest a corresponding organization of the next Conference. It would seem well, therefore, to set apart the two forenoon meetings to small groups of specialists in education, public and private relief agencies, eugenics, and one or two others. (2) The various groups of specialists having formulated their recommendations all the members may come together in more general assemblies to discuss these formulations from the standpoints of the various particular groups. Before a scientific doctrine can be applied in practice many kinds of knowledge and experience must yield

their lessons and all the factors must be studied from various standpoints. The conclusion which has thus been reached is more likely to have weight with the public than if it comes from a single group. In the third place two popular meetings might be held in the evenings for the purpose of arousing public interest and securing a wider hearing for our recommendations.

Perhaps the best method of conducting these discussions the coming year will be, to formulate the questions to be studied as soon as practicable and send them out to a large number of the most competent investigators and practical social workers in the country with the request to have them send in manuscript brief and pointed answers to the questions, based on their special knowledge and experience, with select bibliographies. The chairmen of sections would be reporters for each of the questions to summarize the arguments and conclusions of the individual writers, and formulate resolutions of a direct and practical character for discussion and adoption by the different groups of specialists and by the general meeting of all the sections. Beyond a brief summary of the studies contributed there should be no long papers, and the whole time would be given to discussion with direct reference to practical conclusions and recommendations to be offered to the public. In this way we should enlist a larger number of competent writers than by the ordinary method and the discussions of the Conference itself would be more intelligent and fruitful. Different experts would be asked to furnish a brief bibliography of the most recent articles and books upon the particular points to be discussed so that those who expect to join in the discussion might prepare themselves and the members present would be spared the pain and loss of time of listening to ill-digested remarks. There are sometimes difficulties in the way of this plan, because of the American habit of delay in sending in reports until the last moment, but we can at least attempt to secure ripe and finished results.

In editing the publications a careful selection of materials should be made by the Chairmen in order to avoid needless repetition of matter already printed in our Proceedings and with reference to practical action in view of the information presented.

As to topics for discussion, among others we may lay emphasis on eugenics and on social conditions without neglecting other important and professional topics. A study of the conditions of infant welfare in rural communities would offer a novel and important topic.

It is sometimes said that our philanthropy is producing more misery than it relieves when it attempts to save the life of feeble and short-lived infants. Our answer to this is that we cannot

carry the responsibility of neglecting the life of any human being, no matter how feeble or unfit. When, however, the burden of support is accepted by private relief the question of eugenics and social selection arises. When the community is required by considerations of humanity to save and support feeble human creatures, it acquires by that very responsibility the right to segregate the unfit, and while treating every ward with mercy and humanity to see that those thus supported do not become parents. Thus we have the reconciliation of our philanthropic impulses, which we desire not to destroy by neglect, and our scientific vision of the progress of the race, which has equal or even higher claims upon us. It is true we have much to learn by further investigations of specialists and experts, but we already have the responsibility of a large amount of knowledge which has not yet been put to practical use through the institutions and agencies of society.

While the responsibility of organizing and conducting the Conference during the coming year is very serious, it is also a joyful and hopeful opportunity for any man and worthy of one's best powers and endeavor.

To this twofold task of investigation and of education of the public we address ourselves with all confidence, with the spirit of co-operation and good-will and with hope of large success.

REPORT OF THE EXECUTIVE SECRETARY

The American Association for Study and Prevention of Infant Mortality ends its first year with an enrollment of 500 including 3 life members, 10 sustaining members, and 33 affiliated societies. Thirty-two States, the District of Columbia and Canada are represented in the membership lists, the greatest concentration being in the Eastern States and especially in the cities in which organized preventive undertakings are under way.

The Association is a direct result of the Conference on Prevention of Infant Mortality, held by the American Academy of Medicine at Yale University, November 10 and 11, 1909. It was organized at the close of that conference, at a specially called meeting, held at Lampson Hall, Yale University, November 13, 1909. Headquarters were established in Baltimore, and the executive office was opened January 3, 1910.

The work of the year has been directed along three lines—the collection of information in regard to conditions in this country; the exchange and distribution of such information; the stimulation and extension of an enlightened interest in the extent of the preventable infant mortality in the United States, and the possibility of reducing it. This has been made possible by the cordial co-operation of the affiliated membership, and of other undertakings, public and private.

The educational campaign has been carried on by means of circulars and press bulletins, issued at intervals during the year. Material has also been supplied to persons who were preparing reports or special articles on some phase of the problem, for magazines or other publications. Through the courtesy of the Associated Press and other press services advance abstracts of the papers to be read at the annual meeting, have been distributed to the newspapers throughout the country. The number of copies asked for by each service is as follows:

Associated Press	900
United Press	450
International News Service	200

Early in the year, in response to requests for definite suggestions for preventive work a pamphlet was prepared with the assistance of the committee on nurses associations and social workers. Five thousand two hundred and thirty-one copies of the circular were distributed, and an especially promising feature of this part of the work was the use made of the pamphlet

by teachers of hygiene, of sociology or of home economics, in a number of colleges and universities.

According to the constitutional requirement, one-third of the directorate must be non-medical, and two thirds medical. The membership enrollment is about equally divided between medical and non-medical members. The correspondence files show that inquiries have been received from physicians, health officers, trained nurses, social workers, and teachers—men and women who have approached the problem from all view points.

The income of the Association has amounted to \$5,095.00. It has been derived partly from membership dues, and partly from contributions. The banking house of Alexander Brown and Sons has served as the custodian of the funds, and the disbursements have been made subject to the order of the president and treasurer. A part of the expense of the exhibition, amounting to \$500 was assumed by the Baltimore City Department of Health, and by the Maryland State Department of Health, and does not appear on the books of the Association. The rest amounting to \$1,205.17 was met out of a special fund. The general expenditures have amounted to \$3,220.00.

Of necessity the year has been one of preparation and pioneering. The "staff" has included two people—the executive secretary and one assistant. The second year should show larger results in the way of more widespread interest in the movement, increased membership, representing every section of the country; reports of investigations undertaken, and of preventive activities begun.

The latest report of the U. S. Public Health and Marine Hospital Service shows that there are only about 28 cities in the country in the class containing 20,000 or more population, in which definite preventive activities are under way. With two exceptions, these are under private auspices, and the municipal health department which definitely recognizes its responsibility to its potential citizens, is the exception rather than the rule.

So long as there are communities in which the birth registration laws are not enforced; in which no inquiry has been made into the midwife problem; in which no thought has been given to the necessity for the education of the expectant mother; or in which the relation between the high infantile mortality of the summer months and the lack of supervision of the milk supply, is ignored; so long there will be need for an Association for the Study and Prevention of Infant Mortality.

In view of the limited resources at the command of the Association, I would like to suggest that each member of the Association be asked to resolve himself or herself into a committee of one, for the study and improvement of conditions in his or

her own community; and for the purpose of increasing the interest in the national movement.

The present enrollment is distributed as follows:

Arizona	1
California	6
Colorado	2
Connecticut	13
District of Columbia	6
Georgia	1
Illinois	14
Indiana	3
Kansas	1
Kentucky	6
Louisiana	3
Maine	2
Maryland	84
Maryland—Contributors to Exhibition Fund	74
Massachusetts	20
Michigan	5
Minnesota	3
Missouri	6
Nebraska	1
New Hampshire	1
New Jersey	12
New York	58
Ohio	45
Pennsylvania	106
Rhode Island	8
South Carolina	2
South Dakota	1
Texas	1
Utah	1
Vermont	2
Virginia	5
Washington	1
West Virginia	1
Wisconsin	3
	<hr/>
Canada	498
England	1
	<hr/>
Total	503

In connection with the membership and educational campaigns 11,000 pieces of mail have been sent out. This has included 2,741 personal letters, 3,995 circular letters, and 24,432 circulars. The detailed report of the correspondence follows:

Total number pieces of mail sent out	11,000
Personal letters	2,741
Circular letters	3,995
Packages	136
Printed matter:	
Membership pledge cards (reply postals)	3,995
Circulars No. 1	2,975
Circulars No. 2	2,450
Circulars No. 3	4,950
Nurses and Social Workers Circular	5,231
Preliminary Programs	4,149
Advance Programs	4,677
Copies of Constitution and other printed matter	1,244
Press Bulletins and Special Notices	953
Press Copy, advance reports addresses annual meeting to press services	1,550

November 9th, 1910.

Respectfully submitted,
 GERTRUDE B. KNIPP,
Executive Secretary.

REPORT OF THE TREASURER

January 3rd to November 15th, 1910

Receipts			
Membership dues	\$2,136.00		
Contributions	2,100.00		
Exhibition fund	609.00		
Exhibition and annual meeting (special).....	250.00	\$5,095.00	
Expenditures			
Rent	200.00		
Salaries	1,513.00		
Expenditures office (see statement Executive Secretary)	390.00		
Printing and stationery.....	666.29		
Postage	235.00		
Furniture	81.00		
Lantern slides, charts and office supplies.....	84.85		
Traveling expenses	50.00		
Exhibition	100.00	3,320.14	
Balance on hand November 15, 1910....			\$1,774.86
Total receipts and payments for the Exhibition were not completed until after November 15th. The final statement of the Exhibition Fund shows			
Contributions received	\$1,324.00		
Expenditures	1,205.17		
Balance		\$118.83	
	AUSTIN McLANAHAN,		<i>Treasurer.</i>

EXECUTIVE OFFICE ACCOUNT

DR.

Received from the Treasurer to Nov. 15, 1910.....\$ 390.00

CR.

By expenditures for			
Postage and stationery.....	\$ 104.50		
Clerical help	80.76		
Office supplies	45.39		
Books, etc.,	42.38		
Janitor and messenger service, carfare, telegrams.	39.27		
Multigraphing, Mimeographing	34.50		
Rental of typewriters.....	13.75		
Expressage	10.55		
Clipping service	10.71		
		381.81	
Balance on hand Nov. 15, 1910.....			8.19

GERTRUDE B. KNIPP,
Executive Secretary.

OPENING SESSION

Wednesday, November 9, 8.15 P. M.

**THE DUTY OF A NATION TO ITS
POTENTIAL CITIZENS**

CHAIRMAN

**J. H. MASON KNOX, Jr., M. D., President of the American Association
for Study and Prevention of Infant Mortality**

INVOCATION

By His Eminence, JAMES, CARDINAL GIBBONS

We are assembled tonight in Thy name, O God of mercy and Father of all consolation. We recall to mind that when Thou didst live upon this earth, Thy mission was one of mercy and of humanity to those that suffered. Thou didst exercise Thy Divine power in going about doing good to all men, giving sight to the blind and hearing to the deaf and speech to the dumb and strength to the paralyzed limb. Thou didst cleanse the leper. Thou didst perform all these acts of mercy in the cause of suffering humanity, and those that are here this evening in the medical profession, Thy servants, they also are consecrated to the sublime mission of alleviating human suffering and physical pain.

Thou Who art the author of life and of strength, grant to them that supernal wisdom so that they may perform, in the exercise of their profession, miracles of science. May they control diseases, alleviate sufferings, and, above all, give them the power to preserve and prolong the lives of infants, those little waifs who are so dear to Thee Who hast regard to the sanctity of human life. Thou didst love and cherish the child, and that Thou didst say, "Suffer the little children to come unto Me, and forbid them not for of such is the Kingdom of Heaven." And may Thy servants assembled here tonight be impressed with the conviction of the sense of their responsibility and with this thought, that never do they approach so near to the Divinity as when they alleviate suffering humanity; never do they prove themselves more worthy to be called the sons of God than when they bring light to chambers that are darkened by sorrow and cause the flowers of joy and of gladness to bloom forth in hearts that were dark and desolate before.

"Our Father, Who art in Heaven, hallowed be Thy Name. Thy kingdom come. Thy will be done in earth, as it is in Heaven. Give us this day our daily bread. And forgive us our debts, as we forgive our debtors. And lead us not into temptation, but deliver us from evil. Amen."

Letters from the President of the United States and from President Remsen, of the Johns Hopkins University, were read by Dr. John S. Fulton.

The letters follow:

THE WHITE HOUSE

Washington

November 2, 1910.

My dear Dr. Knox: It is a source of real regret to me that I am unable to attend the opening meeting in Baltimore of the American Association for Study and Prevention of Infant Mortality on the evening of November 9, but on that date I shall be leaving for Panama.

It is not possible to overstate the far-reaching importance of the question of the reduction of infant mortality. Every man and every woman of every civilized country should feel a deep and personal interest in it. It affects not only the happiness of the home, but the welfare of the nation and the future of the race. The learned men and women who will attend these meetings are fitted to take up this vital question by years of study and experience in medicine and surgery and nursing, in hygiene and sanitation. I commend them for their unselfish spirit in bringing the results of their years of effort to the study of this question, and I hope they may receive the universal sympathy and encouragement to which they are entitled. Sincerely yours,

WILLIAM H. TAFT

Dr. J. H. M. Knox, Jr., President, American Association for Study and Prevention of Infant Mortality, Baltimore, Md.

THE JOHNS HOPKINS UNIVERSITY

Baltimore, Md.

November 6, 1910.

Dear Dr. Knox: It is with sincere regret that I am obliged to decline your kind invitation to be present at the opening meeting of the American Association for Study and Prevention of Infant Mortality. As I have already informed you, I shall be in St. Louis at that time, attending an important meeting of the National Academy of Sciences, for the conduct of which meeting I shall be largely responsible.

I need not tell you that your Association is a welcome guest of the Johns Hopkins University. The fact that we have put so much space at your disposal for nearly a fortnight is convincing evidence of our attitude toward your work. It is our desire to be as helpful as possible. A history of the hall in which you meet would show that many meetings of high importance in the interest of the public good have been held here. When the hall is asked for, the only question we ask ourselves is, Is this for the public good? If that question is answered affirmatively, the use of the hall is invariably granted, provided, of course, that it is not already engaged.

In the case of your Association we did not have to ask that question. There is no question in regard to its usefulness, and we are glad to help you, even though our help consists only in providing the place. This however, is not the only way we are helping you. I note that several of the speakers before your meeting, and the President of the Association, are members of the teaching staff of the Johns Hopkins University. In lending you these men we are helping you more than by lending you our hall.

Wishing you the highest success for your Association, I remain,
yours very truly,

IRA REMSEN

Dr. J. H. Mason Knox, President

ADDRESS BY THE PRESIDENT

J. H. MASON KNOX, Jr., M. D., Baltimore

Honored Guests, Directors, and Members of the American Association for Study and Prevention of Infant Mortality:

LADIES AND GENTLEMEN—In the name of this new Association devoted to the interests of the babies of the country I bid you welcome.

We are met together to consider one of the gravest problems that can confront a commonwealth, namely, the problem of conserving its future citizens. Badly stated, we have reason to believe that in the United States upward of 300,000 deaths occur each year under 12 months of age out of a total infant population of one and a half million. That is to say, that one out of every five children born alive fails to reach its first year. The total number of deaths from tuberculosis, the most devastating of all diseases, each year is about 160,000, but little more than half of the number of infant deaths. It is conservatively estimated that at least one-half of the yearly infant death rate is a toll paid to parental ignorance and indifference and can largely be averted. The immediate and thrilling aim of our endeavor, therefore, is the saving of 150,000 human lives a year within the borders of our own land. Surely a goal to enlist the co-operation of every warm-blooded citizen and a sufficient reason for the establishment of a national society!

From the outset it has been the policy of the Association to have its proceedings dictated by sound common sense. The need of relief is most pressing and immediate, it is true, but many of the causes of this large mortality are sanctioned by long habit and protected by well-meaning ignorance. To uproot these causes we know is a work of time and patience. We cannot go further than an enlightened public sentiment will approve. We can only point to the irredeemable suffering and loss which this needless infant death rate is producing and at the same time demonstrate how it can be curtailed, and then await the demands of an aroused popular summons to save the babies. Some years ago Dr. Osler referred to the public as being just awakened to the importance of stamping out tuberculosis; it was, as he said, sitting on the edge of the bed and beginning to take note of the inroads of the

dread malady. In these few intervening years what tremendous progress has been made! Hundreds of State and private sanatoria have been built, and thousands of physicians and nurses are devoting themselves to the prevention and care of this disease. But undoubtedly the most hopeful evidence of ultimate success is the widespread diffusion of knowledge among the people generally of the danger of tuberculosis, and of the means by which it can be prevented and cured.

Along similar lines must our special campaign for the babies be waged. The pivotal point is the mother. She is the natural caretaker of her baby. She must be instructed in the absolute necessity of providing her baby during its dependent and helpless state with such food and surroundings as are compatible with health and life, and we who know and have must see to it that we share with her our knowledge and means until her baby as well as ours really enters into the possession of its birthright, namely, the right to live, now so often denied it.

Is it right that the mortality rate for infants under 1 year is higher than for any age period up to 95 years, when it is much lower for babies nursed at the breast and for the bottle-fed babies of the well to do? This is because while we are properly caring for our own babies we are indifferent to the cries of the many Rachels among the poor. The law rigidly protects the life of the unborn child and promptly proclaims it murder when it is intentionally destroyed. Can it be called anything less when the newly born infant is permitted by the public to live under conditions which just as surely if a little more slowly destroy its life?

At the sessions of the Conference which follow the various factors which are most harmful to healthy infancy will be severally discussed and the most successful means of controlling them pointed out.

It will not be considered an invidious distinction if in this public meeting reference is made to two or three subjects which our Association thinks to be of outstanding importance and which will be considered in detail at the subsequent sessions. And first of all, we consider it fundamental in attempting to combat this widespread infant mortality to have more *accurate vital statistics*, and, particularly, prompt and uniform registration of births. It is impossible to determine the proportion of babies that die, to the total number of children, without knowing the number of births. All statistical data in this country is more or less shrewd conjecture and inference. In no State in the Union is there a satisfactory registration of births. There is a woeful lack of uniformity in our State laws. We are nearly the only civilized country in the world where this dearth of accurate statistical data prevails. Many of the countries of South America are far

ahead of us in this regard. The children of the immigrants coming to our shores from Europe can furnish much more satisfactory evidence for the date of their birth when applying for school privileges, or the right to labor, than can our own children. It has often been said that we have better records in this country of our blooded cattle and horses, than of our infant population. We hope that all those who attend this conference will see to it that the births occurring in their families are duly registered at the Health Department, and that they will remind the busy and sometimes neglectful physician of this important duty. The notification of the fact of birth within a few hours, which is to be distinguished from the fuller registration of the child's name with that of its parents, etc., is absolutely essential in many instances to secure the visit of nurse or social worker and physician in time to avert illness or blindness or to save life.

Emphasis will also be laid during the conference upon the importance of maternal nursing. This natural sustenance is the inalienable right of every infant, and should not be withheld save in very exceptional circumstances. One has only to visit in the homes of the working classes to realize that the mother who is forced to raise her child on the bottle embarks on a most uncertain sea of troubles, and the death rate among such artificially fed children is notoriously high. The truth is that the feeding of a young baby on anything but its mother's milk requires an unusual degree of skill, intelligence and attention extremely difficult for the overworked mother to provide, and when to this is added the uncertainty of the purity of the cow's milk and the inadequate nourishment of condensed milk and proprietary foods the baby's troubles are greatly increased. It is a well-known fact that weaning is resorted to in this country far more frequently than is necessary; that in many cases a little skill and perseverance on the part of the physician will secure to the baby its proper nourishment for many months. Certainly, if breast nursing could be provided during the first six months of every baby's life, our infant mortality statistics would be greatly reduced. It is hoped that you will carry away with you also as a result of the conference knowledge of the large place that education plays in the problem of saving babies. Instruction is sorely needed immediately and at first hand in the homes. It is here that it seems to me the well equipped and devoted trained nurse has a large sphere of opportunity. She enters the home as a tactful and womanly friend, and generally finds a hearty response and a warm welcome from the mother.

But the educational feature should have a still larger outlook, and instruction on many of the questions we are now discussing should be a part of the curriculum of our normal schools and

female high schools. In this way the future mothers of the country would enter into that sacred relationship with some idea of its duties and responsibilities.

Many other topics of almost as much importance could be touched on if time permitted. The value of milk stations and of mothers' meetings and of carefully planned exhibits must be mentioned.

Certainly we are at the beginning of a movement which will not rest until the preventable deaths among this most dependent portion of our population are controlled.

A word or two in closing as to the activities of this National Association during the past year. It was established as the result of a conference called by the Academy of Medicine, in New Haven, in November, 1909. A permanent office was opened in the Medical and Chirurgical Faculty Building, Baltimore, in January of this year. From that time more than 500 active members have been enrolled from 30 States and from Canada, and 30 organizations have become affiliated members. These include milk dispensaries, child-helping societies, social settlements, health departments and similar organizations. We have thought that our principal field for the first year lay in educational propaganda carried on by means of literature, circulars and the public press. More than 8,000 pieces of mail have been sent out from the office, and 22,000 circulars and leaflets have been distributed. The office has been a clearing house of information concerning all matters pertaining to the improvement of infant life and has brought many activities in various parts of the country in touch with each other. The strength of the American Association for Study and Prevention of Infant Mortality lies in the interest it has aroused throughout the country on behalf of the baby and in the cordial assistance it has received from all forces already interested in public health and social betterment.

SOME CHECKS TO INFANTILE MORTALITY

By M. JUSSERAND, Ambassador Extraordinary and Plenipotentiary
from France to the United States.

When I began my diplomatic career many years ago, one of the first Secretaries of State under whom I worked was a very old and wise man. He was an octogenarian and had practically spent his life in company with Aristotle, devoting his spare hours to translating the works of the great thinker. He used to say to all of us: "Young men, society has existed for centuries and centuries. Think of how much it has done for you; you inherit the wisdom of ages, the beauty of ages, the learning of ages, the experience of ages. Whatever you do you will never be able to compensate society for what it has done for you. There is at least one thing you should strive to do for society, that is to continue it."

What your Association aims at, is simply an application of the remarks of that old French sage, Barthélemy St. Hilaire, you strive to continue society.

The problem is a grave one. Throughout the world a marked decrease is noticeable in the rate of births. The exceptions are few, the most striking one being the French of Canada, with their fine families of innumerable healthy children. Some will think, but is it really necessary that mankind should increase? The answer is simple. What do you think of your ancestors? Have you any fondness, any respect for them; any admiration for the principles they have handed down to you? If you have, then hand those principles, with your blood, down to your children, and having children, keep them healthy. Do not allow the whole earth to go to the children of others.

There is no doubt as to the importance of the problem. It is a grave one in France, not, however, as sometimes said, a desperate one. I am sure you will hear with pleasure that the last statistics concerning my country show that during the last six months the number of births has been 21,000 over the number of deaths, which in these days is a kind of record with us. One thing, besides, to be taken into account when forming a judgment is that France is very thickly populated, and such a factor in the problem is to be reckoned with. I remember once talking with a Brazilian friend of mine of the growth of his country and

of its future. He said: "What we want is population; we want immigration." "Well," I said, "there is another means of having population, and it is indicated in the Bible, 'grow and multiply.'" He replied: "Well, you know, in Brazil we admire France so much that we follow your example and we have ceased to have large families." I answered: "Quite right, follow then the example of France, but follow it closely, and when you have near 200 inhabitants per square mile, take a rest if you think fit, but as long as you have only six per square mile you need have no fear of outstripping us."

The situation in France is, therefore, not one of absolute alarm, but it is a serious question none the less, death and life in certain years being almost equal. France, as you may know, is a great producing, but it is more especially a great preserving country. The question of infant mortality could not fail therefore to draw the attention of some of our best men. About 20 years ago Dr. Budin, to whom your chairman has just paid a well-deserved tribute, started a movement of paramount importance for France, I may say for the world. His idea was very simple, it was almost obvious, as are many great discoveries. He observed that physicians took care of the mother and let the infant child take care of itself. The result of this system has been such and the mortality so great that our scientists acknowledged then that between a man of 90 and a child of 1 day the chance of living one week was in favor of the man of 90. In many parts of the country out of two children one was sure to die; in the more thickly populated industrial quarters in certain cities out of three children two were sure to die. Dr. Budin thought that the thing to do was first to learn, secondly to teach. He studied with the most thoughtful care what could be done and then set to working and teaching. He thus came to establish his "Consultations for Nurslings," which have done wonders. Mothers come again and again, every week bringing their young children; the children are examined and the mothers are instructed how to rear their offspring to strong, healthy man and womanhood, and produce citizens to enjoy a useful life. He especially taught that obvious thing, which, like so many other obvious things, had been generally lost sight of once more; for when a thing is obvious no one deems it worth while to think of it, and so it may become forgotten and have to be discovered again. The reasserted doctrine was that children were meant to be nursed by their own mothers, that the use of the best cow's milk, and the most scientifically prepared, could not compare with the mother's milk, itself much better than the milk of somebody else's mother.

None the less, there are cases when recourse has to be had to cow's milk; mothers were taught then what sort of sterilized

milk they should employ, and so, along that line also, many children were saved. All this was simple enough, but it was as practical as it was simple, and its results were so beneficial that the system soon began to be imitated throughout the country and out of it. When its far-reaching results shall have been gauged France will be as proud of Dr. Budin for his good work as she is even of the discovery of the most startling inventions made by any of her sons in the realm of science or industry.

Other attempts are being tried in France with the same object of preserving life, while diminishing the hardships of mothers in poverty. One especially I shall take the liberty of mentioning, because it is perhaps not very well known here. A few years ago a modest family in a small provincial town of France, the family consisting of the father, who had only his professor's salary, the wife and child, lived very happily, when the only child died. Their despair was so intense that their friends feared for their very lives. The man and wife, however, were no weaklings; they considered what they should do, and decided that since their duty was to live and they no longer had any child of their own they would work for the children of others. Many are the women of the poorer class, especially in great cities, who, while they try to nurse their children, fail to nourish them sufficiently, not being properly fed themselves. The bereaved couple decided that they would attempt to feed mothers and to found establishments where food would be provided free to any mother nursing her child. They were so enthusiastic over the idea that nothing could stop them. They came to Paris, hired a little room, provided furniture, which consisted of one table and three chairs, and pasted up an inscription stating that any woman nursing her child would be welcome and would be fed.

When they started their capital consisted of two dollars, with which they purchased their first provisions. At first no one came. People could not believe it was true. Then a few trusted themselves in and were fed, and the report spread. Kind-hearted men heard of the work and gave money. The two dollars themselves have grown and multiplied, and the work promises soon to be one of the most flourishing among the more recent ones in France. There are now a number of such restaurants in Paris; they have begun to spread to the provinces, and several municipalities have contributed help.

A very little help goes a long way. A meal consisting of soup, vegetables, bread ad libitum, one portion of meat, one bit of cheese, costs 7 cents. Here doubtless, tariff or not, it would be impossible to supply such food for such a price, but by careful management and, especially by attending yourself to the busi-

ness, you too could provide wonderfully cheap and wholesome food for such people as those mothers.

The rules of the establishment are very simple. Any woman nursing a child can come in. She may or may not be poor, she may be anything she pleases, the only thing required being that she have a child to nurse; nothing else is asked of her; no question is put; she is welcome and is fed.

People at first thought that the plan would not work well; that those who had some little means might come and be fed for nothing. But it did not prove so, the reason being apparently that there is not a better, a more earnest specimen of humanity than a mother who nurses her child. Those who come are earnest women who would be ashamed to take a meal when they could pay for it; and it has happened more than once that a woman coming for a month or two would one day say, "I shall not come tomorrow. Now I can work and earn my own living and the baby's." You will, I am sure, join me in wishing God-speed to Henri Coulet and his wife, and success to their work, owing to which by feeding the mother they feed also and save the nursing.

Without insisting on many other works due to public or private enterprise and meant to help growing children, such as "crèches," "pouponnières," etc., I shall only add that one more problem connected with the others has seemed to us of great importance. We have started the teaching of hygiene in our primary schools. In each of them very simple lessons in hygiene are given and cleanliness is enforced. Thanks to a legacy from a kind-hearted citizen some money prizes are bestowed on the most successful teachers. An inquiry was made on the general result of that teaching and a report was sent me a few months ago stating that, of course, it was very difficult to ascertain minutely the effect on such a mass of children scattered all over the country, but that so far as could be seen the result was very good, the effect being that not only the child but also the house of his parents was better kept. It is a case, not yet fully developed to be sure, but yet a case of contagious care and cleanliness.

The outcome of those efforts is already felt and the old tables of mortality have to be corrected. It is no longer true in any part of the territory that out of two children one is sure to die. The length of life has been increased and its usefulness, too.

We are now confronted by the future, and what must we do in the future? Your chairman has very well indicated it with that combination of learning and kindness of heart which betokens the good physician.

What must be done and what might be the motto of your Association can be stated in three words, three words from a

poem written centuries ago. It is not only a question of learning and a question of teaching; one thing more, which has prompted indeed all successful efforts up to now, should be added, and the three words summing up the whole doctrine are: *Disce, doce, dilige*—learn, teach, love.

Ladies and gentlemen, I came from the Federal City tonight not to teach, but to learn, and I have already spoken much more than I ought. I want only to add that one of the reasons for my coming was a desire to offer you good wishes in the name of my nation for the work you are doing. My nation, France, has, you know, a very peculiar feeling for you, and that feeling does not date from yesterday. Bent upon the solution of similar problems, she follows with great attention your attempts to improve the condition of the poor: be assured that her good wishes are on this occasion as sincere as your work is excellent.

Chairman: I am sure I voice the sentiment of the audience and certainly of the Association when I thank M. Jusserand for these very helpful and suggestive words. Certainly it is true that the baby makes the whole world kin.

We have now the pleasure before us of listening to one who is perhaps better known than almost anyone else in this country on many matters concerning the health of the nation. The duty of a nation to its potential citizens will be discussed by Professor Fisher, of Yale University. Dr. Fisher has devoted himself largely to investigations on the subject of public health and has just finished a very important report to the Government on national vitality. I have great honor in presenting to this audience Dr. Irving Fisher, of Yale University.

ADDRESS

By IRVING FISHER, Ph. D., New Haven

There are many evidences today that the interest in the problem of conserving our national vitality is greater than ever before. The study and prevention of tuberculosis is one of these evidences. The study and prevention of the pollution of streams, in which one of the citizens of this city is particularly interested, is another evidence. The study and prevention of the social evil is an important evidence. And the study and prevention of infant mortality is another, which appeals, perhaps more than any of the others that I have mentioned or might mention, to the general public. It is beginning to appeal to the statesman, and even to some extent to the ordinary politician. In New York City recently Mr. Lawrence Veiller, who is our leading authority on housing in this country, wished to get the support of Tim Sullivan for getting better tenements in "Big Tim's" district. He spoke to the politician in regard to the matter and was asked what effect there would be on the district from having better tenements. Veiller replied: "I shall have to admit that it will probably reduce the number of people in your district; but, on the other hand, it will reduce the number of deaths." Mr. Sullivan stopped to think a moment, and said: "I am with you. Those babies' funerals get on my nerves." I think that babies' funerals are getting on the nerves of everybody who realizes what they mean. If we could have pass by our windows as Sullivan had pass by his windows, the funerals of babies that die from unnecessary causes we would begin to appreciate what it means.

In Shakespeare's play, "Macbeth," one of the most effective scenes is where the witches conjure up the ghosts of those who are slain by Macbeth in order to excite in his mind remorse and a sense of responsibility for their death. If some witch or wizard could conjure up the unnecessary babies' funerals annually occurring in this country, we would find that the little hearses would reach from here nearly to Chicago, and if we should add the mourning mothers and friends, it would make a cortege extending across the Continent. I refer not to

the total 300,000 deaths of infants, but to that fraction of the 300,000 which is unnecessary. Out of all infant deaths at least 125,000 need not have occurred if modern hygiene as it is known today were practiced universally. And this statement is not the opinion of one man; it is based on statistics in the report to the government on national vitality, to which your chairman has alluded. I cannot assume the credit for all the data on which this report was constructed; much was obtained from medical experts, who were asked, for instance, what part of the deaths from spinal meningitis might be avoided if modern knowledge in regard to prevention were applied; what part of the deaths from diarrhoea and enteritis in infants under 1 year of age might be prevented, and by means of these data it was estimated that at least 47 per cent. of the deaths in infants might be prevented. That would mean that out of 300,000 deaths something like 125,000 might be prevented. No one who once can conjure in his imagination the immense amount of needless deaths, and particularly of needless infant deaths, would need any further argument as to the importance of this movement. And yet the public are, it must be confessed, on the whole as yet somewhat apathetic, and it is apathy rather than opposition to the movement with which we have to deal.

There is another sort of opposition which should be mentioned, although it seldom expresses itself. I find certain philanthropists, who think they are more far sighted than others, who maintain that this prevention of infant mortality is really "against the law of natural selection." A prominent philanthropist confessed to me that, while he wouldn't like to be quoted, he believed we were merely attempting to prolong the lives of the weak and to increase the miseries of the poor and thus reduce the average of the vitality of the next generation. If I believed this to be true, personally I should oppose the movement to prevent infant mortality, for I do not think any considerations of sentiment for the present generation should betray us into the mistake of bringing about worse evils for future generations; but I am sure a careful study of the situation will show that this argument is fallacious, that really we are not interfering with natural selection, but that this movement aims to remove the interferences with natural selection which modern civilization has created. It is not a feature of natural selection that babies' milk should be adulterated or contaminated with germs. Nature gave infants as their birthright their mothers' milk, taken directly from the breast and without a chance for contamination, without 100 miles intervening for the milk man to bring it. It is their natural food, uncontaminated with germs or with polluted water. Now we have to deal with artificial conditions. Artificial

substitution of cows' milk, with the resultant opportunities of adulteration and contamination, has interfered with nature. The movement for the prevention of infant mortality amounts in the end simply to this—to give back to the baby what is the baby's natural birthright, namely, pure milk and pure air.

It would be an ardent disciple of the theory of natural selection who would maintain that to poison all infants is a good way to eliminate the unfit. If this is true, we would better abandon modern hygiene altogether, abolish sanitation and quarantine, and rejoice at the readmission of the bubonic plague, yellow fever and smallpox, as well as the great increase of infant diseases, which would speedily ensue. According to this logic, India with its famines, plagues and life span only half as great as ours, is far more conducive to progress than Western civilization. The truth is that the elimination of disease acts both directly and indirectly toward the improvement in health and vitality, not only of the present, but of succeeding generations. Instead of going back to primitive conditions we ought to go forward. It is sometimes said that the cure for the evils of democracy is more democracy. And it is likewise true that the cure for the evils of civilization is more civilization.

We are confronted with a special condition at present, which makes this movement to prevent infant mortality almost indispensable for future generations; that is, the decreasing birth rate due to voluntary causes. We cannot understand the problems of infant mortality unless we take into consideration the problem of births. A small birth rate requires a small death rate, or else a dwindling population. In countries like France, where the birth rate is small, there is an especial danger of depopulation. This is an important problem not only in France, where the density of population is great, but all over the world today. We do not realize it here because we have no statistics of births. The true evolutionary progress seems to be in the direction of vital economy by decreasing the death rate and the birth rate at the same time. The statistics of Yale University show that the number of children of graduates does not equal the number of the parents; that is, the graduates of Yale University are not reproducing themselves. And this is not confined to my own alma mater, but is true of all colleges where statistics are obtained. The natural order is that we reduce the birth rate and reduce the death rate also. It makes for economy; it makes the birth of a human being a more important event, and it makes for the conservation of the life that is born. This seems to be the law of biology. In the progress of animal organisms there seems to be a tendency to a general reduction both of the birth and of the death rate. The female mackerel lays some 50,000

eggs, out of which on the average only two live to reproduce. As we rise in the scale of life both the number of offspring and their mortality are enormously reduced. In general the higher the form of animal the less the waste in producing children merely to be destroyed and the greater the energy remaining for personal and race development. Aesop recognized this in the fable of the Fox and the Lion. The fox was taunting the lion about having so few children, and the lion replied: "Yes, but every child is a lion." In the larger animals the birth rate is smaller, and as civilization progresses it should be smaller; it makes for economy; it means less drain on the resources of the people, and particularly on child-bearing women. There are a smaller number of children and a smaller number of deaths among those children. The conservation of infant lives is but part of the problem of the conservation of all human life, and the statistics to which I have alluded, when applied to all human life, show that the average duration of life in this country might be prolonged at least 15 years if we simply applied our knowledge of hygiene. As to how this is to be brought about, there will be much discussion during the next few days of this conference. I would like, however, especially as the chairman has alluded to the matter, to speak particularly of one movement—the movement for a National Department of Health. In foreign countries the governments have done more in the matter of conserving vitality than in this country, but in this country the movement toward establishing a National Department of Health has made steady progress. We have now the indorsement of the President of the United States for this project, also the indorsement of a number of far-sighted and patriotic Congressmen, as well as a large majority of the medical and hygienic organizations, but there are some active organizations of the United States opposing this department, and it should be understood by all who are advocating the reduction of infant mortality that this is not merely a question of academic or scientific value, but it is a question of putting a value on human life above the commercial values of certain interests. The problem of special interests seems to get into legislation wherever philanthropy is concerned, and even this movement toward a National Department of Health has encountered such opposition. A few months ago a Mr. Charles Miller, who has at heart the destruction of this effort to establish a National Department of Health and who was alarmed at the progress he saw made at the hearings in Washington, appeared before a meeting of a live stock association trying to get them enlisted in a fight against a Department of Health. On what ground? That such a department might interfere with their freedom in regard to transportation

of polluted milk; it might require more stringent enforcement of laws toward inspection of dairy herds and the destruction of tuberculous cattle, and, in general, the laws regulating the protection and cleanliness of milk. There is now existing a so-called league for medical freedom; that is, freedom to practice medicine for those who do not know how to practice medicine; freedom to pollute the foods of infants. There is no question in my mind that the issuance by the Department of Agriculture of the bulletin showing how much of our infant mortality is due to soothing syrups has had much to do with stirring up commercial opposition to a National Department of Health. It remains for the people of the United States to say whether the commercial interests of those who produce the food for babies are to be put above the valuation of the babies themselves. And if the Department of Health when established shall have had the effect of restricting the freedom of those who would like to put into the stomachs of babies what is bad for the babies, it will have had for one of its results the reduction of infant mortality.

Dr. Knox: I am sure we are grateful to Professor Fisher for his careful analysis of our problem and for indicating what a large factor it is in the general health of the country. Our Association will be glad to work with Professor Fisher in his effort to secure legislation necessary for the establishment of a National Department of Health.

Now we have before us the additional pleasure of hearing about babies from one who has known the baby longer perhaps than anyone in this country. None of us who is interested particularly in pediatrics think we can decide any question without first going to hear what Dr. Jacobi has to say about it, and we do not feel like saying the last word on this question without asking his advice. It is with pleasure that I present Dr. Abraham Jacobi, of New York.

ADDRESS

By A. JACOBI, M. D., New York

In the official program of this Association I read as follows: "The definition of still birth varies from time to time and from place to place. Infants of days or of weeks may be counted as still births. Frequently no publication is made of the numbers included under the title 'Still Births.'" Another paragraph says: "Deaths of infants 2 weeks old or under *may be*, and in some cities *are*, thrown out of the mortality account."

What I want you to do is to ask any woman who has waited a year, or five years, or ten, for the final consummation of her anxious loving hope, to what extent she consents to agree with the cruel definition displayed in your program. Her tears or her trembling lips will tell her tale of woe. The physician, however, and the registrar may give you the approximate number of prematurely cut-off human entities, and estimate the loss experienced by mankind through the death of babies who might have been spared and might have enjoyed and utilized the existence to which they had a legitimate claim.

Excesses of infant mortality are not limited to advanced months, in which the question of proper and wholesome nutriment commands the attention of the physician, the statesman and the philanthropist. On the contrary, the highest infant mortality is observed in the first few weeks of life, when the physical connection of the new creature with its mother has just been severed. Its body, its blood and nerves are mostly the results of inheritance. The future of the body was determined in the womb. It depends on the functional and organic constitution of father and mother. *Their* health furnishes healthy infants; *their* debility or contamination a feeble or contaminated offspring. Inheritance is a powerful factor in the formation and health of the baby. That its nose or ear, its walk or its stature, is inherited is a recognized fact. In the few minutes at my disposal I may therefore merely be permitted to conclude that the diseases and frailties of the parents will be reproduced, actually or potentially, in the offspring; not always in the same form, it is true, but frequently with such predispositions only

as will disturb the equilibrium of the functions of the organs. Parents, with hysteria, or epilepsy, or other nervous diseases, with diabetes, alcoholism, criminal instincts, or other forms of insanity, insure dispositions to kindred, if not the same, affections.

Syphilis is fatal to the embryo or fetus, dangerous to the baby who frequently succumbs to its ravages within a few days or weeks. In spite of the God-sent Paul Ehrlich, who promises to eradicate the disease, generations will still suffer from it, and the baby's health and life will still depend on the complete recovery of both father and mother, and on the appropriate and energetic treatment of the new-born. That is how they may and will be saved. Tuberculosis in the mother will only predispose the baby; open tuberculosis will directly infect the nursling,—it may be, the first day or week. Local inflammations of the womb are frequent causes of malformations,—aye amputations, aye monstrosities in the baby; that is how its health and life depend on the treatment and care of her who is to be, after years, perhaps, a mother. So individual caution of the present generation will or may, and must, safeguard the existence of the new-born that is to be. In that connection it should be known, however, that consanguineous marriages do not deserve the blame attached to them. Two healthy parents are entitled to and will have healthy children; it is only the disease, or vice, or incompetency of one or both that is procreated, or even exaggerated, in the new creation. But individual foresight alone does not suffice. It is the duty and the privilege of the commonwealth to see to it that marriages among the unfit or dangerous are prohibited. The watchfulness of a parent over a child is not more justified than the watchfulness of human society over its members. Marriages are not permitted between the immature even now; they should be prohibited among the advanced tuberculous, the insane, the incurable epileptic, the hopeless criminal. The laws of Colorado, California, and Indiana justify and even enact the practice of surgically rendering the propagation of the physically and morally unfit a physical impossibility.

Look at the present generation. Women underclad, underfed, overworked, cannot bear infants endowed with an organism fit to stay; factory children with no light, no air, no resistance, grow up, if at all, to ages in which they are permitted to procreate their kind. Their poor kind it is, only poorer. They are themselves wasting, their infants die. A few statistical facts lately collected are as follows:

In Bremen, Germany, 30 per cent. of the women occupied in wool spinning are consumptive; of cigar makers, 37.5 per cent. Amongst those who are married, beside the time required by

confinements, the days of sickness are 70 per cent. larger than those of the unmarried. Girls of 16 work 11 hours a day, interruptions not being counted. Women with child work to the last day possible, and have beside some domestic work to do; their food is scanty and improper, their bodies over-tired and defective. The law orders a recess of six weeks after confinement but it is rarely obeyed. That is why in Hanover 10 per cent. of all women working in factories have pelvic diseases. In England, of 77 married women employed in lead factories, 15 had no children, 35 had 90 miscarriages; of that number 15 never had a living child; 36 others had 113 living children, 61 of whom died very soon. We out-Herod Herod. One woman had 8 miscarriages; of her 4 living children, 3 died very soon. The average percentage of stillbirths in Switzerland was 3.91; among factory women, 8.2 per cent.

Women working at home are worse off. Their constant labor at the sewing machine undermines their health; seamstresses develop anæmia, tuberculosis, and consumption, pelvic irregularities and diseases; cigar makers who work at home—such as they call home—reap consumption to the amount of 90 per cent. That kind of work and distress begins when puberty is not, or is barely reached. Such is the kind of woman who, while living in dwellings without air and light, and full of dirt—bears children that are starved before being born, infected with hereditary diseases, and destined to be born only to perish. And children, frequently not far removed from infancy and fed on coarse material, are forced to work—an impossible task—school or no school, until 9, 10, and 11 o'clock at night. Laws intended to protect them are disobeyed whenever possible, and wondrously possible it is. They, too, are expected to be men and women and to elevate the citizenship of the future. What they accomplish is to populate asylums, hospitals, protectories, penitentiaries, or the streets, or the cemeteries.

The number of babies that die in the first week or two is very large. The death rate should be lowered by expert knowledge and stubborn attendance. Forty years ago I sat with a newborn, whose nose was obstructed by adenoids and hypertrophic nasal mucous membrane, for three days and nights—no nurses being accessible in antediluvian times—cauterizing its nares and keeping its mouth open to allow it to breathe. No undertaker's bill in that case. Congenital debility can mostly be prevented by attending to the parents. The healthy generation of today secures a healthy one tomorrow.

Mismanagement of labor kills many babies. Fractures of the upper arm or clavicle, or thigh, should be avoided. Paralysis

of an arm contracted during birth is an affection difficult to heal. Wounds of the scalp, the shoulder, the nares, and other parts of the surfaces may lead to blood poisoning. Many die of them. They should be avoided; they can be avoided in goodly numbers. Nor are we at the end of our possibilities. A contracted pelvis that will permit a baby to be born only with wounds and fractures, and interrupted circulation and sepsis, and the almost positive certainty of death within a few days, may be circumvented in future by cæsarian section. A few weeks ago I listened to the reports of an obstetrician in country practice who saved practically every one of 11 cases—women and infants—by that operation. It warms your heart to learn things that never were done before and never must be omitted in the near future.

Many babies die of asphyxia, or, what is worse, they contract paralysis, epilepsy, or idiocy for life. A few moments more or less in which the baby does not breathe and cry may determine its future. In hundreds of cases of idiocy in small children I have asked my usual question, and received the unanimous answer that the doctor or midwife was absent, or they had to work over the baby before he cried—with the result of convulsions, or stiffness, or sickly smiles after months only. Sure they would better be dead. But asphyxia has no right to exist, either to kill or to maim.

The blood vessels of the baby are very fragile; hemorrhages, large and small, are frequent. Pressure on the head, on and within which the vessels run in very superficial grooves, causes blood to burst through under the scalp with no, or very little, danger to the baby; or in the cavity of the skull, with great danger to health or life. In most cases they are the result of protracted labor. That can be avoided.

Many newly-born have died from so-called melæna—large amounts of blood being vomitted or passed. They were often considered unavoidably fatal—and the babes did die, almost every one of them. Some depended on ulcerations in the infant stomach, caused by the curdling of blood in the smallest blood vessels under the influence of a diseased heart. Many cases are caused or sustained by the lack of coagulation of the infant blood. But within a year Dr. J. E. Welch, of New York, has taught us how to save many by the injection of blood serum taken from some adult, thereby adding to the defective infant blood a ferment which renders it more coagulable. There is new knowledge which is new power. A number of such new-born babies have been saved from certain death this very year; almost all such cases will be saved in future.

Many a cause of death may be avoided. Cold bathing, which prevents or defers reaction; hot bathing, which scalds the skin; improper washing and rubbing the baby's mouth, during which the mucous membrane is corroded; wanton squeezing of the baby's breasts—will give rise to microbic infection and cause sepsis, either in the shape of erysipelas or general blood poisoning—just as the contact of a baby's eye with a certain infected pus may produce blindness or prove fatal. Know the vicious mistakes, and avoid them, and the babies will live, and your infant mortality diminish.

Mortality is also increased by the belief prevalent amongst all to whom it should not concern that it is natural and even wholesome for the new born to lose weight. What you may admit is that a loss of five or seven ounces of weight during a few days may be balanced on and after the third or fourth day. It has been stated, however, that if the tenth day restores the weight to the original, all is well. All is not well. Urination, perspiration—insensible or not—and respiration will abstract water, with and without salts, from the circulation and dessicate the tissues. Ignorant treatment with honey, castor oil or rhubarb adds to the danger. The loss begins on the first day. Some food and plenty of fluid should be introduced. Some prominent German children's doctors, I might use the name specialist if I could convince myself that specialist sounds or is better than doctor—Czerny and Keller—advise to treat the baby on tea and saccharin. Why tea and saccharin? water is better. Better for other reasons also. The kidneys of the newborn have small impervious capillaries, but large arteries. That predisposes to insufficient circulation in the soft embryonal organ. Asphyxia or congenital heart disease add to it. Now, inflammation—Bright's disease—is quite frequent in the newly born or quite young. On and after the second day of life—for a week or more—the urine often exhibits yellow sand, consisting of uric acid. Water is required in plenty to wash it out. If any of that sand remains, stones will form—indeed kidney stones in the very young are not at all infrequent, or the kidney tissue is irritated so that blood may be admixed to the urine. Not to give sterile water frequently to the newly born, provokes illness and possibly death. Now as you are bent upon removing infant mortality, you may possibly heed me. To me and to many babies, the knowledge of the need of water has been a source of gratification since Virchow published his paper on "Uric Acid Infection," nearly eighty years ago. Disease of the kidney, moreover, causes intestinal disease; while, on the other hand, intestinal disorders, mainly in the very young, cause disorders of the kidneys.

Now, ladies and gentlemen, whatever is presented to this Association for the Study and Prevention of Infant Mortality should be useful. Our father, Benjamin Franklin, claimed that no philosophy was justified unless it served some purpose. I want, you want, none of the numerous new-born babies to be lost that can be saved. And many, most of them, can now be saved. To give up a new born merely because it seems to be feeble and unpromising, is preposterous. Kant, Goethe, Helmholtz, are reported to have been puny waifs whose lives were despaired of. Being saved, they added untold treasures to the intellectual capital of the human race. The opportunities to save the new born, however, seem to be few, or rather have been few, only, mainly among the poor. Thus stillbirths were reported in all Switzerland to the number of 3 per cent.; amongst Swiss working-factory women, however, nearly 8 per cent.—a dead loss of 5 per cent., provided even the 3 per cent. were unavoidable. I am afraid or rather hopeful that many were not.

You will admit that superior knowledge and skill and conscientiousness may save the new born as they do the aged. Now I am quite sure that our young doctors, unless they have had the great luck of being taught in obstetrical wards and practice, learn, if at all, at the expense of the women who bear children, and of the infants that are borne by them. And I fear lest many of us, if not excessively old, remain always just so young. They may be sure I mean no harm, either to them or to myself, for I am willing to admit that I also, in what is sometimes called advancing years, may have preserved or accumulated an unenviable amount of ignorance, to be remedied by my betters or my successors. So I want to offend nobody, but what I want more is that the babies live, and the country thrive through the babies. But our medical schools do not begin to convey adequate obstetrical knowledge and practice to the students. The frivolous remark that doctors want each a cemetery for themselves is not a source of smile or laughter only. Will the time ever arise when practical wisdom that is to save women and children will be attained without cold corpses and hot tears?

Affluence and care and caution, and the services of a medical man and a nurse—the latter with or without an ornamental knowledge of Latin and Greek—I prefer without—surround the bed on which a newly born cry is first received. The number of those, however, who cannot enjoy such privileges, is growing from year to year. The poor go without the safety vouchsafed by knowledge and by means. Their women suffer for want of help, the babies die without it. In New York 200 women are reported to have died of puerperal fever in one

year. Their babies rarely survive when the mothers die. That makes 400. Two hundred cases, however, are not the exact number. I know that this very day, as ever before, the diagnosis of acute Bright, of peritonitis, of pneumonia, is inscribed on the certificates received by the health departments when it should be puerperal fever. And puerperal fever is avoidable; its occurrence is a scandal and a shame in the community—like small-pox or typhoid fever; and no actual precaution is taken to avoid it. Poor agricultural Prussia had its well-informed and trained and supervised and responsible midwives a century ago. There was and is no village in that country without one. We, however, have none that can compare with them. We cling to our prejudices and our indolence. Forty years ago the midwife question was discussed in a large New York Medical Society. One per cent. of the members present voted for instructing, and licensing and supervising them. And this very day the system under which they practice is slovenly and shiftless; no instruction is held out, no examination enforced, and the babies swell—what you are bound to combat—infant mortality of all classes. You do not question where the baby was born; it is a human baby; you do not consider the usefulness or uselessness of a baby after it will have grown up. We never question the right of an individual, though one may be the offspring of the poor, who will struggle and work and add to the wealth of the nation; and the other that of the idle rich that will never learn to work and create, but only to consume. In the roll of humanity the latter is the inferior creature, but before our forum here, and statistically, they are equal. Still, I plead mainly for the millions of the babies of the poor who are excluded from the benefit of a scientific hygiene.

The women of the nation must be healthy else the young will be feeble and sickly. But the vast majority of the confined women in the large cities have no time to recover. Under the law in Prussia, working women are not readmitted to factories within six weeks after their confinement. Then they may allow their forsaken babies to shift for themselves. Those who do not work in the factories work at home, here and there. Tens of thousands get up after their confinement on the third or fourth day to do the washing and the rest. Instead of the two months which is the shortest period in which the organs can become normal, a few days are allowed, with scanty food and no attention, and a household to care for. A woman that has not sufficient time to recover will start and retain her pelvic inflammation and decrepitude. Her present child suffers, and dwindles, and dies; the

future ones, if any there is, will be decrepit when born and are counted amongst the dead.

In New York city there are at best 1,000 beds for convalescents of all classes; \$5,000,000 bequeathed for convalescent homes by an old man who died lately, are contested for the moral reason that they are 5,000,000. The only Mr. Shrader, of Westchester county, N. Y., has proven by the foundation of his Catherine Rest that puerperal women can be nursed to complete health, and their babies preserved like your healthy babies. Let there be a thousand Shraders, and the generation of women with life-long invalidism will soon be extinct, and the babies will no longer swell the ranks of infant mortality. Why do I speak of women and of infants at the same time? Unfortunately, they cannot be separated, they suffer together. The sobs of an invalid woman and the moans of a condemned baby are not heard along the shrieks of a furnace or locomotive.

What did I wish to say? Something very prosy, viz.: If you want to break up the infant mortality of the first weeks of life, see that your young doctors can be made competent and the indigent women supplied with a thoroughly informed midwife. As long as you cannot abolish dire poverty, give no rest to your legislature, none to your health department. No infant fit to live must be sacrificed through the absence of a competent and responsible midwife, who is taught enough of hygiene to prevent fatal mistakes, and enough to know when it is time to send for a doctor.

Chairman: You have all seen from this address how intricate and difficult the problem is and how much it deserves your sustained interest and support.

We cannot discuss any large public problem in Baltimore without having recourse to the last speaker. I hope you will all realize what a piece of altruism it is for Dr. Welch to come here and tell us how to take care of somebody's else children.

ADDRESS*

By **WM. H. WELCH, M. D., Baltimore**

Mr. President, Ladies and Gentlemen: You know it is the old bachelors and old maids who know how to take care of children better than the mothers do themselves.

It is so late that I am sure you will be pleased if I do not extend the exercises very much longer, especially as there is a very entrancing exhibition outside which I know you are all eager to see.

I may perhaps be permitted, as a resident of this city, to reinforce the words of welcome which have already been expressed, and I know that I speak in behalf of my fellow citizens, who are also present, these words of welcome, to the members of this Association, to the guests and others who have been so good as to come here. We wish especially to express our gratitude to his Eminence, the Cardinal; to his Excellency, Ambassador Jusserand, who has brought us these kind messages from France; and to Professor Fisher, who has made himself an inspiring leader of the great movement for the improvement of public health in this country; and I would like especially to impress the note of welcome to my old master and teacher and friend of these many years, Professor Jacobi, of New York.

We are very glad, indeed, to have this first meeting of an Association, which I believe initiates one of the most important campaigns in preventive medicine in this country, in this city, partly, perhaps, because there is no city which needs the influence and benefits which will come from the work of this Association more than the City of Baltimore; partly, also, because we have a certain measure of loyal pride in the fact that that great tuberculosis association, The National Association for the Study and Prevention of Tuberculosis—which, I judge, the name of this Association has followed—had its first meeting in this city, and in connection with it was an exhibition which Dr. Fulton devised and which has turned out to be one of the most interesting and important factors in the whole crusade against

*From the stenographer's notes.

tuberculosis. And I trust that there is a future of lasting usefulness and power before this Association equal to that which has been demonstrated to have been the outcome of the work accomplished already in these few years by the Tuberculosis Association.

There is, of course, no need of my saying anything more than has already been said as to the fundamental importance of the subject of infant mortality. Statistics are tiresome for most people, but, trite as it may be, it certainly is enough to arrest one's attention, no matter how busy he may be, to learn that in the State of Maryland over one-fifth of all the deaths of all ages occur under one year of age; that one-third of all the deaths occur under five years of age. The rate is a little higher in this State in consequence of our negro population than in some other parts of our country. In the registration area of this country the deaths under one year of age are a little less than one-fifths of all deaths at all ages, and about one-third under five years of age. In the first three months of life, one-ninth of all the deaths occur. Such figures as these are enough, of course, to indicate the fundamental importance of this subject.

When one inquires into the leading causes of death during this period one finds that the greater number are operative in the first months of life. Some of these are sometimes spoken of as unavoidable, but, as Dr. Jacobi has said, most of them are not. We do not think, however, that the crusade in the prevention of infant mortality will yield the quickest results if directed against those causes which to some seem unavoidable—such causes as premature births, congenital defects, hereditary taints, accidents at birth, causes of that kind. It is more especially against another set of causes of infant mortality, namely, the so-called diarrhœal and digestive disorders, the acute respiratory diseases, bronchitis and pneumonia and the infections that the campaign should be directed. Probably the infectious play a very important part in the digestive disorders, and tuberculosis we know plays a by no means unimportant part in the deaths during the first year of life. During this period especially in nurslings the infectious diseases which we associate with childhood are less common than after the first year of life. Whooping cough and measles occur, but scarlet fever is uncommon and this is especially true among those that are nursed at the breast. This is in itself suggestive; it shows that the infant receives from the mother a certain measure of protection against diseases toward which she is herself immune. There are many reasons why the cow's milk can never be an entirely satisfactory substitute for the mother's milk, and one reason is that the protective substances in the cow's milk—admir-

able as they may be for protecting the calf against the diseases of cattle—do not protect the infant against the diseases of the human being. We have the most satisfactory experimental evidences that the milk contains immune substances which have been generated in the body of the mother, and see how important it is that she should transmit these protective substances to the offspring at this period of life when the offspring is attempting to adjust itself to these new conditions and is exposed to all these changes. This kind of protection is needed particularly in the class of diseases which I have specified, the acute respiratory and diarrhoeal infections and the infections which are most preventable. Professor Fisher has made interesting investigations, which he himself would not consider to be anything more than approximate, but they are certainly suggestive as to what is the ratio of preventability of these various diseases of childhood and infancy. At least 60 per cent. of this class of diseases is preventable, and readily preventable, by the application of knowledge already in our possession. With further additions to knowledge, the ratio of preventability would be still further increased, but at present we probably are within entirely safe bounds to say that 60 per cent. of the deaths of infants in the first year of life due to the causes which I have mentioned could be prevented.

It will be the purpose of this Association to point out in considerable detail what the causes of these preventable diseases are and the measures which are to be taken for prevention. You cannot have the most cursory reference to the subject of infant mortality without having at once brought to one's attention the fundamental importance of maternal nursing in preserving the life of the infant. That will be repeated over and over again. I think that those in the audience who are familiar with the subject only in the families of the well-to-do can hardly realize the risks in artificial feeding. It is not because artificial feeding is not possible. It is possible we all know, but it requires an amount of care and education on the part of those entrusted with it which is not to be expected in the families of the poor. It is not surprising to hear that the deaths are at least 15 to 1 among the artificially fed, as compared with those fed at the breast.

I had intended to speak further along somewhat similar lines, but, as I have said, our time for keeping you here has passed, but I would like before sitting down to point out what I conceive to be certain of the useful functions of this Association. Of course, one of the most important is the education of the public, the enlightenment of the public. The responsibility is with you;

it is with me; it is with the public. When you are told that the application of knowledge which we now possess in an entirely practicable manner will lead to the saving of 125,000 lives yearly among these infants, is that not enough to stir you to activity? In this country at least—in any democratic country—the public must be enlightened, otherwise we cannot secure from our legislatures the necessary laws and the necessary funds, resources for carrying out these preventive measures. I regard, therefore, the stirring up of the public, the enlightenment of the public, as one of the most important functions of the Association. It should stimulate better sanitary organization and administration in the country all along the line. It should lend its whole force toward the organization of a National Health Department, which movement has been so forcibly presented to us by Professor Fisher tonight. We should all be familiar with the character of the opposition to the movement. I do not propose to discuss it, but it is based upon misconception and it is based upon ignorance, and sometimes, I think, it is based upon intentional misrepresentation, as has been pointed out, putting personal interests and commercial interests above the interests of health and life. This Association, therefore, should stand, for a strengthening of the activities of the Federal Government in public health work. That department will surely have a Department of Child Hygiene. We have had demonstrated to us in New York City how much good can be accomplished by the creation in a Department of Health of a division of Child Hygiene. They have taken the lead there in this regard as so often and to such a great extent in public health work.

Then this matter of registration of births. That is at the bottom of this whole movement. I hope those who are here will be able to be present when Dr. Wilbur reads his paper on this subject tomorrow night. Then you will learn that we are creeping in the dark until we have an accurate and tolerably full registration of births. There must be a pressure brought to bear upon the medical profession, who are woefully lacking in the performance of their duty in this matter, and I simply mention that as a matter of very first importance to be considered in the activities of this Association to see to it that our country is no longer in the scandalous and disgraceful condition in which it is today as regards an accurate recording of births. It would be the topic of an entire lecture to make clear to you exactly why we should have an accurate registration of births. We cannot tell you what the rate of infant mortality is, the ratio of deaths of infants under 1 year of age per thousand living. We can only guess at it. We cannot define the rate of

infant mortality at all in this country today. We guess it is something like one-seventh; in New York perhaps one-seventh of those born die in the first year of life.

Another very important activity will be the correlation of all the various agencies that are acting separately. The various public and private agencies should be all brought together in order to secure the best results, because they will often be working at cross purposes otherwise. This is specified as one of the very important activities of the Association, and it is indeed to be very much emphasized.

Then I hope the Association will stimulate investigation in this field. We have by no means the amount of knowledge which is to be desired. It is a big and significant fact that the campaign for the prevention of infant mortality has been long delayed in this direction. One reason is, I think, that we have not such tangible, accurate or precise knowledge of the many causes of infantile diseases that we have about some other diseases. Take, for instance, yellow fever, typhoid, malaria. How relatively definite our knowledge is of the etiology. There are a great many problems connected with this whole subject, which must be solved before we can go ahead with as full knowledge as is to be desired.

I think also one of the important purposes of the Association must be to formulate a definite program of preventive measures. When you go over all the possible factors and influences concerned, you will find that you are brought to problems of poverty, of ignorance, of dirt, of insanitation, of industrial conditions, etc., and one is confused to know exactly where to take hold in order to secure in the shortest time the best results. I hope one of the purposes of this Association will be to formulate as definite a program as possible as to where and how efforts should be concentrated in order to secure the best results in the shortest time and in the most economical way.

These are what I conceive to be among the important functions of this Association. What we may expect from the direct benefit in the saving of human life would, of course, justify all efforts; but I am very fond of dwelling upon the indirect benefits which come from all these movements. "Infant mortality is the most sensitive index of social welfare;" it takes hold of the very foundations of society. Its prevention means improvement in the homes, improvement in the mothers, and improvement in the social conditions, the industrial conditions and the sanitary conditions in general. This, as Professor Fisher has pointed out, is sufficient answer to those near-sighted persons who think they are extremely philosophical in this matter when they argue that we are

interfering with natural selection. Newsholme, who is the greatest student of this whole subject, at least from a statistical point of view, says the high rate of infant mortality brings about conditions which make for national degeneracy and infirmity, and I believe firmly that this is true. Those who plead that our preventive efforts are interfering with the natural selection of the individual are pleading virtually for the retention of what are the most unfortunate social conditions. They are pleading that the woman shall continue to work in factories to the end of her pregnancy. They are pleading for continuance of the intolerable social conditions. I think we can look forward, even if this Association meets only a part of its expectations of what it is going to accomplish in this country, to a great future of usefulness, both of direct and indirect benefit.

Let me urge upon you the importance of studying the exhibit. I have not myself had the opportunity to do so yet, but I know that that exhibit has been brought together with great sacrifice of time and thought and energy on the part especially of the Chairman of the Committee, Dr. Price, Secretary of the State Board of Health. We are particularly indebted to Dr. Schereschewsky of the Public Health and Marine Hospital Service, who has been of invaluable assistance in helping us to get together this exhibit. We are also indebted to Dr. Wilbur, head of the Vital Statistics Department, Bureau of the Census, and to many others, who have been so good as to send exhibits. No such exhibit has ever been brought together before. It will be, I think, the most distinctive and instructive feature of this meeting, and I believe it will be an example to those who are engaged in similar movements elsewhere and that they will recognize this feature as their strongest means of reaching efficiently the general public.

SECOND SESSION

Thursday, November 10, 10.30 A. M.

**PHILANTHROPIC PREVENTION OF
INFANT MORTALITY**

CHAIRMAN

HASTINGS H. HART, LL. D., New York, Director of the Department of Child-Helping, Russell Sage Foundation

SECRETARY

SHERMAN C. KINGSLEY, Superintendent of the United Charities of Chicago

STUDY OF INFANT MORTALITY BY THE RUSSELL SAGE FOUNDATION

By the Chairman, HASTINGS H. HART, LL. D.

At the request of Mr. Homer Folks, Chairman of the Committee on Institutional Prevention of Infant Mortality for the New Haven Conference of 1909, the Department of Child-Helping of Russell Sage Foundation undertook a preliminary study of the mortality of infants in institutions. The time available was so brief that it was not practicable to undertake an intensive study of the subject, but only to secure those facts which are already available in published reports, or in the statistical material accumulated by the officers of the institutions.

Thirty institutions were visited by a special agent of the Department, including infant asylums, foundling asylums and other institutions which care for infants under 2 years of age. The statistics furnished were obtained partly from the reports of state boards of charities, partly from the published reports of institutions, but mainly from the statistics furnished by the superintendents of institutions.

The most gratifying spirit of co-operation was evinced by the authorities of institutions who furnished the information, even in cases where it involved a large amount of work, and in cases where the showing was, on its face, unfavorable to the institution.

It became evident at the outset that it would be unjust to publish the statistics with reference to particular institutions, for the reason that the mortality rate in many cases was affected by circumstances out of the control of the institution. For example, some institutions send all sick children to hospitals, and such children appear on their records as "transferred to an institution"; while other institutions furnish hospital accommodations, and all infants who die figure in the mortality records. In other cases it was found that it is the practice to board out delicate children in private families, and the statistical custom varied as to whether such infants are recorded in the mortality list of the institution or not. In other cases it was found that moribund infants were returned to their mothers, and in such cases they appear as "returned to mother." and their deaths are not reported.

Reports were received from 22 institutions, most of them covering a series of years, showing the following facts:

Total number of infants under 2 years of age received...	56,451
Number of deaths reported.....	22,743
Ratio of deaths, per cent.....	40.3

The following is a statement of the death rate reported:

<i>Institutions.</i>	<i>Death Rate.</i>
6.....	Under 30 per cent.
6.....	Between 30 and 40 per cent.
3.....	Between 40 and 50 per cent.
3.....	Between 50 and 60 per cent.
2.....	Between 60 and 70 per cent.
2.....	Above 70 per cent.

It is a common impression that the death rate in institutions has been greatly diminished in recent years, owing to the improved methods of care and feeding.

A summary of the reports received for the last year show 7,326 infants under 2 years of age, of whom 2,677 were reported to have died, an average of 36.5 per cent., which is only 4 per cent. less than the average for the series of preceding years.

The point of view of some of those who are in charge of institutions of this class is illustrated by the following facts:

In the printed report of a prominent home for the care of infants occurs the following statement: After referring to a change of practice, whereby nursing infants were placed on board in private families, instead of being kept together in the institution, the report says: "The mortality has been reduced from about 100 per cent. to about 34 per cent." A later report of the same institution shows a further reduction to less than 20 per cent.

The physician in charge of an institution where the practice of boarding out children in family homes has prevailed during recent years said: "During my period of observation, covering more than a year, every motherless infant under the age of 1 year admitted to the institution died before reaching the age of 2 years."

The superintendent of an asylum for infants sent the following report: "I send you the infant statistics required. During the past 20 years the death rate among the children 2 years and under was 75 per cent."

The preliminary inquiry above referred to revealed the fact that accurate information with reference to the mortality of infants under the care of philanthropic institutions and agencies is very greatly needed as a basis for the efforts of such organiza-

tions to prevent infant mortality. It revealed also the fact that very little accurate information exists and, where it does exist, it is not in such form as to permit intelligent comparison.

The statistical reports of boards of health and state boards of charity afford no usable material. The State Board of Charity of Massachusetts is considered one of the most reliable sources of information in the United States. That Board has been accustomed for many years to publish an annual "Summary of Infants Under Two Years of Age. Report to the State Board of Charity under the law which provides for the protection of infants and the licensing and regulating boarding houses for them." This summary enumerates a list of institutions, showing the number of infants, male and female, and the number who died in licensed homes and in unlicensed homes, and the aggregate number of deaths. On a casual examination one would suppose that this summary covered all of the infants cared for by the institutions named; but on inquiry it was learned that the summary covers only children who die in family homes, and does not include children who die in institutions named. The statistics, therefore, are valueless as far as the general question of infant mortality in institutions is concerned.

The New York State Board of Charities publishes statements from year to year with reference to the care of children in all the private institutions of the State, including mortality statistics. An examination of these statistics shows that for a series of years the statistics relative to certain institutions for infants showed for each institution the number of "persons died." After a series of years, this heading was changed from "persons" to "boys and girls." Subsequently it was changed to "under 2 years."

The discovery of this variety of headings led to an examination, which revealed that under "persons received" and "persons died" was included not only infants, but also their mothers. It was discovered also that when children under 2 years were included a much more favorable mortality rate was produced than if children under 1 year only were included.

The institutional statistics of infant mortality were found to be misleading in many cases, because of the practice of basing the death rate on the entire number of children cared for during the year. Take, for example, an institution which had 50 infants on hand at the beginning of the year, received 100 infants, making a total of 150, and had 50 deaths. That would give an apparent death rate of 33-1-3 per cent.; but if the whole number of children received for a series of years was taken, and it was ascertained just how many of these children had died, the mortality rate would be found to be nearer 50 per cent.

The fallacy of this method of computing death rates is illustrated in the following statement, taken from an official record of the board of health of one of the largest cities in the Union, relative to an infant asylum:

DEPARTMENT OF HEALTH
Mortality Statistics—Infant Asylum

Date	On hand beginning month	Received during month	Total for month	Died during month	(a) Percentage of deaths
1908—					
September	250	108	358	18	5.0
October	251	114	355	16	4.4
November	265	65	330	16	4.8
December	241	78	319	15	4.7
1909—					
January	256	54	310	17	5.5
February	229	64	293	16	5.5
March	230	51	281	13	4.6
April	220	67	287	9	3.1
May	221	54	275	13	4.7
June	163	78	241	12	5.0
July	175	52	227	7	3.1
August	182	77	259	15	5.8
Year.....	250	1,122	1,362	167	12.3

(a) These percentages are our figures, not contained in the original report.

In the foregoing table we have an apparent death rate taken by months of 4.7 per cent., but an apparent yearly rate of 12.3 per cent. Neither is right. There were on hand 250 children at the beginning of the year and 259 at the end of the year. Of these 259 probably 40 died under 1 year of age.

The nearest practicable way would be to figure the number died as against the number of children actually received during the year. This would give a mortality rate for the year of 15 per cent., which is an extremely low institutional death rate, and is sufficiently creditable without juggling figures to produce an artificial result by counting the same children over and over again.

Any intelligent study of the subject of infant mortality should deal with infants under the age of 1 year. If the number is taken to the age of 2 years, the showing is necessarily unsatisfactory. What we need to know is the actual number of babies that die under 1 year of age out of the total number dealt with. At the present time that fact is not ascertainable, in so far as we have been able to discover, with reference to any institution or any set of institutions in the United States.

AN INTENSIVE STUDY

In view of the facts discovered by the preliminary inquiry above mentioned, the Russell Sage Foundation decided to undertake a detailed and specific inquiry into the matter of the mortality of infants cared for by institutions and child-helping societies. It was deemed best to examine first the work of the child-helping societies in the care of infants.

In order to discover the reasons for success or non-success in the efforts of child-helping societies to prevent infant mortality, it was necessary to undertake an examination of the methods followed in caring for infants. It was discovered that not only was there no uniformity of recording the personal and medical history of infants under care, but it could not be discovered that any one society had perfected even a fairly complete system of recording such histories. In children's hospitals the usual hospital data are found carefully kept and recorded, but those data do not cover the heredity, condition at birth, previous care and feeding of hospital cases, nor do they cover the much larger number of infants who die without receiving hospital care.

It was decided that the only way to ascertain the facts with reference to the mortality of infants in the care of institutions and societies was to study individually the cases of all of the infants cared for by each institution under consideration, adopting a uniform schedule for the study of each case.

The preparation of suitable schedules was committed to Miss Ellen C. Babbitt, and such schedules were prepared after consultation with leading pediatricians and trained nurses in Boston, New York, Philadelphia, Baltimore and Washington. These schedules were prepared, not simply with a view to recording certain facts relative to the infants concerned, but also with a view to enlarging the vision and raising the standards of the people who are responsible for the care of infants.

This study has not yet gone far enough to produce results for tabulation, but it has gone far enough to make clear:

First—That there is room for improvement in the care of infants, even by the most careful and conscientious societies. For example, one society with a deserved reputation for high standards and careful methods is accustomed to receive children from a certain public hospital for placement in family homes. It was found that the hospital would telephone to the society in the morning: "Baby for adoption." A nurse would be sent to the hospital to bring the baby to the office of the society. There a trained nurse would feed the baby from a bottle. In the afternoon a nurse would take the baby out to the family home and would feed it at her discretion en route. Upon arrival the nurse would deliver the baby to the foster mother,

who would then proceed to feed the baby according to her ideas. Thus, in a single day, the unfortunate infant would receive four different feedings of different milk, with different modifications and without any exchange of information.

When this practice was brought to the attention of the society they immediately changed their methods. The baby is now taken directly from the hospital to the train. The hospital nurse provides a supply of the milk to which the baby is accustomed for use en route, and the hospital physician furnishes a formula for the guidance of the foster mother in feeding the child. Thus there is only one change of food instead of three, and that change is made under the advice of the physician who knows the child and its needs.

Second—That there is a surprising amount of ignorance in quarters where knowledge might be expected. Only a very few societies have anything like an adequate history of their wards, and very few have a proper medical examination on admission. Nurses are often incompetent and ill paid, and babies are given to foster mothers who are without instruction or training for their responsible work.

Third—That physicians, nurses and superintendents are eager to obtain information which will assist them in improving their methods of dealing with infants, and the Society for Study and Prevention of Infant Mortality has here a great opportunity.

DISCUSSION

Dr. Woodward: I would like to ask Dr. Baker about the record of mortalities in the asylums. Has it run very high, year after year?

Dr. S. Josephine Baker, Health Department, New York City: I do not know that I can answer definitely. At the present time there is an investigation being conducted as to the exact conditions relative to the founding asylums in New York, with particular reference to the mortality of the babies that are kept in the institution and those that are boarded out in homes. I think the real problem of the institution is not the problem of the breast-fed baby. The breast-fed baby in the institution or in the home does pretty well, but the real interesting feature to my mind is the fact—which I can not prove by statistics now, but which I know to be absolutely true—that the bottle-fed baby boarded out in a home has a chance for life at least 50 per cent, better than if kept in the institution. I think the question of boarding out babies in homes should be elaborated more for the bottle-fed baby than for the breast-fed baby. I have a chart of infant deaths in homes and institutions which is very striking, but owing to the fact that it is made of red and blue pins it was rather impossible to send here. No one could see it without realizing that almost half of the infant mortality in the borough of Manhattan of New York City is the institutional mortality.

Dr. Woodward: I wish to ask a question more. I would like to know whether any one knows of a community where there is kept an official or public register of available wet nurses. Dr. Skinner, in charge of the Columbia Hospital, in Washington, has suggested that

the frequency of applications for wet nurses called for some public register in each community, containing the names and addresses of available wet nurses, so that when people desire to obtain a wet nurse for a child, they would know where to go. You who have had experience trying to find wet nurses for children will know the difficulty of finding one, and Dr. Skinner's suggestion seemed to me to be one of considerable value.

A speaker reported that such an institution for wet nurses has been in existence in Boston for about a year. There are nine or ten wet nurses registered and never more than one or two left on the register at a time. The baby always goes with the mother; the mother is not allowed to go out without the baby. So far it has been very successful.

Mr. Walter Kruesi, Director Milk and Baby Hygiene Association, Boston: The Boston Floating Hospital during the last summer instituted a system of collecting maternal milk from mothers who had more than sufficient for their own child and who are glad to give it to the children of the Floating Hospital. Names of nursing mothers were obtained from the Lying-in Hospital, District Visiting Nurses and physicians. Those who were willing to give or sell milk were examined by a physician, their milk was tested, their own baby examined and weighed and kept under observation. Their own child was not allowed to suffer in any degree and several babies on the hospital ship received the only nourishment they could take. They collected from two to four quarts per day. The Floating Hospital offered fifty cents a quart for the milk, and sent a graduate nurse to collect it. She carried a refrigerator and an exchange supply of sterile bottles. Many of the mothers contributed it and would take no money for it; they were glad to send it to any child who needed it.

Mr. Robert W. Bruere, New York: Mr. Chairman, I beg leave to make a statement and to ask a question. The experience of the New York Association for Improving the Condition of the Poor and of the New York Milk Committee show that low wages, insufficient family budgets, account for a considerable percentage of our preventable infant mortality. Last year at New Haven, I reported the striking results of the Association's Caroline Rest experiment, the object of which was to ascertain what the effect on the infant death rate would be if working mothers were protected against economic pressure and given simple hygienic instruction before the birth of their children. During the first year, in 135 families where the mother was visited, instructed, and protected from economic pressure after the child had fallen sick, there were 22 infant deaths, or a mortality of 17 per cent.; in 202 families of precisely the same social status, where the mother was guarded against want and taught in advance of the coming of the new life, there were only 9 infant deaths, or a mortality of 4.9 per cent. A similar reduction in the death rate in the whole of New York City would mean an annual saving of approximately 12,000 infants. This result was so startling that the Association took pains to emphasize its tentative character. At the end of the second year 789 cases were available for study. In 300 of these the nurses began their work after the babies were born, and 40, or 13 per cent. of them died during their first year; in 489 cases the nurses were able to begin their aid and instruction a month or more before the children came, and here the deaths during the first year were 23, or 4.7 per cent.!

Just before coming to this meeting, I had occasion to analyze the budgetary information published by the New York Lying-in Hospital

about the families of the women who were confined by the staff of the hospital in 1909. Of 6,157 families, the hospital's report says that the husband was unemployed in 1,781, or 29 per cent., when the child came. In three families the husband was earning \$2.00 a week; in forty-one families, \$3.00 a week; and in two hundred and ninety-two families, \$5.00 a week. Seventy-six per cent. of the entire number of employed husbands were earning \$10.00 or less, and only 5 per cent. of the 6,157 fathers were bringing home as much as \$15.00 a week at the time the child was born! And an investigation showed that among 2,664 families there were only 556, or about one-fifth, in which a child had reached the legal working age of fourteen.

These facts bring me to my question. I have frequently asked it in private, and I am especially glad to ask it here openly, because I see that Dr. Frankel is in the room. In his book on "Workingmen's Insurance in Europe," recently published by the Sage Foundation, Dr. Frankel devotes a brief, but interesting, chapter to Maternity Insurance. Somewhere in the book (p. 409) he explains that the scheme has worked so well that there is an active demand to extend the present insurance protection from the six weeks now provided to eight weeks so that the mother may be relieved of anxiety and have proper care two weeks before the birth of her child as well as six weeks thereafter. But at the end of his chapter on Maternity Insurance, Dr. Frankel declares that in America there is no crying reason for insurance of this type, because (I can only give his approximate language, but I am certain that I have the sense of it right) "American husbands as a rule support their wives adequately." In the light of the facts I have cited, I am curious to know the ground of Dr. Frankel's statement.

Dr. Lee K. Frankel, New York: Mr. Bruère has evidently read my book more carefully than I have. I do not remember saying those things. At all events, what I meant to say was that my objection to a system of maternity insurance is this: that I object to married women working. I think the average woman who is a mother is doing her full duty by the community when she takes care of her child and when she brings it into the world. We must readjust our economic conditions so that the husband will have a wage earning power to support the other members of the family. The system as developed in Germany and as beginning to develop in Italy is a very different problem. There they have to consider the problem of the illegitimate child. An attempt has been made there to provide a scheme by which the woman will be able to stop work during the last few months of her pregnancy and not be compelled to go to work immediately after the birth of her baby. That is what I meant to say.

Dr. Leonard D. Frescoln, Assistant Chief Resident Physician, Philadelphia General Hospital: Inasmuch as my city has not been mentioned in connection with this work, I thought it my duty and also thought that it would be of interest to you to tell you that the Department of Health and Charities, under the efficient head of Director Neff, is carrying out this work of interesting other societies, this harmonious work of which Dr. Hart spoke. The Philadelphia General Hospital is in direct communication with these societies and through them we hear of the foundlings and information concerning them that the various societies can get hold of, and we take up the matter and see what we can do for them. We try to furnish wet nurses. In this matter of furnishing wet nurses, it seems to be generally understood by the profession in Philadelphia that when such

are needed they may be had by resorting to the City Hospital, and so we have almost every week calls to furnish wet nurses. This we are only too glad to do, and I look through the obstetrical and gynecological wards for women who are suitable for this and who are in almost all cases anxious for the money, and I encourage the families getting these wet nurses to pay a reasonable sum. Some of them are quite able to pay, and are almost always willing to do so. They usually pay from six to eight dollars a week for these nurses. These women must take with them also on leaving the hospital their own baby and must assure its care before leaving the hospital.

Question: How do you require this assurance?

Dr. Frescoln: By simply having them tell us that they will look out for the child, take it with them and also feed it. Unfortunately, in connection with our institution we have not the personal supervision of these women that I wish we had.

Mrs. Wm. Lowell Putnam, Boston: While we were doing this work, which we have now given over to the Infants' Hospital, we started a plan of having women who had too much milk for their own babies go out to nurse by the day merely, or, if it was necessary, to spend the night, but in any case they always took their own baby with them. My object in mentioning this is merely that it seemed to us a desirable thing because most of our women were of a self-respecting class. There were almost no illegitimate children. And to have a self-respecting, nice woman in one's house is very much pleasanter than to be compelled to have one who is not, and, other things being equal, it is very much more desirable. It seems to me that the work done by the District Nursing Association with the Floating Hospital is very desirable in that it does not take the woman away from her home.

Dr. C. O. Probst, Secretary of the State Board of Health, Columbus, Ohio: One feature that has not come out is the licensing of these places where women go to have their children, or the boarding out hospitals. A law has been enacted in the State of Ohio and the matter placed under the State Board of Health so that no one may run such a place without a license from that Board. And before the license is granted an examination is made of the proprietress and the hospital, and no child born in such an institution can be placed anywhere in the State without the knowledge and consent of the authorities.

THE RELATION OF INFANT WELFARE WORK TO THE GENERAL SOCIAL MOVEMENT

By **SHERMAN C. KINGSLEY**, Superintendent of the United Charities
of Chicago

The brief annals of one baby who passed on a year ago suggests the substance of my theme. He was born in a three-room flat, on the third floor rear, of a tenement house located on the rear of a lot. Some months before his birth the father had died of tuberculosis, leaving the mother, already harassed and worried to the breaking point, to care as best she could for the four children already in the home. She got such work as offered, and kept at it until the baby in question was born. There was no time nor means to prepare the kind of welcome for this little stranger that it is most appropriate to accord. She hurriedly summoned a midwife as her only aid and counselor other than that of the neighbors of the tenement. The care of the child was in accord with the traditions and superstitions of the midwife, plus such care as the mother could give in her limited circumstances, guided only by her instinct and traditions. She got up within a week and, as soon as she could, resumed her work. The baby was not strong and cried a good deal at night, and, due to some infection and lack of proper care, developed sore eyes, which threatened blindness. The mother attempted to nurse the child, and did as long as she could, but when this form of feeding failed she was obliged to put the baby on artificial food. She had no way of keeping the milk and the supply in her neighborhood was poor, it being 24 to 36 hours old when delivered. When the baby cried, he was given more of this milk. The midwife's traditions and superstitions did not embrace the giving of water, and the mother instinct did not lead her to do so. Finally the baby died. A little emblem announcing this fact was placed on the door, a white hearse visited the neighborhood and a funeral was held, which cost a large sum of money, considering the circumstances of the family, and which was partly paid for by contributions from the poor neighbors and partly by a sum raised from a loan agency, where the mother mortgaged what furniture she had. A more detailed narrative of this case would suggest still other points where infant welfare work is related to the general social movement. Let us name them in the order suggested here and discuss them in a little more detail:

First—The relation of the baby to the housing question.

Second—The general problem of poverty.

Third—To preventable disease.

Fourth—The midwife and birth registration.

Fifth—The milk question.

Sixth—Loan sharks and expensive funerals.

We could go on, but this I think will illustrate my point.

First—Let us discuss the baby's relation to the unsuitable house. The average number of rooms occupied by all the families dealt with by the United Charities last year is about three and one-half. The average number of people to the family about four and three-eighths. This overcrowding is one very serious handicap to the baby entirely regardless of all the consequences that come with the general problem of living in three rooms. It indicates a low income and a very narrow margin, if any margin at all. In the rearing of animals and birds great care is taken to provide suitable quarters for the care of the mother and young. There is taken into careful account right conditions of space, of light, air, warmth and food. Our government is spending a great deal of time and a great deal of money in promulgating right information in these lines, even as to the selection and care of the proper kind of seeds that go to raising plants and grain. It sends experts out in special trains. They hold meetings. They invite the farmers and breeders. They distribute literature. They hold personal conversations. The information that is given is scientific and correct, and can be followed with safety. They do not expect right results unless there are not only right conditions and care, but they even make selection of what the stock itself shall be. So the baby, born in the three-room home has not only this handicap resulting from overcrowding, but usually many other handicaps added thereto. There is not only an absence of the scientific aids that are available for rearing animals and plants, but the kind of instruction that the mother gets is largely from patent medicine advertisements and quack doctors, inducements to use this or that kind of drug or food—advice and recommendations which are usually absolutely wrong and detrimental to the child. This greatest, most important and most delicate task in the world is the one thing for which there is least or no preparation.

Second—Poverty and the baby. The general social movement concerns itself with efforts at amelioration or prevention of poverty itself. No member of the family or community is so vitally affected by all of this as the baby. He is affected before he is born and after he is born. The mother is denied a chance to feed and nurture the child according to his needs because of the limitations placed upon her through the exigency of need. The

final test of the efficiency of all kinds of charity work and evidence of usefulness of various forms of social movements is whether they are helping to make the home and the city the right kind of place for the baby.

Third—Preventable disease. In the city of Chicago about 4,000 people each year die of tuberculosis. It is almost impossible to compute the loss due to this one cause of sorrow and privation. The greatest part of the loss comes when the bread winner is most needed, for it is during the period when there is a group of growing children. It is bad enough for all of them, but here again the baby is farthest under the whole load. One could go on and cite the large per cent. of children in such families who bear traces of infection, and give also a long recital of things required to give them a chance and check the spread. Indeed, if any of the workers in the general work of charity think they are getting through their task, they will be remanded to their places by the Infant Welfare Crusader, who comes along and tests their work in the light of the baby's needs and rights.

Fourth—This particular baby was ushered into the world through the aid of a midwife. This is the case with about one-half of the babies born in the city of Chicago, and the services of the midwife are used largely among the poor in other cities. These people are not adequately registered or supervised. They are not trained. There is present among them no degree of professional skill or exchange of information. Many of them are ignorant and superstitious and guided by tradition. There is no certainty that preventable blindness is prevented or that any right kind of instruction is given to the mother to be used after the midwife leaves, or that in the first days the baby is adequately cared for by the midwife. The importance of the individual citizen has not yet arisen to the point in this country where the registration of births is appreciated. This birth was not registered. We do not know to what extent we are, or shall be, dependent upon the child born in this country, or to what extent we can rely on immigration to supply needed citizens. The whole chain of children's rights and privileges and protection—school, work, age of consent, property—a long list of social conventions, standards and institutions depend upon this measure, and yet it is not done. With the establishment of Children's Bureaus in our Health Departments this should be brought about. Then the child can be reached and helped in an hundred ways and at a time when help is most vital.

Fifth—Our child in question did not even have the right kind of milk when deprived of the mother's breast because of the exigency of her situation. Few communities appreciate the importance of a good milk supply and of the price which must

be paid to get it. They go on paying taxes for expense of police, criminal prosecutions, or caring for permanent dependents, but it is usually difficult for the Health Department to get an appropriation large enough to provide inspectors to cover the farms and dairies, the milk depots and wagons, the care of cans and bottles. Occasionally a burst of interest and attention is manifested if an epidemic of typhoid fever, diphtheria or scarlet fever breaks out which can be traced to the milk supply, but the fact that thousands of babies like the little one we have cited suffer and die because they are obliged to take milk that has from 500,000 to 25,000,000 bacteria to the cubic centimeter makes no particular impression on any one. Again, the baby offers the very best index to the question of the milk supply, and the milk supply is not right until it gives the baby a show.

The final chapter in this history was the baby's funeral and the introduction of the mother to the office of the loan shark. His was a pathetic little life journey, but it is duplicated thousands of times in the cities in this country every year. This final chapter in the child's career further impoverished the family and made the struggle for the rest of them so much harder.

To be sure, this was only one avenue of introduction of poor people to the loan shark, but it is one and suggests anew the need of some regulation. Illinois tried to get such a law last year, but the legislature that year was not specially interested in babies or the victims of loan shark evils and the law failed to pass.

The Infant Welfare campaign in Chicago last summer was carried on in a larger way than the year before. The machinery worked much better since the large number of interested societies had learned how to co-operate to better advantage.

The central point of the campaign was the baby register in the United Charities Office, with Dr. Caroline Hedger as director. Here was gathered from every source possible the names of all babies born during the summer and for some months back—25,000 babies represented in the big card index that covered a large table.

A corps of Health Department nurses covered the high death wards. Literature on the summer care of babies in nine different languages, so that each family might profit by it, was distributed, and thus every mother had placed in her hands the simplest and most helpful instructions that experienced medical talent could devise. In homes where the babies were ill—and there were 5,000 such babies—especial care was taken to do the effective thing for the baby. He was either referred back to his own physician (this was always done if there was a family physician) or he was made the object of special care of some responsible

agency that was enlisted in the crusade. The baby register grew. A little steel marker flag was put on each card bearing the name of a sick baby. Thus the sick baby situation was flagged. This was an advance. Heretofore the only time that any kind of thing was placed or hung for the baby was to hang some crepe or other emblem on the door after he was dead. The whole movement helped to exalt the baby—and that means exalting citizenship. Then, too, through that beautiful foundation, the Elizabeth McCormick Memorial Fund, the United Charities of Chicago, was again able to let down in the very midst of the thickest baby death districts fresh air stations—10 tents—located on roofs or in yards were operated double the number of last year. Here about 2,000 of the sickest babies in Chicago came and received the most skilful and loving care that the big heart of big-hearted Chicago could afford.

The nursing service was obtained through the Visiting Nurse Association, and had the benefit of the skill and devotion and efficiency of that splendid organization. The medical service was generously given by members of the Pediatric Society, Dr. F. W. Allin in general charge; then from the Health Department, in addition to supplying the field nurses, there emanated a campaign of education—it came through the bulletin of the department, through lectures, churches, through phonographs and films in 5-cent theaters. The department also carried on a fight for all the babies and all the people in its vigorous efforts for a better milk supply.

So the campaign went on, and when the heat of an unusually hot summer had passed it was found that in the wards where the campaign was centered—the congested wards, of course—the death rate over the previous August had declined 6 per cent. in the wards where we had worked. In the well-to-do wards, where we had not worked, it had increased 44 per cent. for the same period.

This work for the baby drives straight at the heart of our social troubles. The Infant Welfare movement relates itself to general social work as the baby is related to the general population. He grows into the population and makes either our effective citizenship or our social problems. The place to do telling effective work is with the children and with the children when they are babies.

DISCUSSION

Miss Carolyn C. Van Blarcom, Executive Secretary of the Committee on Prevention of Blindness of the New York Association for the Blind: In Mr. Kingsley's story of the short life of one baby in Chicago, he mentioned the fact that this baby was attended by a midwife. He also stated that about 50 per cent. of the births in Chi-

cago are attended by midwives and, moreover, that the majority of these women are ignorant and untrained, and consequently incapable of properly discharging the functions they assume.

The condition of the midwives in Chicago, both as to the character of the women practising and the percentage of the births which they report, is duplicated in the majority of our large cities. It would seem that the last word had not been said in connection with the prevention of infant mortality so long as we ignore the fact that about 50 per cent. of the babies born in this country are attended by women who, by the consensus of opinion, may be pronounced incompetent. Moreover, since the keynote of many of these discussions of work for the preservation of infant life is the importance of teaching mothers how to care for themselves and for their infants, surely an important feature in this work is being disregarded when so powerful an instrument as the midwife is not utilized. Her word is law and gospel to her patients. The logical conclusion is then that if the midwife herself knew something of the rudiments of nursing, of hygiene and of the care and feeding of infants, her influence would be far-reaching toward preventing unnecessary death among infants.

It is deemed necessary for a doctor in this country to take a long course, both practical and theoretical, and to pass a state board examination, before he may practice obstetrics. A nurse must also be trained before she may assume the nursing care of a mother and infant. It seems criminally unjust, therefore, that a midwife who at the outset is often ignorant and dirty in her habits, may, without training and without supervision, discharge all the functions of both doctor and nurse, in attending nearly half the births in this country.

We have also to consider the long train of disasters which follow in the wake of the midwife—among them being, not alone death of infants, but blindness, mental and physical degeneracy, and invalidism and death of mothers.

These being the facts, it is indeed unreasonable for us to continue to build and equip hospital wards for mothers, conduct schools for the blind and feeble-minded, while allowing these untrained women to pursue their calling in such a way as steadily to increase the number of inmates of these institutions when, if midwives did careful and clean work, many of their patients would be deflected from these institutions.

In spite of the damaging evidence against midwives in America, they are after all not the ones at fault. The culpability lies with the American public, in allowing this condition of affairs to exist. So far as we are able to discover, this is the only civilized country in the world in which the lives and health of mothers and infants are not safeguarded by means of the training, supervision and control of midwives.

In countries other than this the question of preserving infant life is regarded as a grave problem, but a question of equal gravity is preserving the mind and body of the infant intact. Society is not enriched through the addition of lame and halt and blind citizens, whereas the person who is normal both in mind and body is regarded as one of the state's most valuable assets.

Evidently the problem of the untrained midwife in America must be faced. Either she should not practice at all, or she should be trained and supervised.

Mr. Edwin D. Solenberger, Secretary of the Children's Aid Society, Philadelphia: I want to say just a word on the subject of this paper, the relation of infant welfare work to the social movement.

It seems to me that one of the important things in each community is to have a general plan so that each agency that is dealing with infants in any manner whatsoever, whether in their own homes, whether through visiting nurses or institutional care, or in whatever particular way they touch the life of the infant, may be encouraged to fill in the fullest measure the field in which it is fitted to act. Also, an effort should be made under the Departments of Health and Charities of the cities, each season at the beginning of the hot weather period, when infant mortality rates go up, to bring out the full strength and influence of all the existing agencies for the promotion of infant welfare in the community; and to help to encourage and educate along the right lines those agencies that may not have had the right point of view in this work.

If we can learn to know the needs of our communities, we can begin to make progress. I am glad to report that in Philadelphia a beginning has been made in this direction, and early last summer a large and enthusiastic meeting was held in the Mayor's office, called by Dr. Neff, and a great advance was made in bringing together representatives of practically every agency in the city dealing with infants. We cannot report as great success as we had hoped, but a very great gain was made in the prevention of infant mortality. I believe that the plan should be inaugurated at the opening of each season in succeeding years. We shall learn by experience, and as one of the agencies working under that plan, having a particular function to perform, namely the boarding out of infants, I think that great progress can be made by co-operation. Unless we know the lacks in our community we cannot make progress and we are not likely to know them until we can bring together all of the people who are interested in the problem.

Dr. S. W. Newmayer, Philadelphia: It is so evident that many factors enter into the causation of the great mortality among infants, and many resources furnished by many agencies are needed to prevent these deaths. Mr. Solenberger has told you something about Philadelphia's efforts to bring together all the organizations and societies working among infants and their mothers. We had in the City Hall an office to which all these agencies reported, and from this office various cases were referred to the particular agency which would be interested in any certain case. This office was a "clearing house" for philanthropy. There were registered here all the milk and ice stations, dispensaries, hospitals, nurseries, societies furnishing outings for convalescents to country or seashore, settlement and neighborhood houses, shelters and the many divisions of the health bureau. They all worked harmoniously together and the plan was eminently successful.

I would call your attention to an experiment which is soon to be tried in Philadelphia, and one which I believe will be of great value in solving the problem of the expectant mother who is compelled to work in factories. Laws enacted to control the employer from allowing these women to remain at work to the last day, and then return, in a few days, may be difficult to enforce. The Visiting Nurses' Society intends to send nurses to the factories to instruct and care for the female employee. You can realize what vast amount of good can be accomplished by such a plan. Few large factories would not be willing to contribute small sums to support such work. It would be an economic benefit to the employer. This thought may give you some ideas for similar plans in other cities.

Mr. Louis H. Levin, Secretary of the Jewish Federated Charities of Baltimore: A statement made in regard to the training of midwives has induced me to tell you of a little plan that we are trying to work out here. It is not one that has been put into full operation, but the object is this. One of our Jewish associations attempts to take care of women during their confinement. This association has a long list of so-called caretakers, thirty or forty, women who are sent into homes during the time the mothers are incapacitated, and they take care of the mother, of the house and of the children. It was reported to our association sometime ago that the caretakers were absolutely untrained. They did the best they could under the circumstances, but they did not know how to take care of the mother and the young child; in fact, they were simply housewives sent in for a short time, and they did not do all that was necessary for the purpose of making the mother comfortable and seeing that the child was properly taken care of. It then occurred to us that it might perhaps be possible to work out a system for training these caretakers, and I put the question to the Hebrew Hospital, which has a training school, and the idea was accepted, and we are working out now the training of caretakers, who will see that the mother receives proper attention, the child gets a proper start; and they are to report to the proper people when anything does not go right. The plan has simply been drawn up; a number of rather intelligent girls have already applied for entrance to the course. We hope in time to have trained caretakers. This is the only step that occurred to us by which to meet this particular difficulty, and the suggestion of having trained midwives really covers the idea that we have in mind. The plan has been worked out, a course is going to be instituted, but I am unable as yet to report any work done along this line.

Question: What salaries are to be paid, and will there be any difficulty probably in getting applicants?

Mr. Levin: Until we have graduates there will be no reason, I believe, to fix salaries. It will be perhaps a year before there will be a graduate. The caretakers at present receive from six to eight dollars a week, the untrained ones. The salary as a practical question has not yet been taken up.

Question: How much training are they to have?

Mr. Levin: I think the course will be a one year's course. They will not be trained nurses, but distinctly caretakers. There will be no attempt to foist them upon the public as trained nurses.

Miss Van Blarcom: The idea of eliminating the midwife does not commend itself as being practicable. The midwife in America will continue to practice whether we will or no, for the foreigners in this country cling tenaciously to the world old custom of employing midwives. Should laws be passed making it illegal for a midwife to practice, she would continue to practice in spite of the law, since there would always be doctors ready and willing to protect her by signing birth certificates for a small consideration.

Moreover, the clean, well-trained midwife gives her patients more and better care than the average physician who practices among the same class of patients, since the midwife not only attends the mother at the time of birth, but also gives both mother and infant what may be compared to the care given by a visiting nurse, for ten or twelve days after the delivery.

From this it would seem that it is not a choice between elimination and training of the midwife, but a choice between allowing the untrained woman to continue to practice unsupervised, and making provision for her training and control.

These provisions might be secured if the English method of controlling the midwife problem were somewhat modified and adopted in this country. This might be done if the boards of education were empowered to standardize schools for midwifery, issue certificates, adopt rules and regulations governing the practice of midwives after graduation, and if they were supervised and controlled by the local departments of health.

(A request was made that Miss Van Blarcom give a brief account of the training of midwives in England.)

Miss Van Blarcom: I might preface this by saying that the training and control of midwives in England is entirely under a central midwives' board, which was appointed by an Act of Parliament in 1902.

The central midwives' board does not itself undertake any of the training or instruction of midwives, these being carried out in maternity hospitals, which are recognized by the board as training schools, or under the authority of a registered medical practitioner, recognized by the board as a teacher of midwifery.

The training which is given to the pupil midwives, I found upon investigation this summer in London, is analogous to the training which is given in the large hospitals in this country to obstetrical nurses. The reasons, I think, are perfectly obvious to an audience of this sort. They feel that midwives must know something of hygiene, of anatomy, and of the rudiments of nursing if they are to care for the mother subsequent to delivery, and to give the proper care to the child. All of the pupil midwives are taught something of hygiene, of cleanliness, a slight knowledge of anatomy and physiology. Of course, they only attend normal cases and are obliged to call in a physician upon the appearance of any symptoms suggesting an abnormality.

The Midwives' Act forbids any woman not licensed and not holding a certificate issued by the central midwives' board to practice as a midwife. In order to secure a license and a certificate from the central midwives' board, a candidate must present a diploma from a recognized training school for midwives, together with a certificate as to her moral character, and must satisfactorily pass the examination given by the board.

Having in this way secured a license to practice, the midwife is required to observe the rules and regulations adopted by the board. The rules which the board has adopted relate to her person, equipment, duties to mother and child, obligations with regard to disinfection, obligations in securing medical assistance, and responsibility in returning notifications of births and deaths.

These rules are enforced through the agency of what are termed the local supervising authorities, which are councils of the counties or county boroughs throughout England and Wales.

Violation of these rules is punishable by fine, suspension or even exclusion from practice.

Practising midwives are required to register annually with the local supervising authorities, these registrations being forwarded to the central midwives' board, and the hope is entertained that in the near future they will also be required to take short post-graduate courses of training at intervals of two or three years, as long as they practice.

These seem to be briefly the provisions in England for the education, licensure and control of midwives.

A resolution was presented by Mr. Kruesi: "Be it resolved, at this first meeting of the Association for the Study and Prevention of Infant Mortality, that the state or local boards of health shall examine and license as midwives only nurses who have had a thorough obstetrical training."

INFANTS' MILK DEPOTS AND INFANT MORTALITY

By WILBUR C. PHILLIPS, Secretary New York Milk Committee.

No single agency is so important in the campaign against infant mortality as the infants' milk depot. It is the fulcrum on which rests the lever of the situation—the instrument through which medical, social, educational and philanthropic prevention effect their purpose and achieve success.

The infants' milk depot is not merely what the name implies—a depot or store from which milk alone is distributed. In the purpose which it has come to serve it is an educational center, a district branch for the dispensation of relief, and an indispensable co-ordinating unit between nurses, physicians, clinics, dispensaries, hospitals and various philanthropic institutions, which concern themselves directly or indirectly with the welfare of the child.

Milk depots vary in type according to the size of cities, the character of neighborhoods, and the individuality of nurses, physicians and social workers who are connected with them. A few broad principles, however, underlie all of them, and it is my purpose in this paper to name these principles as simply as I can and to suggest ways in which depots can be started and maintained successfully.

The first thing to consider in establishing an **LOCATION**: infants' milk depot is its location. Many argue in favor of its connection with a social settlement. Others believe that it should be independently located in quarters of its own. In my opinion, neither of these views is right, for whereas the settlement may be just the right place in one instance, in another it may not answer the purpose at all.

The ideal location is at a point where the depot is most easily reached by the mothers patronizing it. The woman who has housework to do and a family to care for is a busy person. She is apt to be overworked and "tired out" most of the time. What she wants, therefore, is a place where she can get milk, instruction and advice with the fewest possible "steps" and the least expenditure of energy. If this place is in a settlement, church building, or some other place, with attractive surroundings, good! But if this place cannot be reached easily, a new center

must be created. As a general principle, the same rules of accessibility which govern the establishment of a commercial milk store apply to the establishment of a depot. Where mothers will go for milk, they will also go for instruction. The important thing is to find a convenient central place for milk distribution, and then, if no accommodations for instructional work are offered, to attach to this place the necessary comfortable and attractive rooms.

Ideally, there should be one room for milk distribution, and one or more rooms for the educational and social work among the mothers. At the start, however, many makeshifts may be necessary. When only a few mothers are in attendance, it is quite feasible at the first for the milk to be distributed and the consultations held in the same room. This room may be the basement room of a settlement; a room in a cheap apartment; a room in some municipal building; a lunch room in a school house, or one of many other kinds. It makes very little difference what the room is, provided it can be reached easily. Its proximity to the mother's home is, as I have said before, the essential factor.

The equipment of a depot may be as simple or elaborate as one wishes. A refrigerator for the milk, a plain wooden table and an inexpensive account book are all that are actually needed for milk distribution; whereas the essentials for educational work consist of a pair of scales to weigh the babies and the few simple utensils which the nurse uses in making her demonstrations and in teaching the mothers the feeding and care of their infants. The maximum equipment would provide pictures, window curtains, flowers, comfortable chairs, a coat of white enamel and all the perquisites of a well-appointed settlement. Such a depot is to the mother as a haven of rest, a fair oasis in the desert of her existence, a stimulus to cleaner living and an inspiration to better motherhood.

The selection of a nurse is most important, as her personality is the soul of the depot, her tact and sympathy the keynote of its success. She should be a woman thoroughly acquainted with feeding and care of infants, of some social experience and fitness, intelligent and capable. A sympathetic nurse, who wins the respect and confidence of her mothers, will accomplish far more than a nurse who understands the theory of infant feeding and hygiene, but whose heart is not in the work. Wherever possible the nurse should speak the predominant language of her neighborhood. If she cannot speak this language, the difficulty may be partly overcome by securing interpreters to do this work for her.

Having located the depot and selected the THE MILK: nurse, the next thing is to secure a supply of milk. Many organizations which run milk depots own laboratories, where they modify milk in individual feeding bottles on a wholesale plan and retail it through the depots. These laboratories are expensive and unnecessary, because nine-tenths of all mothers can undoubtedly be taught to modify milk for their infants at home and thus save the great cost of artificially prepared milk. This statement is not based on theory, but on actual experience. At the beginning of its work in New York the Milk Committee operated its own laboratory and dispensed modified milk exclusively. The average amount of modified milk consumed by each baby daily was $32\frac{1}{2}$ ounces. The actual cost of producing, modifying and delivering this milk, not including rent of depots, help in depots, refrigeration, light, incidentals in depots and general administration, was \$.004 an ounce daily, or 13 cents for each infant. Had the items been added, the actual cost of milk distribution alone, not including in this any items whatever for educational work or for the supervision of the educational work, would have been very nearly \$.005 an ounce daily or $16\frac{1}{4}$ cents for each infant.

In August, 1908, the actual cost of relief among 100 infants fed gratuitously upon modified milk provided by the depots was \$438.75.

Believing that the mothers in the majority of cases were able to modify milk for their babies from whole milk, the Milk Committee in November, 1909, gave up its laboratory, sold its equipment, discontinued the distribution of commercially modified milk in individual feeding bottles and threw its entire energies into an educational campaign among the mothers themselves. Strenuous objections were raised. Social workers protested; mothers pleaded; nurses implored; doctors said it was impossible, the mothers were too ignorant, the babies would die. In spite of these protests the change was made, and those who most strenuously opposed it are now among its warmest advocates. The committee's reasons for making the changes were as follows:

1. Because, in the committee's opinion, the exclusive sale of modified milk placed undue emphasis on hand feeding and, as the committee's doctors found in many instances, actually discouraged feeding at the breast.

2. Because the exclusive sale of modified milk deprived the fairly intelligent mother of an opportunity to exercise her intelligence and thus was a step backward in the educational program.

3. Because, where the mother was intelligent and carefully followed the doctor's instructions, she actually could give the baby a food better, because more elastically fitted to its needs.

4. Because modified milk cost more than the average tenement mother could afford to pay, making her of necessity a recipient of charity.

5. Because the committee believed that the way to reduce infant mortality was not to help mothers alone by doles of milk, but by gifts of knowledge; and because of its desire to develop women who would possess initiative and self-reliance instead of helpless women dependent upon four-legged cows and bottling machines for the lives and welfare of their infants.

What were the results of this experiment?

In the committee's four depots in the summer of 1910 an average of 325 babies were cared for. Of these babies only one died from diarrhoea. In this case this death was caused by an obstinate mother, who, becoming impatient at the slow progress of her child, took it off the depot milk and weaned it on condensed milk. In our depot in Cannon Street, in the heart of the lower East Side, there were no deaths from diarrhoea. One baby died from pneumonia, one from the whooping cough and one as the result of the gross carelessness of an ignorant grandmother. In a depot in Bloomingdale Guild, which the committee in 1909 turned over to the Diet Kitchen Association, only one death occurred. In another depot in Union Settlement only two deaths occurred. In Henry Street the mortality was practically zero. In all of these depots the same methods prevailed.

The significance of these figures can be appreciated when one considers that these mothers who were thus educated to self-reliance came from the poorest families in the city; lived in the most congested neighborhoods, and were for the most part so ignorant that they were not only unable to speak English, but in many instances could not read or write their mother tongue. The important facts in the success of this educational work I shall discuss later. The only fact to be considered now is that it *was* a success.

From a financial standpoint, the experiment was striking. For 100 mothers to whom relief was given the cost of free milk at 9 cents a quart was \$210, as opposed to \$138.75, when modified milk in individual feeding bottles was sold—a saving of more than 100 per cent.

All this is a digression, but a digression very much to the point. And the point which I hope will be clear to everyone is that a cheap whole milk is much more important in reducing infant mortality than an expensive artificially prepared milk. In almost every city or town such a cheap, clean milk can generally be secured from some dealer or producer for distribution at the start in the infants' milk depot. A better way perhaps would be to interest some person or persons in the operation of a

model milk farm. Dr. Goler's able work in Rochester could profitably serve as a model for this undertaking. In still larger towns it might be possible to do what the New York Milk Committee has done through the organization of its model milk concern, the New York Dairy Demonstration Company. The important thing to remember is that milk demonstration is not a problem for persons who are employed and paid to do philanthropic work; not a problem for amateurs, but a problem for specialists who know the milk business from the ground up. In handling and selling milk the smaller the amount sold the greater is its cost of distribution. Some one must pay this cost. It may be philanthropy or it may be those who are distributing the milk, or it may be the customer—but somebody has to pay it. The most economical way to distribute milk is to adopt business instead of amateurish methods and to run this end of the work at its maximum capacity.

Having secured our milk supply, arrangements
RELIEF: must be made for the financial assistance of indigent mothers. This should be done through the local relief society or societies. The agency maintaining the infants' milk depot should not assume the responsibility of relief. It has enough to do to run the educational work.

The next thing is to find doctors for the con-
DOCTORS: sultations or weekly classes. Perhaps the best way to secure them is for the nurse herself, in conjunction with the director of the undertaking, to confer with leading social workers in the neighborhood where the depot is to be located and, after a thorough discussion of the character and peculiar problems of the neighborhood, to select doctors who will tend to articulate all interests and give the depot a standing in the community. An inefficient, unpopular physician will not secure the co-operation of his fellow-practitioners, and the work of the depot will suffer greatly. An able, genial doctor is the making of an infants' milk depot.

We now have the depot located and
STARTING THE equipped, the nurse employed, the milk con-
WORK: tracted for, relief assured and doctors
 selected for the educational work. All is ready to begin. How shall this be done? Usually the first step is publicity. This can be obtained by a meeting in a church, settlement or in the depot itself; the depot or settlement preferred. After this meeting has been held, leaflets may be distributed through the neighborhood, calling attention to the fact that a milk depot has been established and stating simply its plan and purpose. At first only a few mothers will appear, and the nurse will have a great deal of leisure time. This time can be utilized

by house to house visiting. The Health Board in almost every city or town will probably be glad to supply names and addresses of new babies born; and it will not be long, if the depot is centrally located, before the nurse has all the babies she wants, and more.

By this time she finds it necessary to adopt a daily schedule. During certain hours in the morning the milk is distributed. At first she will distribute it herself; later, as the work grows, she will secure assistance. Still later, if it is a large city where there is great demand for the milk, this work may be turned over entirely to the person or persons who are delivering the milk to the depot so that these persons will actually sell the milk in addition to producing, handling and delivering it. But although the nurse no longer actually dispenses the milk herself, she will keep "office hours" during all or part of the period of its distribution in order that mothers may advise with her and that she may keep in daily touch with each infant under her care. This is a most important feature of the depot work and one which contributes greatly to its success. Nurses who do house to house visiting and have no central place like the depot are greatly handicapped, as they are thus compelled to make separate visits to each home at a great loss of time and energy.

Classes for mother should be arranged at regular intervals throughout the week. If there are only 25 or 30 babies, one doctor can handle them at one consultation weekly. If the same doctor has the time, he can handle twice the number of babies in two consultations weekly, or, better than this, because it promotes a feeling of fraternity among the physicians, two doctors can do the work together. I prefer to see a depot in which several physicians have one consultation each than a depot in which one practitioner monopolizes it all. The conduct of the consultations depends upon the personality of the doctor and the nurse. Some physicians are born educators, and can talk easily to all the mothers as they weigh, examine and prescribe for the individual babies. This method is a very good one, as each mother is stimulated into a sort of competition by the necessity of exhibiting her baby weekly in the full presence of all the other mothers. The strain upon the doctor's voice and nerves, however, is considerable, especially when the weather is hot and the babies are restive; and many physicians prefer to meet their mothers individually. Probably this method will appeal most to the average practitioner, who, it must be remembered, is still far from being what we all hope to see him one of these days, a teacher and educator. But the opportunity to instruct a

large group of mothers singly at one "fell swoop" usually proves too attractive even for the average physician, and, although he may prefer to meet them individually at weekly classes, he also arranges to meet all the mothers collectively from time to time. The talks given by the doctor should include all subjects relating to infant hygiene and infant feeding. Demonstrations by the nurse increase their value. Talks to little mothers, to expectant mothers, and even to fathers, are all embraced in this interesting educational work.

When the nurse is not in the depot either meeting the mothers individually or assisting the doctor at the weekly consultations, she should be in the homes—teaching the mothers how to use the simple utensils at their command, scolding their disobedience of her injunctions, praising them for orders carried out, encouraging them to be better wives and mothers.

Most of the success of the depot work depends upon this personal hand to hand work on the part of the nurses, for in the last analysis infant mortality is to be solved, not by philanthropy, or by institutions, or by the medical profession, or by the State, or by the proverbial George, but by the mothers themselves. In the discussion of this problem too little emphasis has been placed on this feature of the work. We must "put it up" to the mothers. We must heighten their sense of responsibility. We must teach them what to do and then see that they obey. The State, as Percy Mackay has pointed out, is powerless when it comes to the question of removing the pin from a baby's throat.

STATISTICS: The collection of statistics is not necessary for the immediate saving of babies' lives, although it is obviously desirable that the physician and nurse should have some record of the history of each baby under them. Much time and energy is wasted by societies on the collection of statistics which are not scientifically planned out, not thoroughly collected and not carefully analyzed. I do not believe in the collection of statistics by small local societies when problems of life and death demand their attention.

GENERAL SUPERVISION: If several depots are to be established, the question of supervision is important. The director of a philanthropic agency who has not had special training along medical or nursing lines is not qualified to supervise the work of depots. The best supervisor is a trained nurse who possesses all the qualities already alluded to in this paper. An excellent plan of supervision is to make this nurse secretary of a special committee on depot management, of which the director of the agency might be a member. This committee should be as small as possible and should consist preferably of persons each of whom rep-

resents a special interest, such as a nurse representing the nursing features of the work, a pediatrician representing the problem of infant feeding, a social worker representing social problems, an educator representing the educational side of the work, etc. If the director of the society maintaining depots has time and the inclination to devote to this work, he might be chairman of the committee. Such a committee, with the supervising nurse as its executive, is, in my opinion, the best way to manage and control the work carried on in infants' milk depots.

Lastly, the work of infants' milk CO-ORDINATION: depots must be co-ordinated with the work of hospitals, clinics, dispensaries, floating hospitals, fresh-air homes, day nurseries and all agencies which are interested in the baby problem. Before birth the depot nurse, through her intimate knowledge of these agencies, will assume the responsibility of preparing mothers for a successful delivery. After the baby is born she will continue to look after it, and will place at the mother's disposal every known means of bringing it to strong and healthy childhood. The milk depot is the natural co-ordinating unit in all this work because of its proximity to the home. If infant mortality is to be prevented and not cured, the home must be the crucial place of attack.

I look forward to the time when more effective ways of co-operation and co-ordination can be worked out between milk depots which reach directly into the homes and hospitals, dispensaries and clinics which care for babies on a larger institutional scale, as I believe it is desirable that the assistance and supervision exercised over mothers from the period before confinement until the child is weaned should be as uniform as possible with respect to instruction given and methods taught. Probably some day the instructional work to prevent infant mortality which at present is carried on in the depots, being paid for either by philanthropy or given gratuitously by physicians, will be taken over by our cities or towns. Already in New York City we have seen organized the Bureau of Child Hygiene, with the great corps of nurses working at least during the summer among the babies, and it is not unreasonable to expect this work in New York City and elsewhere to continue permanently throughout the year. Arousing present and future mothers to a full consciousness of the significance of child birth and the responsibilities of motherhood is surely equally important as the teaching of Greek and algebra to children who will perhaps never make any practical use of their knowledge along these lines. Whether it is for the State or for private individuals ultimately to handle the problem of milk distribution is a disputed question, but we must all admit

that those who produce this precious commodity upon which the lives of our babies and young children to such a large degree depend should at least not exploit the poor. The Mills hotels and the model tenements indicate that a new spirit is entering into business—the spirit of service replacing the desire for dividends, no matter at what cost. Who knows where it may lead?

Lastly, the word “relief” brings us to a survey of the whole field. After all has been said and done, infant mortality is a question of poverty; for with money can be purchased pure milk, medical service, nursing assistance, light, air, sunlight, sanitary surroundings, all that conduce to normal and healthy babyhood. That large numbers of infants die annually from causes which are absolutely preventable and of which the cost can be figured in dollars and cents is horrible. As social workers we must protest and we must stand committed to a program which will secure for all persons alike the right to live and be happy without the hypocrisy of alms given, or the degradation of alms received.

DISCUSSION

Dr. L. T. Royster, Norfolk: It has been said that character is a combined product of heredity and environment, and that education is a modification of environment. Dr. Jacobi remarked in his address that the infant's health is the combined product of heredity and environment. From no less a source than Professor Ira Remsen we learn that no person is truly educated who is not educated with his hands. Women must be taught to modify their own infant's milk and thereby feel an additional responsibility in the rearing of their own children. I cannot commend that too highly. I carry it out in my own practice and wherever I can teach the mother to modify the infant's milk I get better success. They can be taught it and should be taught it. I am not discouraging milk depots; I do not wish to draw invidious comparisons.

A word along the line of carrying the educational propaganda into the school system. I come before you as a representative of primary school education in our city. We have not carried this line of work into the schools as we should. The system of education has changed markedly in the last five years. Only 1 per cent. of the children attending public school ever reach the university. Are we to train this 1 per cent. of the children alone? Education today is to prepare men and women for the battle of life, and if this is true, what is more important than to prepare the coming mother of a generation hence and, only too frequently, the little mothers of today to take care of those already there and those to come. We cannot do better than to carry this educational effort into the schoolroom, teaching the children to prepare there for the life before them and to prevent the cortege of white hearses reaching from New York to Chicago, as alluded to previously.

Dr. Baker: I just want to speak very briefly about the Little Mothers' League in New York City. It is a movement that has not been carried on, I think, in any other city in this country, and it has been more or less of an experiment with us, but its results have been so excellent and so far-reaching that I want to call it to your attention. Two years ago we started to deliver lectures to girls in the

public schools over twelve years of age on the care of babies. Nothing very much came of it either in interest or results. This last spring during the month of May we had a lecture given in every public school in New York to the girls over twelve years of age, and strenuous efforts made to form Little Mothers' Leagues in all schools where their need seemed indicated. These leagues were formed in practically all of the crowded sections of the city. The girls met once a week, elected their own president and secretary, were provided with certificates of membership, quite official looking documents. For attendance at these meetings the members were given a silvered badge and the president a gilt badge. The doctor and nurse were the honorary president and vice-president. The meetings were held once each week and the children were actually taught to prepare food for infants, the methods by which milk could be modified, the exact method in which a baby should be bathed, and all simple fundamental rules of hygiene and sanitation of the home. The results have been brilliant. We have no statistical results except the statistical fact that we had over 22,000 members whose interest kept up during the entire summer, and that a large number of leagues are still meeting during the winter to form the nucleus of more leagues next summer. In New York City the child of twelve years or over in the crowded sections practically takes care of the family. The mother in many instances is intensely ignorant and in many instances unable to speak our language. In all infant mortality work it has been my experience that the older child in the family is the vulnerable point of attack. We are not only working for the present with the child, but we are doing what is far more valuable to my mind—we are working for the future. We are dealing with potential mothers and we are doing double work. I do not believe that there is any phase of the work that can be made of greater value than this work among the so-called little mothers.

Dr. Ira S. Wile, New York: The paper of Mr. Phillips, which covers almost the entire subject of milk depots, omits the discussion of one or two points which seem important. Firstly, a milk station does not essentially mean artificial modification in the home. Breast-fed children are more welcome to the milk station than the artificially fed. No child should receive milk until all the tests have been applied to prove that the mother herself is not able to supply the milk. Many of the mothers are obliged to go to work and they are not able to nurse the baby excepting before they go to work and after they return home; and during the part of the day intervening the child is put upon modified feeding.

Another point is the milk stations are not for the care of sick children. They are institutions for the purpose of keeping children well and not for the purpose of curing children that are sick. That is one of the reasons I object to the term "milk clinic." Clinic is associated in the minds of the people with sickness.

The third function of the milk station is to teach during pregnancy the preparation of the breasts for their functions. Instructions should likewise be given at milk stations in everything pertaining to health. If you can get fifty mothers to come once a week to hear about housing conditions and regulations, dietetics, economics, it will make better mothers of them. I am sure that such education has in many districts absolutely lessened the amount of infant mortality.

Dr. J. H. Mason Knox, Jr., Baltimore: I should like to express my sincere appreciation of Mr. Phillips' excellent paper. I am particularly interested in the success which he has had in feeding the babies

of the poor on whole milk modified in their homes. We have not had the courage to attempt this in all cases in Baltimore, as it has seemed to us that the danger of contamination was increased in preparing milk amid the unhygienic conditions in which so many of our babies live. Encouraged by Mr. Phillips' experience, however, we shall increase the number of babies furnished whole milk to be modified in their homes.

I should like to say a word about the local work in Baltimore, and extend to you all a cordial invitation to visit our eight milk stations now in operation. This year we have taken a somewhat larger grasp of the whole problem and are attempting to lay additional stress upon the encouragement of maternal nursing. This is possible through the co-operation of the Mother's Relief Society, which for many years has done excellent work in combating the evils of the midwife problem. On our staff are a social worker, an obstetrician, and a physician especially trained in this kind of work both in this country and abroad. We are attempting to follow up all the babies delivered at the Hopkins obstetrical clinic during their first year, encouraging their mothers to nurse them, and giving advice when needed in all matters pertaining to their care.

The number of wet nurses available in New York referred to by Dr. Hart is a revelation to me. Nursing of this kind, I know, is extensively done in European cities, but I did not know it was possible on such a large scale in this country.

I am particularly interested in the problem of illegitimate babies, and fully believe that their salvation in a large measure depends upon keeping them with their mothers. Most of them sent to asylums or bereft of home care are doomed. We all know that many of these unfortunate children develop into our sturdiest wage earners. Some of the brightest minds have had this shadow cast over their birth.

Our work here is very much encouraged by what we have heard this morning. We have learned a great deal and I am sure that all of us in Baltimore appreciate the reports of the experiences of those engaged in similar work elsewhere.

The chairman requested that Miss Holman give a brief statement in regard to inaugurating district nursing in the mountains and rural communities.

Miss Lydia C. Holman, Ledger, N. C.: Just as I entered the room I was struck with this statement from a paper being read: "How long through failure to organize must we allow this loss of babies?" I do not know whether we in the cities ever think of the rural communities or isolated communities, but I want to say that we have more babies born perhaps in a year than could be recorded in five years, without organization. I believe the Government undertook it and found it a failure a few years ago. When you know that the neighbor, the tanner or the soapmaker, or anyone else, man or woman, often even leaving the fields, will stop and deliver a woman, you know what chance the mother and baby have. When a man will deliberately in his fear and hurry dissect a baby before it is born, you know what chance the woman in the mountain has. When a baby is brought up, you might say, on turnips and cabbage and is often given snuff and tobacco, you know what chance the baby has. Fortunately, those mothers are not so cultured that they wean the baby too soon; they nurse the baby too long, generally. The baby in the isolated communities has no chance, and the reason I remained in the mountains of North Carolina was because there was so little chance for

the mothers and babies in that neighborhood. My attention was called to this state of affairs by a man who worked on the place attending funerals so frequently. It was always a mother's funeral, often mother and baby. Since that time, nine years ago, I have delivered 308 women, and I have all the mothers and babies. It would not be fair to the good people of Baltimore who have organized an association for the care of these people not to tell you about it. The work we are doing is in the way of district nursing, hygiene and social science, and we are going to carry it into every rural community in the United States. Next year we hope to have a paper for the infant mortality meeting, and to give you some figures. I hope that we shall have your co-operation.

THIRD SESSION

Thursday, November 10, 8:15 P. M.

**MUNICIPAL, STATE AND FEDERAL
PREVENTION OF INFANT
MORTALITY**

CHAIRMAN

WM. H. WELCH, M. D., Baltimore

SECRETARY

JOHN S. FULTON, M. D., Secretary-General, International Congress on Hygiene and Demography

ADDRESS*

By the Chairman, WM. H. WELCH, M. D., Baltimore

I notice that I am expected to make an address. I think I should hardly be justified in occupying much of your time in view of the fact that there are others here who have carefully prepared papers and who have come from a distance. However, there are just a few words which I may be permitted to say by way of introduction.

You will have noticed that the main topic for discussion tonight is Municipal, State and Federal prevention of infant mortality. You will probably also have observed that it has been impossible in arranging the programme to cover all of the subjects, even those which might be considered of fundamental importance, relating to this topic of Municipal, State and Federal prevention. Of course, the subject for discussion tonight is of particular importance because in this country we are so far behind other civilized countries in the activities of the Federal, State, and, for the most part, Municipal governments in this matter. If we had as thoroughly organized and complete service for public health in the national government as we should have, I do not think we should have been so far behind other countries in this respect, for a national bureau or department would have served certainly as a great stimulus to organization in this field. It would have furnished a model as to what could be done. It would have furnished a vast budget of information, which is essential in carrying on this work. We, therefore, have here another of many examples of how much we suffer in this country from the lack of a thoroughly organized and complete bureau or department of public health under the national government. Indeed, our municipal health boards have only recently and only in a very few instances taken up with any energy and thoroughness work in this field. The New York City Board of Health has done so. It is already under way, I think, in Pennsylvania, and something has been done elsewhere.

*From the stenographer's notes.

An interesting question is raised as to what shall be the relation of such municipal official work to that of private initiative and private organization. I do not think it is possible to draw a very sharp line here. Very often work which is begun by private initiative can then be taken over more successfully by the municipal or State boards of health than if they were called upon to initiate the work. I mean that it is, at least so far as our experience here in Baltimore and Maryland goes, often the case that work which is undertaken by some private organization or some public organization, which, however, is not connected with the Government, and which is carried on to a certain point, can then be taken over by the Health Board to a great advantage. A very good illustration of that is our experience with tuberculosis work. It became perfectly evident that our State Association for the prevention of tuberculosis was doing work which, properly speaking, did belong to the community or to the government. We felt that we should have stood very little chance of getting an adequate appropriation from our City Council if we went there without any demonstration as to what could be accomplished by this system, so we employed a certain number of tuberculosis nurses and it became apparent that we were doing an immense amount of service to the community. With that as an argument we appeared before the Mayor and City Council and we had no difficulty in persuading them to make the requisite appropriation for carrying on the work. And I imagine that is only one example of many that might be cited and possibly it may serve as a guide in this work of prevention of infant mortality.

It is evident from the programme that one topic, that of midwifery, was not included on the official programme. It is largely in consequence of the omission of that and the recognition of its great importance that I think this meeting should not go by without at least some discussion of this very important question, and I would like to emphasize its importance in all that relates to the care and preservation of the health of infants. We encountered it here in our efforts to do something in the cause of the prevention of blindness. It requires, I think, no special argument to appreciate the importance of this subject in this campaign for the prevention of infant mortality, although the question is one to which we have rather shut our eyes in the past. It is, of course, a department of the practice of medicine, but one might say an outlawed department of the practice of medicine in this country, and the same is true to a great extent in Great Britain. Physicians have here ignored the practice

of obstetrics by midwives or else have opposed any regulation of the practice to secure better conditions, and I apprehend that methods to improve these conditions will encounter to a certain degree opposition on the part of practicing physicians of the country, but it is wrong for us to be blind to the existing conditions. As a matter of fact, a large part of this practice is in the hands of midwives. The investigation of the actual conditions is as yet a very imperfect matter in this country. Four years ago Miss Crowell made a very notable investigation of the conditions surrounding midwifery practice in New York. She later directed a similar investigation in Chicago, and Dr. Mary Sherwood has reported the results of such a study for Baltimore.

We know that in a certain class of the population between 80 and 90 per cent. of the births are attended by midwives; that is true of the Italian part of the population, the Slavs and the Germans; the immigrant population are accustomed to it. It is a condition which actually exists and cannot be done away with, and we must recognize that as a fact. The investigations also brought out conditions which, I believe, are not more deplorable than is to be expected in view of the lack of requirement as to what the qualifications of midwives shall be. They brought out appalling conditions, to be sure, but I do not think they are any worse than one would have expected from the fact that there is no control of midwives in this country, at least no adequate control. Very few States have any legislation on the subject at all, and I know of no State that has entirely satisfactory legislation on the subject. We secured at the last session of our Legislature a fairly satisfactory midwifery Act. It remains to be seen how effective it will prove to be. It is placed in the hands of the State Board of Health. It requires registration and specifies certain qualifications which they must meet.

There is no place for the midwife to fit herself to pass satisfactory examinations, theoretical and practical, on the subject. One of the great needs unquestionably are schools for the training of midwives in this country. I do not believe there is any question that this is one of the urgent necessities. There are so-called schools in New York and St. Louis, but I do not know that they deserve the name. On the Continent of Europe there are quite thorough training courses, from six months to two years, but in this country what right have we to make these demands in the way of qualifications when we provide no opportunity for the training of midwives? One of the most significant facts brought out from the investigations of Miss Crowell is that even those midwives who come to this country

satisfactorily trained in foreign schools, with diplomas,—and included in their training, of course, is training in antiseptic and aseptic midwifery practice,—abandon the requirements here. They have perhaps sterilizers, but they do not use them. There is no supervision of their work so that they do not even live up to the training which they already have. I wish to emphasize the great importance in this movement for the prevention of infant mortality of this midwifery question. It is a complicated and difficult one, but it is one of the questions which must be met and I am very glad indeed that a call has been made for a discussion of the subject tomorrow morning.

We shall proceed now with the program, and I shall call upon the first speaker, Dr. Wilbur. Dr. Wilbur has done more to further that cause which lies at the foundation of public health and preventive medicine—vital statistics—than anyone else in the country. It is therefore with great pleasure that I introduce Dr. Wilbur.

REPORT OF THE COMMITTEE ON THE REGISTRATION OF BIRTHS

Presented by the Chairman, Dr. CRESSY L. WILBUR, Chief Statistician, Bureau of the Census

Study, or knowledge, of infant mortality should precede, as it does in the title of this Association, *prevention* of infant mortality.

This is reasonable and natural, and will doubtless command the assent of all workers for the saving of human life in infancy or at any period of age. We must first know the nature and exact extent of the evils that we seek to check before we can obtain the most efficient results in our efforts for their prevention, or be able to measure the efficiency of the various sanitary agencies employed.

In the narrow sense this may not be too literally true. We should not claim too much for the indispensable importance of proper statistical methods in dealing with the practical problems of infant and child mortality because common sense will point out at once that much has been done—and very much more *can* be done—in the utter absence of reliable vital statistics, or of any statistics at all, to prevent many deaths of infants. We can use the experience of other countries, whose sanitary services have been founded upon a sound basis of vital statistics such as the United States does not, at present, possess. It is not necessary to consult a table of statistics to know that filthy, bacteria-teeming milk should not be used by human beings, and that the whole chain of milk production, from producer to the smallest ultimate consumer (with one little sick baby), safe-guarded, with full publicity and the enforcement of the penalties of the law without respect to persons, so that the chief cause of the deaths of infants in the first and second years of life, diarrhoea and enteritis (which is responsible for over one-fourth of the total deaths of infants under 2 years of age and nearly 1 death out of every 16 of those at all ages), would largely be prevented. Moreover, we know, from common observation of every summer season, that these deaths occur much more frequently during the hottest months of the year, so that our campaign for the reduction of infant mortality can at once be directed to the most vulnerable point—prevention of milk and food infection in the summer—with the hope of wiping out a large proportion of the preventable deaths of infants by a few

months active work and strict enforcement of law each year. No statistics are necessary for undertaking the prevention of mortality from diarrhoeal diseases of infants, although it is true that our knowledge of the importance and peculiar incidence of these diseases with respect to age and seasonal occurrence has been the result of thorough registration of birth and deaths.

In the broader sense, however, accurate vital statistics are indispensably necessary for the conduct of any intelligent campaign against the preventable causes of death. The American Association for Study and Prevention of Infant Mortality is not founded for a day, but is an organization whose purpose must be to lead the forces engaged in the saving of infant life this year, and next year, and the year after, and so on until its object has been accomplished. After the slaughter caused by infantile diarrhoea has been stopped, there are other preventable causes of infant mortality; their study and restriction may proceed while the larger and more pressing duty of saving infant lives from filthy milk and other filthy food is being accomplished. The work of the Association and its success from year to year can be measured only by complete vital records, and it is therefore one of the paramount duties of this organization, in entering upon the contest with the foes of infant life, to build up and support this scout service or intelligence department, which alone can give true and exact information for the guidance of the active workers in this field of preventive medicine.

What we chiefly need in planning and conducting the work for the prevention of deaths of infants are accurate statistics of *infant mortality* for individual cities, rural districts, states, and the nation as a whole. They should be thoroughly dependable, strictly up-to-date with respect to time, and should be presented in such form that the results will be comparable, with precision, among themselves and with those of foreign countries. After the gross rates are presented, a thorough analysis of the returns should be made with respect to causes of death, and also as regards monthly occurrence and relation to the parent nativity, occupation of parents, sanitary condition of dwellings, etc. But the first step is necessarily to secure complete and comparable data for the total infantile mortality, because, if this can not be done, it is evident that all the secondary details will be more or less subject to question and comparatively valueless as a guide for practical sanitary work.

The accurate statement of *infantile mortality* requires the complete and satisfactory registration of *both* births and deaths. *Infantile mortality* is the ratio of the number of deaths of infants

under one year of age (exclusive of stillbirths) to 1,000 children born alive. It is *not* the ratio of deaths of infants under one year of age to the enumerated or estimated population of that age. This ratio is sometimes employed, but is very misleading when mistaken for the accepted ratio of infantile mortality based upon the comparison of deaths and births. We can not, therefore compute the true amount of infantile mortality from the registration of deaths alone, and this is the reason why we can not for the United States as a whole, for the registration area, for any State, or for even a single large city in the entire United States, present reliable statistics of infantile mortality that may be safely compared with those of other civilized countries.

Talk about the registration of *births* in the United States! Why, for not much more than one-half (55.3 per cent.) of the total population of the United States is there even fairly accurate registration of *deaths* alone. Many States—practically the entire South—make no more records of the deaths of their citizens than if they were cattle; not even as much, for blooded cattle have their vital events recorded, while human beings are thrown into their graves without a trace of legal registration. And even the States that have fairly good registration of deaths, and that have had such registration for many years, grossly neglect the equally important, or even more important, registration of births. Here is a specific case mentioned by Dr. John N. Hurty, Secretary of the State Board of Health of Indiana, in his Chairman's address, on "The Book-keeping of Humanity," at the last meeting of the Section on Preventive Medicine of the American Medical Association:

Farmer Hadley, of Indiana, dying, left his valuable farm in trust to his unthrifty son, to go to his granddaughter on her twenty-first birthday. The girl had been told the date of her birth and always celebrated as her birthday the annual recurrence of the same. However, when she believed she was 21, then claimed her inheritance, her father denied her age, saying she was only 19. The family Bible was appealed to [we have few family Bibles nowadays], but the leaf with the record was gone. *No birth record had been rendered, and the attending physician was dead.* The court was in a quandary. A Solomon was needed for judgment. At last a neighbor remembered that a valuable cow belonging to the grandfather had given birth to a calf on the day the girl was born, and he could swear to it. Perhaps the grandfather had recorded the date of the birth of the calf. His farm books showed this to be the case. *The date of birth of the human being was established.*

Pretty cheap humanity, not willing to spend about thirty

cents apiece (it costs no more, unless the wholly unnecessary and detrimental feature of payment to physicians and mid-wives is incorporated) for making the permanent legal records of the deaths of our parents, our brothers and sisters, our children, and our kin, as well as our own when our appointed time shall arrive, and of the births of our children! No other civilized nation on the face of the earth so neglects its duty in this respect or holds the vital records of its people in such low esteem. If this is the estimate that we deliberately place upon ourselves, it would seem that this Association has undertaken a foolish task in trying to save the lives of babies that are not even worthy of civil record. It is not true that such is the case. It is largely ignorance and thoughtlessness on the part of the people, who have never realized the essential importance of such records, and slovenly and faithless service on the part of their official servants, who have grossly neglected the administration of such laws where they exist.

The blame is sometimes placed by health officers upon physicians or mid-wives for failing or neglecting to register births. This is unfair, because the physicians and mid-wives are not charged with the enforcement of the registration laws. It is their duty to obey them, and if they do not obey them, it is the duty of the registration officials to compel them to obey them under the penalty of the law. Such excuses show great weakness and a misconception of the duty of the registrar to enforce, not to connive at the violation of, the law he is charged with executing. It is perfectly easy to ascertain whether or not such a law is being thoroughly carried out. Here is an extract from a paper by Florence Kelley, General Secretary of the Consumers' League, in "The Survey," September 3, 1910, on "What Our Official Statistics Do Not Tell Us:—"

"In a rapidly growing number of States children must produce their birth certificates before they can go to work. In New York city they must produce such certificates before they can enter the public schools, and again before they can go to work. The exceptional children admitted upon other evidence of age are put to such inconvenience in the process, that every exertion is made by parents to get birth certificates. Of 28,000 children, native-born and foreign-born alike, who get working papers each year in New York city, between the ages of 14 and 16 years, three-quarters have birth certificates. *The remaining quarter, who fail to get birth certificates, are native American children and those who come from certain parts of Russia or from the earthquake district of Italy.* What earthquake and revolution do in Europe, official slovenliness accomplishes

throughout the greater part of this nation, in depriving the children and citizens of the most fundamental of all vital and industrial statistics, the record of births.

"In New York city some years ago, Dr. Ernst J. Lederle, the Health Commissioner, introduced a *simple device for forcing doctors to record births*. Whenever a child's death certificate was filed, the birth records were searched for its birth certificate. If the child's birth had not been recorded, the family was questioned as to the doctor or mid-wife, and a warning sent to the offender that the next failure to record a birth would be followed by *publicity and prosecution*. Immediately the [apparent] birth rate rose—not because more children were born, but because a simple workable device was installed for *compelling registration*."

Your committee has emphasized certain passages in this statement because they go to the heart of the question of effective registration of births, which would enable dependable ratios of infantile mortality to be computed for the special service of this Association, as well as of all the official public health agencies, in the work of saving the lives of our American-born babies. Our native-born children of native parents are as worthy of protection as the children of any other country, and the children born to foreign-born parents in this country should have the same safeguards about their cradles as if they had been born in a foreign land. America should not mean barbarity in its relation to infant life. The aegis of protective civilization should rest upon the infant of American birth, and a proper record be made of the vital events of his life for his personal protection, legal use, and for the most important sanitary information which can alone be obtained from such records.

Not even the records in New York city, the second largest city in the world in the magnitude of its population, are yet complete. In the last report of the Department of Health it is stated that "the returns of births in this city are not complete," there being "still many that are not recorded by reason of the neglect of the medical attendants and mid-wives;" while as to comparisons with previous years or periods so that it can be ascertained what the course of infantile mortality has been, "the absence of anything like complete returns of births in this city in previous years prevents the preparation of a table possessing rates" suitable for that purpose. A disgraceful condition in the history of American sanitary progress at the end of the first decade of the Twentieth Century! And when questions of public health have come so largely into the public eye—sometimes even to the extent of constituting fads! Yet New York

is far in advance of many cities in this country with respect to the thorough registration of births. It is perhaps fortunate that this meeting of the Association for Study and Prevention of Infant Mortality should be held in this good city of Baltimore, the Athens of higher medical education, because it is probably that large city of all the earth—certainly of all the civilized nations of the earth—in which the registration of births is most shamefully deficient. It is true that it has close rivals in Chicago and New Orleans. It is a little difficult to decide in which of these great and progressive cities of the United States, Baltimore, Chicago, or New Orleans, the registration of births is most utterly worthless; but it is certain that it would not be possible to find their equals for worthlessness in any other country where vital records are maintained.

What is the remedy for this condition? It may be simply stated as consisting of only two items, namely, (1) the enactment of adequate laws for the complete registration of births and deaths in all States that do not, at present, possess them; and (2) the thorough *enforcement* of the present laws and of the new laws when enacted.

The principles upon which registration laws must be constructed in this country in order to be successful are thoroughly settled upon the basis of practical experience, and are set forth as Rules of Statistical Practice adopted by the American Public Health Association and approved by the United States Bureau of the Census, which may be found on page 37 of the annual bulletin of Mortality Statistics, 1909, copies of which are here for distribution. A model law, based upon these principles, has been constructed and indorsed by the American Medical Association, the American Public Health Association (whose Section on Vital Statistics includes all the leading State and city registration officials of the United States), and by the Bureau of the Census; copies are here for distribution in the American Medical Association Bulletin of January 15, 1909, which also contains a discussion on "Why Should Vital Statistics be Registered?" The co-operation of the organized medical profession of the country has been very effective in securing the rapid extension of proper methods of registering vital statistics, despite the occasional opposition encountered from some unenlightened physicians, or even county societies, who complain, chiefly, that the model law as recommended by the House of Delegates of the American Medical Association, compels them to make returns of births and sign medical certificates of cause of death "without compensation"—the petty sum of 25 cents being in mind. This law has been put into force in various

States, and is giving most excellent results. As examples may be mentioned Pennsylvania, Ohio, and Missouri. Pennsylvania had endeavored to secure registration of vital statistics for fifty years, but it was not until the model law was adopted in 1905 that results were secured; the State was admitted to the registration area for deaths for the year 1906. Ohio had much the same experience. Imperfect laws had been in force since 1857, resulting only in worthless vital statistics; the model law enacted in 1908 was an immediate success and the State was admitted to the registration area for deaths beginning with 1909. Missouri had virtually no system of vital statistics, although a foolish law constructed on the old county system had been in effect many years. The model law adopted in 1909, went into effect on February 1, 1910. The State is thoroughly organized and excellent results are already being obtained.

In all of these States, and in other States where advanced legislation has been adopted, some slight opposition has been encountered, but the cordial support of the more progressive members of the medical profession, and the hearty interest of the press and public in the valuable results gained, may be fully counted upon. We may cite an editorial comment from the *Journal of the American Medical Association*, July 9, 1910, on "Upholding the Ohio Law:"

"An Ohio physician was convicted of violating the vital statistics law by persistently refusing to report births. He was not a member of a county society, but in appealing the case to the Supreme Court he solicited financial aid from the societies. On this account the matter came before the House of Delegates of the State society. That body wisely expressed its disapproval of this violation of the law, and also of the action of those county societies which had extended aid to this physician. In effect the resolution adopted by the Ohio House of Delegates says that the vital statistics law of Ohio should be upheld by physicians and strict compliance with it insisted upon. We believe this is right. A physician who refuses to comply with the law does not appreciate his responsibility or his obligation to the State. The attitude of physicians in such matters should be carefully considered. It is an axiom in the legal profession that every lawyer who has been admitted to the bar is in fact an officer of the State. The State has granted him certain privileges, in addition to placing its seal of approval on him in the form of a license to practice medicine. In return for this he is under moral, and in some states legal, obligations to render a fair and proper return by promptly performing the duties his position requires. The importance of vital statistics is known better to physicians

than to others, and they should be the last to resist in any way the enforcement of these laws. Hence the attitude of physicians who refuse to make returns of births or who demand the payment of a small fee by the State cannot be commended."

And in a later comment (October 8):

"The value of such data is recognized in all civilized communities. The carelessness of Americans regarding birth and death records is looked on with astonishment by our European neighbors. Cattle, dogs and horses are carefully registered. The birth of even an Angora kitten is considered worthy of record, yet we have practically no birth records (of *complete* and satisfactory character) while, in nearly half of the United States, human beings die and are buried without any record being made of the fact. The properly educated physician recognizes the importance of (birth and) death certificates and furnishes them without compensation, not as a privilege, but as one of his duties to the State."

The registration area for deaths has rapidly extended in recent years, as indicated in the table on page 7 of the bulletin on Mortality Statistics, 1909, and in the maps exhibited before this Association. Soon we shall have no State of which it may be said, as Dr. E. C. Levy, Chief Health Officer of the city of Richmond, said of the "Mother of the Presidents" before the Virginia Funeral Directors' Association, May 21, 1908:

"You would see what an awful light that State is put in that buries its dead people (Virginians) with no more ceremony than it buries its dead dogs, and you would take a view of this thing which would make you dissatisfied until Virginia was in the list of registration States."

But in the registration of births the country is even more backward. Only a very few States have even approximately complete registration of births (90 per cent. or 1 birth omitted for every 10 that occur). A tentative list might include the New England States, Pennsylvania, Michigan, and the District of Columbia. Even the District of Columbia, whose laws are made by the direct action of Congress and which is identical with the city of Washington, *does not register all its births!* Nor are physicians frequently prosecuted for violations of the law. In fact the only State in the Union in which, now or at any former time, a determined effort has been made to thoroughly enforce the registration of births, as the law provides and with prosecution and infliction of the penalty of the law in delinquent cases, is the commonwealth of Pennsylvania. The work of *enforcement of the law*, an absolutely essential part of an effective administration of any system of birth registration, is

beginning in Ohio, and will be taken up in Missouri; these States have had the model law in force for a much shorter time than Pennsylvania. But in the great majority of States the compulsory enforcement of the provisions of the laws for the registration of births by means of the penalties provided for noncompliance is practically a dead letter, and is solely responsible for the worthless character of our statistics of births and the utter absence of any reliable figures for infantile mortality. Pennsylvania has pointed the way, and the more progressive States will surely follow. It should be the great opportunity of this Association to aid, to the full extent of its power, in supporting the effective *official enforcement* of registration laws compelling physicians and mid-wives to register ALL births, because, in addition to all the other reasons for such registration, the work of saving the lives of infants and children is seriously impeded by the lack of reliable statistics of infant mortality due to official slovenliness and neglect of duty.

What this Association should not do, nor should any other organization not familiar with registration work and the practical requirements of effective administration of registration laws undertake to do, is to attempt to introduce changes in methods of registration or to modify the form of the standard blanks used as certificates of birth and death without the most careful consideration and full consultation with the organized registration officials of the United States (Section on Vital Statistics of the American Public Health Association), the American Medical Association, and the Bureau of the Census, which represents the Government in this matter. Some very unwise changes in State law have been made, such, for example, as reducing the limit of registration of births to 36 hours for rural districts in a State where even the enforcement of the provision for 10 days or 5 days after birth had notoriously failed. It is worse than useless to attempt to secure effective birth registration, not by *enforcing* the plain provisions of existing law, but by setting a lower, and in the judgment of the most experienced registration officials an unreasonably low limit, under which, of course, there will simply be many more unpunished violations of law. The limit in the model law is, for a State, 10 days. It might be possible to enforce a 5-day, or even in time a 3-day, limit over an entire State area, but until a 10-day limit has been thoroughly enforced in practice in one or more States, it is ill advised to advocate a limit that would be even more difficult to enforce, and that the courts might not be disposed to sustain as a reasonable requirement. It is, of course, proper to require a very short interval in a city, and one that

would be quite impracticable in the country; but even in the cities in this country at the present time more would be gained by requiring the thorough enforcement of the registration of all births within 5 days or 10 days after their occurrence than by requiring prompter returns and permitting the repeated violations of the law that now occur.

Neither is it desirable to make any changes or additions in the United States Standard Certificate of Death or in the corresponding Standard Birth Certificate. These blanks have been officially adopted by the American Public Health Association, at Richmond, 1909, for use during the next ten years, and are used in the great majority of the States of this country. They contain all that is necessary for the essential purposes of registration and it is extremely unwise to attempt to modify them to secure special information. Information of this kind, such as character of infant feeding, use of nitrate of silver to prevent blindness, etc., can better be obtained in other ways. Much of the imperfection of our vital statistics has resulted from the absence of a uniform blank for the initial data, which we now have in the Standard Certificates, and perpetual changes and alterations in these blanks, however desirable from special points of view, should be discouraged until they assume sufficient importance so that the next general revision can include them and all registration States adopt them at the same time. We want no more tinkering with the forms in use until the time arrives for a general change.

At this point it is desirable that the distinction between the mere notification of births and the complete legal registration of births should be clearly understood. The notification of births is much like the notification of sickness. Both are of value for certain purposes and it is to be hoped that practicable methods of birth notification and sickness notification may be widely introduced in this country, and the notification of births may be of service to the thorough registration of births and the notification of sickness be of aid to the complete and satisfactory registration of deaths, as well as supplying reliable morbidity statistics, which are our most crying need after that of complete birth registration. But the notification of births is in no sense a substitute for the complete legal registration of births, and sickness notification can never take the place of thorough registration of deaths. The methods employed for notification and registration are somewhat different, and any attempt to combine them indiscriminately, or to modify registration laws in blissful ignorance of the essential requirements of registration, can only do serious injury to vital statistics and delay the day when we shall have satisfactory records of infant mortality.

The difference may be indicated by the fact that England, the native home of modern vital statistics and in which country the registration of births has proceeded under national law since 1837, has only as recently as August 28, 1907, adopted the Notification of Births Act. The Act is even yet not in force in the entire kingdom, but is subject to adoption by local authorities (councils or boroughs, urban and rural districts, and of counties), and the returns are made to an entirely different set of officials (health officers, not local registrars) and under an entirely different administrative direction (Local Government Board, not Registrar-General) from those employed for the *registration* of births and deaths. It is, in fact, expressly provided in the Act (paragraph 4 of section 1) that—

“The notification required to be made under this Act shall be in addition to and not in substitution for the requirements of any Act relating to the registration of births; and any registrar of births and deaths, whose subdistrict or any part thereof is situate within any area in which this Act is adopted, shall at all reasonable times have access to notices of births received by the medical officer of health under this Act, or to any book in which those notices may be recorded, for the purpose of obtaining information concerning births which may have occurred in his subdistrict.”

It may be noted as of interest that the necessity of the Notification of Births Act, as a most important means of giving timely information of the occurrence of births and thus enabling measures to be taken for the prevention of infant mortality, was warmly advocated by members of the English medical profession, who subsequently opposed the bill when the provision for giving a special compensation to physicians for such reports was stricken out by Parliament. It is unfortunate, in every way, that the question of compensation to physicians and midwives should be urged by the medical profession in connection with the legislation for the registration or notification of vital statistics, because it at once places the profession in the position of asking a favor, for interested motives, and may be denounced as “medical graft” by many members of State legislatures. It retards the cause of registration, has no good effect whatever on the completeness of the returns, interferes with the thorough enforcement of the law, and, very fortunately, is not sanctioned by the American Medical Association or, it is believed, by the English medical profession as a whole, since they are cordially supporting the Notification of Births Act now that it is in force.

It may be desirable to require physicians and midwives to notify births to the local authorities. They may be asked to report within 36 hours, or within 24 hours, or as soon as the

case is seen or the child is born. Let them use postal cards, or, in cities, call up by telephone. Only the very simplest statement need be secured, such as the names of the parents and place of birth. A statement as to the use of silver as a preventive of ophthalmia neonatorum could be required, and also whether aid of a district nurse would be desirable, could be obtained at the same time. But do not let such attempts to secure immediate notification of births interfere with the proper legal registration, which cannot be made as rapidly in many cases, nor load up the standard forms of certificates with items which have no proper place upon the permanent legal records of births and deaths. It is hard enough to secure the enforcement of registration laws without further embarrassment from well-meaning but uninformed enthusiasts, who are prone to subordinate all other considerations to their immediate purposes.

DISCUSSION

DR. WILBUR

The Committee on Birth Registration has not taken up in its report some questions of very great importance in their relation to the prevention of infant mortality. Among these are the more complete reporting of still births, and the sharp distinction that should be made between still-born and live-born children. The causes of antenatal mortality are most important, but, on the whole, it hardly seems profitable to attempt greater stringency in reporting still births when so many births of living children are not recorded. So also it is necessary that greater precision shall be employed in the statement of the causes of death of infants, and a uniform nomenclature of diseases, from which, as from the nomenclature of the Royal College of Physicians used in England, such indefinite terms as "marasmus," "atrophy," "inanition," and the like shall be stricken is much to be desired. Such a nomenclature is now in course of preparation by a special committee of the American Medical Association, co-operating with committees of other national medical organizations, and with the Bureau of the Census and other Government authorities, so that the official nomenclature, when published, shall be fully comparable with the International Classification of Causes of Death which is now in use for the mortality statistics of the United States and many other countries. Recommendations on this subject cannot be made until the work of the Committee on Nomenclature is completed. It is not necessary, either, to dwell upon the absolute necessity of reliable vital statistics, and especially statistics of births from which are derived ratios of *infantile mortality*, for the benevolent purposes of this Association. The evidence is before you in charts and

diagrams prepared by the Bureau of the Census, which show the great value attached to these subjects in the official statistics of all civilized countries except our own and the most lamentable deficiency of the United States in surrounding infant life with these safeguards of legal registration, which are not only of the greatest personal and legal value to the individual and the State, but whose absence renders our efforts for the saving of infant life, and also all organized public health work in the United States, largely a blind groping in the dark when we are entitled to, and should have, just as full information in regard to the mortality of infancy and its preventable causes as the citizens of any other nation.

The most urgent matter at the present time is to secure the registration of all births and deaths that occur in the United States; to aid the movement for the adoption of such laws; and, most important of all, to SECURE THE THOROUGH ENFORCEMENT OF REGISTRATION LAWS. We therefore present the following preamble and resolution, which we hope may be adopted by this Association, and that the active interest of all workers for the prevention of infant mortality will be concentrated on this point until satisfactory results shall be accomplished:

WHEREAS the registration of *all* births and of *all* deaths is most essential for the study of infantile mortality and the prevention of the deaths of infants and children from avoidable causes, therefore, be it

Resolved, That the American Association for Study and Prevention of Infant Mortality cordially approves of the model law for the registration of births and deaths, as recommended by the American Medical Association, the American Public Health Association, and the United States Bureau of the Census, and urges the thorough *enforcement* of such laws by the officials charged with the responsibility of their execution, with prosecution of physicians and midwives who neglect their duties to their clients and to the public health by failing or neglecting to register births as required by law.

STUDIES ON MILK SUGAR

By HENRY F. HELMHOLZ, M. D., Chicago

For my topic this evening, I have chosen a subject that deals with one of the causes of infant mortality, and in its recognition as such becomes at once a means of reducing the excessive death rate from the acute gastro-intestinal diseases. My subject is "Milk Sugar." To many, no doubt, it may be a surprise to hear milk sugar spoken of as an important factor in the etiology of these acute disturbances, but I hope to show you, before I have finished, that the recognition of the danger of sugar to the infant organism is one of the greatest advances in the solution of the artificial feeding problem and, as such, a very important means of reducing the excessive infant mortality.

To my mind, relatively too much emphasis has been laid on the freshness and purity of the milk and not enough on the form in which it is given to infants. The idea that the problem of infant mortality could be solved by furnishing all infants with milk of low bacterial content, has predominated here in America. The danger from pure milk—per se—and from the sugar in particular has received very little, if any, attention. Take, for example, the four stock formulae put up by the Milk Commission of Chicago. What is the underlying idea upon which these modifications are based? The indigestibility of the cow's casein for which there is practically no scientific or clinical proof.

It is time that we understood what the relation of each of the different elements of the milk is to the acute gastro-intestinal disturbances, how these different components interact and how each one of them can only be considered in its relation to the others. As an example, let me cite the danger of fat when given with high percentages of sugar; its relative harmlessness when given with low percentages.

For many years, the bacteria held the center of the stage and our efforts were all directed toward finding a serum or vaccine with which to master this disease. There can be no doubt that specific bacterial infections do play a role in a small percentage of cases; but the fact is equally certain that the great bulk of the cases which make up our mortality records are due to improper feeding—especially in regard to the sugars.

It is only within the last few years that our attention has been called to the sugar of the milk as a cause of the acute gastro-intestinal disturbances of infancy. Largely through the work of Czerny and of Finkelstein, an entirely new conception of these acute disturbances has been given us. The idea about which this new conception centers is the nutritional range of the infant from the minimum amount of food which is necessary to growth to the maximum amount of the food that it can take without bodily harm. This upper limit is known as the tolerance for any food. The greatest tolerance is manifested for mother's milk; it is harder to render a child sick by over-feeding it with breast milk than with anything else. The same food—be it mother's or cow's milk—that acts as a food when given in amounts below the tolerance limit, will act as a poison when given in amounts above it, and the disturbances will vary according to which element of the milk is given in excess. The tolerance is lowered (1) by continued overfeeding, (2) by bacterial contamination of the milk, (3) by parental infections, (4) by external heat. By each one of these last factors, the tolerance may be lowered beneath the amount upon which the child had been previously thriving. In such a case, the toxic action of the food manifests itself by loss of weight and a train of symptoms that will depend upon the character of the food being given.

A slight overstepping of the sugar tolerance will lead to a condition called dyspepsia, marked by a slight drop in weight, an increased number of bowel movements and a slight rise in temperature.

Gross increase above the tolerance or rapid lowering of the tolerance by heat, infection or toxins, give rise to typical cases of cholera infantum characterized by coma, rapid drop in weight, watery stools, fever, slow toxic breathing, leucocytosis, albumen, casts and sugar in the urine. This is the condition in which the little patients are usually brought to the doctor and it is practically impossible then to form a definite conception of the cause of the disease from the history alone. It is only when one can observe the development of such a case that deductions of some value can be drawn. In institutions where there are large numbers of infants to be artificially fed, cases of cholera infantum (intoxication) occur with some frequency. Finkelstein, in charge of 140 orphans under one year of age, had occasion to see a large number of such cases and by acute clinical study discovered the relationship of the sugar to this condition. By increasing the amount of sugar, he could bring on an intoxication; by

removing the sugar from an incipient case, he could prevent its development. In like manner, he discovered that the sugar was responsible for those cases in which there was only increased peristalsis, loss of weight and fever; and that its withdrawal caused a prompt cure.

Two of the symptoms in particular deserve mention because of their intimate association with bacterial infection, namely, fever and polymorpho-nuclear leucocytosis. It has been definitely proven by the experiments of Meyer, Schloss and others, that salt solutions and sugar, when given per os to dyspeptic children can produce fever of 102° F.— 104° F., and polymorpho-nuclear leucocytosis as high as 30,000. We see thus that sugar can produce symptoms that we have been accustomed to associate only with bacterial infections.

Lactosuria is another symptom to which I wish to call attention more in detail, because of its early appearance (it may be the first symptom of an impending intoxication) and because of its relation to the understanding of the condition as one of disturbed metabolism. The normal infant can handle from 2 to 3 grams of lactose per kilo of body weight. If more than 3 grams per kilo are given, the child will excrete lactose in the urine. In intoxications the tolerance for lactose is greatly reduced; even when as small an amount as 5 c. c. of mother's milk is given at a time, the urine may show a decided reaction for sugar. Figuring mother's milk at 7 per cent. sugar, would make the tolerance less than 1/80 to 1/100 that of a normal child. This is explained by the assumption that the intestinal lining has been so changed that the sugar, instead of being split as normally is rapidly absorbed and excreted through the kidneys. The normal permeability of the intestinal mucosa has been so changed that other toxic products might be absorbed. The question as to whether the sugar thus overflowing into the circulation acts toxically is still a mooted one.

As a natural development of this study, came the therapeutic food that has been brought forward during the last year by Finkelstein and Meyer. The excellent results obtained with this food prove, in a very definite and concise way, the importance of the saying that the elements of the milk cannot be considered separately, but must be considered as a whole. The fat, is considered by many the most dangerous element of the milk in the etiology of acute gastro-intestinal disturbances. In former times the casein has been accused of being the element of cow's milk in which the dangers of artificial feeding centered. Here these two constituents are given the infant in large amounts, but in a mixture poor in sugar. In this form of albumin milk, they are

a therapeutic agent for the cure of just such cases as they were supposed to produce.

Clinically, then, excessive amounts of lactose may cause a chain of symptoms, namely, fever, diarrhoea, leucocytosis, prostration and death, which closely resemble the effects which follow the absorption of certain true bacterial toxins. Experimentally, too, it is possible to show that lactose fed in excess to pups will cause a similar picture. Pups about six weeks old were fed increasing amounts of lactose in sterilized milk. At first, the pups increased in weight more rapidly than the controls, were very active, and seemed perfectly well. Upon still further increasing the sugar, the weight increased more rapidly for a while even after the stools had become thin and frequent. Quite suddenly there was a decided change. The pups began to lose weight rapidly, lost their desire for food and had numerous watery stools. During the next three days their flesh just seemed to melt away, and they died in a very emaciated condition, without any special symptoms. The sudden change, from fat, well nourished pups to sickly, emaciated animals in the short period of two days reminded one of the way in which infants just seem to fade away during an attack of cholera infantum. Increasing the amount of sugar produced also an increase in the rate of gain in weight up to the point where the tolerance limit was overstepped, then came the breakdown in metabolism and the rapid loss of weight that ended fatally in three days. The controls that were fed on the same sterilized milk without lactose addition gained weight more slowly, but showed none of the acute symptoms of the sugar-fed pups. In none of the pups was there any urinary evidence of an acidosis.

Although there can be no doubt that the sugar is an agent in causing these effects, there is a question as to whether lactose, per se, is the substance primarily responsible, or whether its excessive administration facilitates the entry of other toxic substances into the circulation. The modus operandi is of theoretical and practical importance. Comparatively recently Leopold and Reuss have made the observation that when lactose is injected subcutaneously into infants and dogs there occurs a quantitative excretion in the urine, if only a single dose is given. If the injection is repeated daily, the amount of lactose which appears in the urine falls until finally no lactose at all is excreted by the kidneys. It has been hinted that the gradual increase of tolerance for lactose so administered is analagous to the development of immunity by repeated doses of a true toxin. If this be true, it is of the greatest importance—this immunity action to lactose, a compound of very simple chemical formula.

There are, however, certain criticisms to be made against the work of Leopold and Reuss. First, their method for measuring the amount of lactose excreted did not include the possibility that a mixture of sugar in the urine gave rise to polarization figures that corresponded to a quantitative figure for the amount of lactose injected; and, second, lactose subcutaneously injected may be excreted by certain channels other than the urine, so that the disappearance of the lactose from the urine is not necessarily a criterion for the destruction thereof in the body. In making a systematic study of the relationship of lactose to intoxication, Dr. Woodyatt and I have had occasion to repeat the work of Leopold and Reuss, using an improved method and laying more stress on the possibility of the existence of a mixture of sugar in the urine following injection. We could show that by fermentation a portion of the reducing and rotary substance was lost, after the first injection when less than 100 per cent. of the injected amount was excreted. Repeating the injections we noted a gradual reduction in the amount excreted, but no consistent absence of lactose from the urine. By suitable experiments on dogs it could be demonstrated that the lactose after parental injection was excreted not only by the urine, but also in the bile, and by the duodenal mucosa, so that it is readily conceivable that instead of an increased destruction of lactose within the body, as shown by the urinary findings, a larger per cent. of it is shunted into the intestinal canal. We are at present engaged in experiments along this line and hope to be able to report on them at some future time. At this time, however, it is apparent that absence from the urine after injection is no indication that lactose is destroyed in the body.

I have come now to the part which will be of more interest to most of those present, namely, the bearing that all this has on the great question of the reduction of infant mortality. I have tried to show you that the commonest type of gastrointestinal trouble is caused directly by the food—that it is brought on in its most acute form by the lowering or overstepping of the tolerance for sugar, be that by improper feeding, by infection, by spoiled milk, by high external temperature, or by other causes. The food which, under normal condition nourished the child, becomes a poison as fatal as bacterial toxins.

As I mentioned before, the purity of the milk, though of great importance, is not the only important factor. The emphasis that is being laid upon pasteurization of a city's milk supply, while it is of great value and if properly understood, leads to much good, has unfortunately overshot the mark among the uneducated. Instead of feeding their infants fresh milk, they avoid

the bacteria entirely by giving them proprietary foods with the dire results that one sees in dispensary work. This concentration on the bacteria of the milk has left the equally important factor of the quantity and character of the food entirely out of account. It was my good fortune to substitute for one of the physicians during July at one of the Berlin Säuglings-fürsorge-stellen. I was impressed by one thing in particular—the good results that can be obtained by simple, home-made gruel dilution of milk in a class of people who have no ice chests and who live under poor hygienic conditions. Milk was supplied only once a day and so the bacterial content of the milk must, in most instances, have been high. And still the children did well. Why? Because they were carefully watched and weighed, and their food was always kept within the tolerance limit. Only in exceptional instances was a special food prepared in the milk kitchen of this Fürsorgestelle. The mothers were taught how to make their milk dilutions by a nurse who visited each new case. And so the movement is gradually educating a large part of the population to rational ideas of feeding and hygiene.

How many mothers do you suppose there are in America today who realize the danger that lurks in the sugar which they so generously add to the milk? How many doctors are there who appreciate this fact? How many doctors are there who will tell a mother to stop nursing her child with no other indication than the fact that the first few drops of milk expressed from the breast are blue? We see this in the dispensary only too often. This cornerstone of infant feeding is lightly set aside, not by one, but by a large percentage of physicians who will take a child from the breast for the most trivial reasons. As regards his advice to mothers on feeding infants, it will depend largely on whether Mellin, Nestlé or Horlick sent him the last sample.

What we need is education of the physician primarily and through him the education of the public. We need to cull the scientific and clinical facts from the mass of empiricism of infant feeding so that they can be presented to the physician in a form that will be useful to him, so that he may appreciate the dangers as well as the therapeutic advantages of the different elements of the milk. What we need is capable supervision of each milk station by men who can make each station a center from which the propaganda of rational feeding and therapy will spread, so that ignorance will keep no infant from the breast, so that ignorance will no longer prevent the institution of the right therapy when there is still hope to save the child.

In conclusion let me repeat once more that I appreciate as much as anyone the advantages and necessity of pure milk of

low bacterial count for infant feeding. On the other hand, of equal importance is the appreciation that improper dosage of even the purest milk is a serious danger to the life of the infant.

DISCUSSION

Dr. Abraham Jacobi, New York: I certainly beg your pardon, Mr. President, for taking a few minutes more of your time. There is one paper that struck me as if it deserved discussion, at least at my hands; that is, the paper of Dr. Helmholz on "Milk Sugar." If I understood him correctly, he is of the opinion that nothing is easier than to overfeed with milk sugar. I understood him to say that milk sugar was the frequent cause of intestinal disorders. If that was not in his paper, I have misunderstood him altogether.

Only today I had an opportunity to repeat what I have said a number of times, which is that the better class of American physicians are very much better informed than the better class of European physicians. When you see a French or German book you will find that they quote French or German literature. That is not so with Americans. I am positive that the better class of American physicians and writers know foreign literature very much better than the people in the old country. For that reason I appreciate highly the fact that the doctor who is American like all of us quoted German authors who have done very meritorious work in connection with infant feeding. The same thing, however, might have been said of American physicians. Tomorrow morning, for instance, your session will be governed by one of our great American pediatricists, who is one of the few whom they happen to know in Europe. He has written a good deal on the subject of infant feeding; I know his practice and I know that he does not overwork infant intestines with milk sugar. The changing of milk sugar in the same way in which the doctor has spoken of it has been taught in this country for the last 50 years, so it is quite natural as it has been taught 50 years ago that it should have been forgotten. It has been written about, too, and it is quite natural that the American literature not getting to Europe very often has been overlooked on the other side. The fact is that the danger frequently accompanying infant feeding often depends on the excess of milk sugar given; that only one danger is greater; that is the excess of fat feeding. Fat feeding has been a fad in America for some time. The worst cases of destructive indigestion I meet are those of over-generous fat-feeding doctors. People are beginning, however, to retrace their steps and to learn that cow's milk fat is not easily digested, that it gives rise to intestinal disorders. As far as milk sugar is concerned, there are those in America who do not give it at all. They think that in "modified" milk there is enough milk sugar contained for the purpose of digestion, and that if more is added the milk sugar will be changed into lactic acid with all its local and general disagreeable results. What I meant to lay stress on is that the Doctor is perfectly correct, that I approve of his method of applying his knowledge in practice among babies. I do not believe much in proving his theory of knowledge by experiments on pups. We do not practice on pups; we have to deal with infants. A very great experience in the treatment of babies is very much better than experiments of this kind, but his experiments and our practice have certainly led

to the same results, and I hope in a very short time the Doctor will have ample opportunities of applying his present knowledge on thousands of babies in every year that he will live. I have not the slightest doubt that that will be so, for a man who wants to work and who knows how to work has ample opportunities of practicing on babies as long as the public insists on having sick babies. The public insists upon having sick babies, else they would not give them so much fat; they would not feed them on proprietary and patent medicines.

What I mean to say, to the public more than to the Doctor, is that I, for my part, for more than fifty years have not used any milk sugar in addition to that which is contained in milk, but that I use exclusively cane sugar. I have done well with it, and I am not in the habit of producing enteritis by over-feeding with anything and certainly not with milk sugar. I must say that I congratulate the Doctor on his results. His experiments have been on pups, but his practice will be on babies, and if he continues to keep aloof from milk sugar he will do well.

Dr. Helmholtz: I greatly appreciate Dr. Jacobi's remarks, especially as he was perhaps the first to call attention to the fact that excess of milk sugar is very harmful.

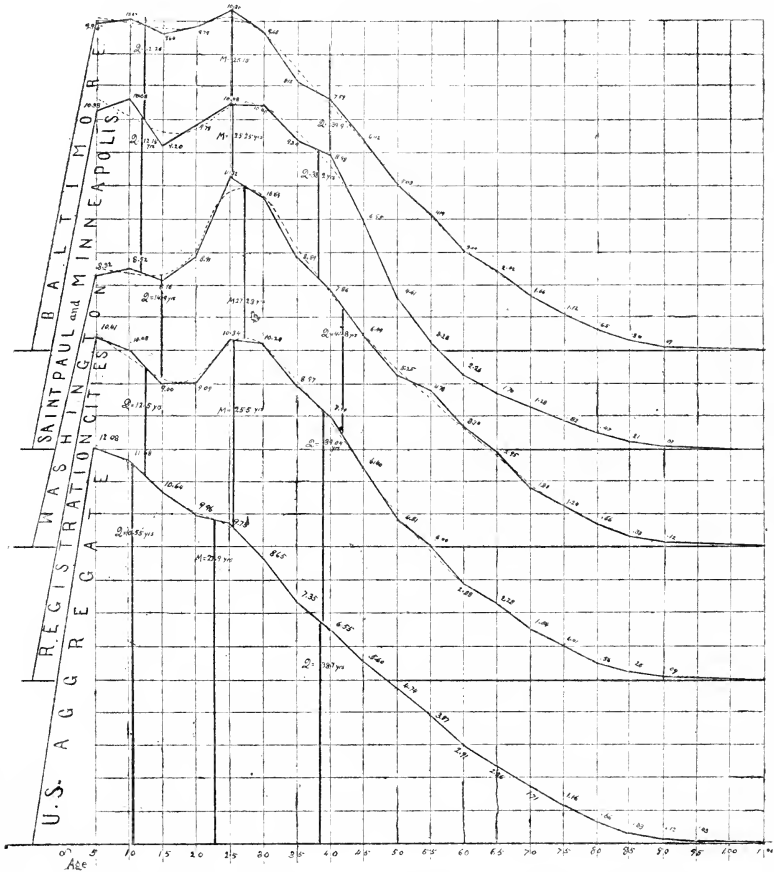
THE NECESSITY FOR MINUTE STUDY OF THE AGE-INCIDENCE OF CAUSES OF INFANT MORTALITY

By JOHN S. FULTON, M. D., Baltimore, Md.

In the Registration Area of the United States there occurred in the year 1908 (U. S. Census Report on Mortality, 1908), 691,574 deaths, in a population of 45,028,767. Of this mortality, that part which occurred under the age of one year numbered 136,432, or 19.73 per cent. The Registration Area includes those parts of the country which account for their mortality, under effective registration laws, to within 10 per cent of completeness. The population is estimated for intercensal years, but the population under one year of age is never well accounted for even in census years. No country has ever made a satisfactory enumeration of its population under one year and infant mortality therefore cannot be stated in the usual ratio to the thousand living. Nor can we, in this country, follow the custom of other countries and state the infant mortality in ratio to the thousand born alive during the year; for births are not registered with completeness anywhere in the United States, within or without the Registration Area.

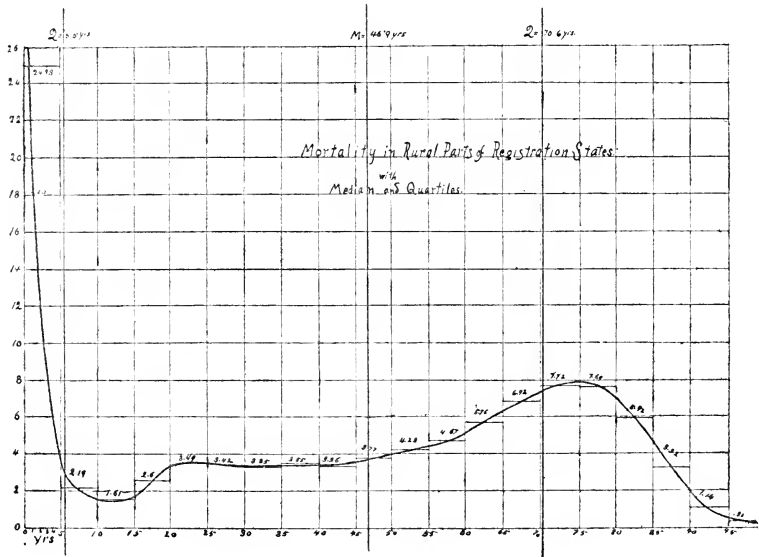
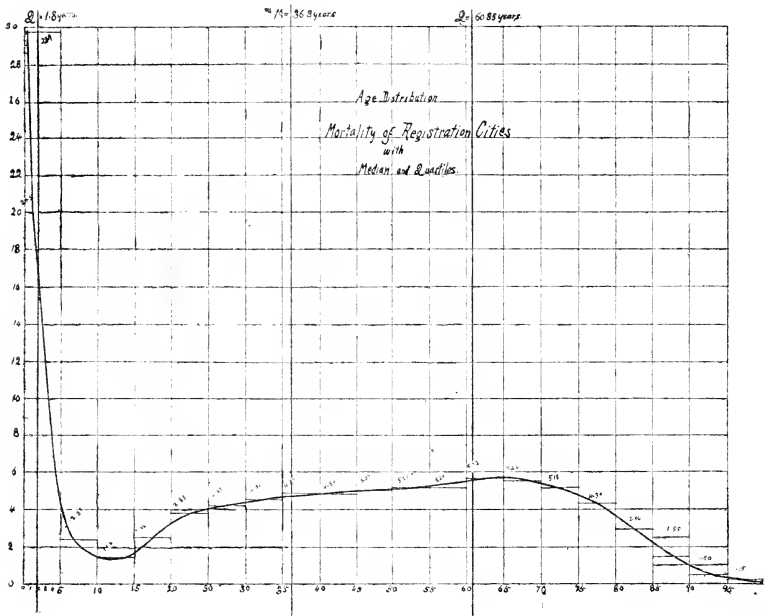
While we are less informed about population than about deaths under one year, we may, nevertheless, make some significant distinctions with respect to population. The population of the Registration Area, in its age distribution, gives a profile somewhat unlike that of the aggregate population, of which it forms a little more than half. It shows the influence of urban populations more than the aggregate population does, having, in the young adult period a larger deviation of excess which is due largely to foreign immigration, is likely to persist for many years, and explains in part our relative apathy on such subjects as infant mortality and birth registration. The population the Registration Cities shows the same deviation, increased by internal migration, strengthening the cities at the expense of rural districts and small communities. Four city profiles are shown; that of Baltimore as typical of the older and more stable American cities; that of St. Paul and Minneapolis combined, as typical of the younger cities in the Middle West; that of Washington showing extreme variation from the type regularly occurring in the Eastern cities; and the profile of all the Registration Cities combined. The profile of the aggregate population of the United States is also shown, as it was in 1900. That for the Registration Area is not shown. Since 1900,

several States have been admitted to this area, and its profile may be quite different from that of 1900. A glance at these curves will suggest that such inequalities of age distribution must be reflected in the mortality curves. Death cannot score alike on unlike targets.



Age distribution of urban populations; with medians and quartiles.

By the aid of these profiles we may be relieved of some erroneous notions derived from the age distribution of deaths when plotted on a straight base-line. The base-line of a mortality curve should be thought of as conforming to the age distribution curve of that population in which the mortality occurred; and if, for want of small measurements of population, there are significant errors in one's conceptions of population,



greater errors must arise with respect to mortality in those parts of life where the incidence of mortality is relatively high, as in infancy.

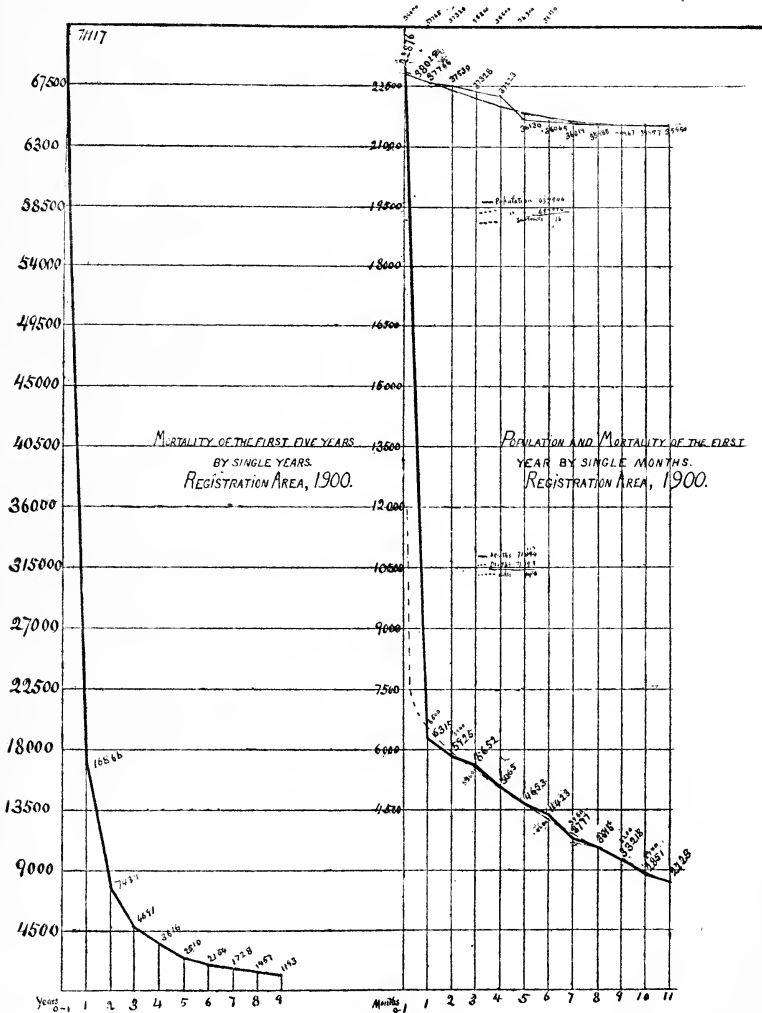
The Registration Cities contributed 448,113 deaths to the total mortality, and to the mortality under one year 92,314 deaths. The rural parts of the Registration States contributed 243,461 deaths, of which number 4,418 occurred under one year of age. The ratio of infant mortality to total mortality was therefore, for the cities, 20.51 per cent., and for the rural parts of the same States 18.13 per cent. For the whole Registration Area we find the first quartile of mortality to end at the age of 2.68 years; for the cities at the age of 1.8 years; for the rural parts of these States at the age of 5.5 years.

In Maryland, outside of Baltimore, that is to say, under rural conditions, Dr. Price has found that the average age of those who die in January, February and March is a little less than 41, while the average age of those who die in July, August and September is a little less than 32. The summer mortality of infants probably causes the difference. Whether the average age at death, stated in the same way, for cities would show like distinctions, I do not know; neither do I doubt that they would.

These observations confirm our long-standing belief that urban mortality, especially in infancy, is heavier, but they do not justify reference to the rural mortality in the way of contrast. When numbers are subtracted from the young adult rural population and added to urban populations, it might be expected that the rural population would appear relatively stronger in the age periods which are not diminished by migration; and so perhaps it is in general. We are not informed about the age distribution of the rural population of the Registration Area in 1908. The rural population under five years, in the whole area is said to have been 9.75 per cent of the whole. The percentage in some of the Registration Cities exceeds this figure, and it therefore appears that the movement city-ward sometimes carries along enough reproductive energy to more than offset the superior fertility commonly attributed to rural population. The infants at risk, in 1908, under rural conditions, were not more numerous proportionately than those at risk in the cities, but above middle age more lives were at risk under rural conditions. One must take this into account when interpreting the percentages, quartiles, and average ages. With respect to the average age, one individual aged 60 is equivalent to 60 individuals aged one year. All individuals count alike in the percentages and quartiles. But there is a wide interval between quartiles of the living and quartiles of the dead; for old age and infancy, the first and fourth quarters of vitality count faster in

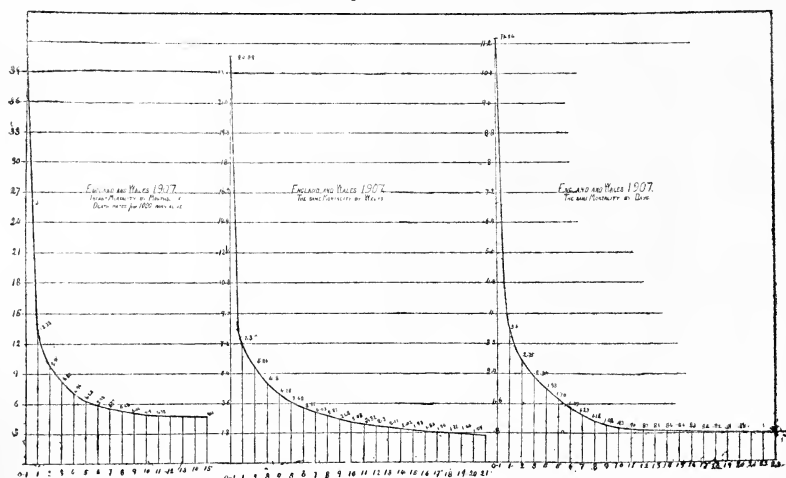
mortality than the intervening, second and third, quarters. The relation of rural to urban mortality in infancy is not that of good and bad, but that of bad and worse.

The Census Mortality Report for 1908 contains, for the first time, a table of deaths by single years of life (U. S. Census Report on Mortality; Table 13). It accounts for the years 1900 to 1905 inclusive. This table shows that the great emphasis, always observed to fall on the first quinquennium when deaths



are stated by five-year periods, falls with even greater emphasis on the first year when deaths are stated by single years. In the same table the deaths of infants, in the years 1900, 1901 and 1905, are given by single months, and here again we find the emphasis of the first year falling on the first month. American statistics do not permit any finer distinction of time than this, but the need of minuter measurements is now generally recognized, and a few tables are available containing the required data.

The Report of the Registrar-General gives the infant mortality of England and Wales, in 1907, for the first day of life, for the following six days, for each of the next three weeks of life, and by months to the end of the first year. The statements are made in the ratio of the dead to the number of children born alive during the year. From this table I have attempted to construct separate statements of mortality for the first 20 weeks and for the first 20 days of life.



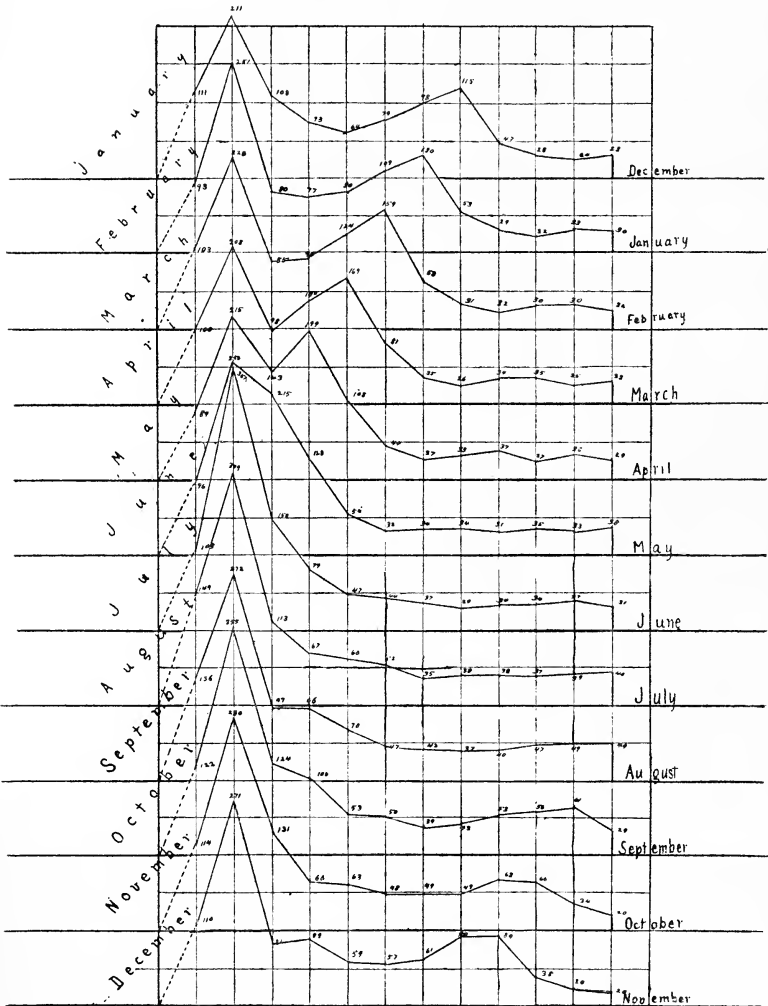
Whatever corrections actual statistics may apply to these figures in future, I do not believe that the significance of first-day (birth-day) mortality will be diminished. In these figures we see the event of birth as an occasion of death. When we consider deaths by separate causes, as we shall do later, we shall find that the antenatal causes of death in early infancy include a significant number of casualties belonging to parturition, and other numbers attributable to antenatal pathology. We can see perhaps some necessity for studying still births more carefully, and certainly we must be convinced that the gross measurements of time which suffice for the study of adult mortality do not suffice

for the study of infant mortality. So far it appears that the relation of age is of first importance. This is no discovery. To the end of life, in every category of causes of mortality, age is the first item. But, at the beginning of life, age itself has not been discovered, and the story of infant mortality is a secret of the ages within the age.

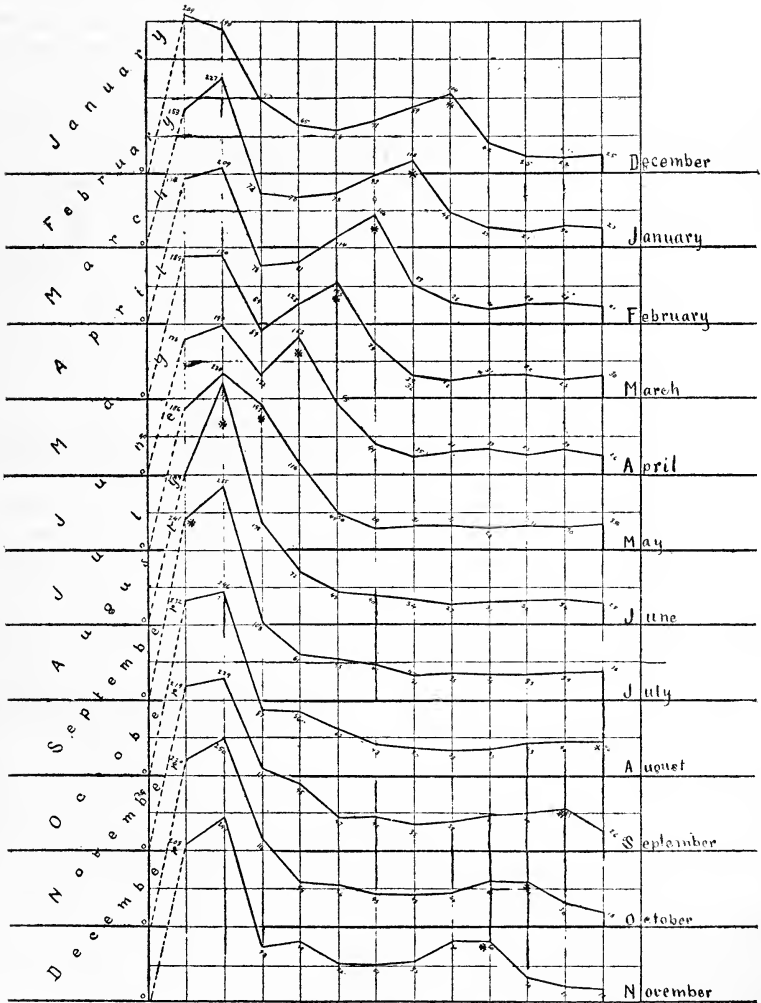
Next one would like to know how age and season combine in the mortality of infancy. That information is to be sought in statements of death according to the month of birth. H. Neumann, in a study of the influence of feeding on infant mortality (*Zeitschrift für Sociale Medicin*, Band 3, 1908) gives two tables of mortality under one year by single months according to the month of birth. These tables account for 41,498 deaths among 199,525 infants born alive in Berlin and Hamburg. Berlin, in the years 1900-1902, furnishes 149,688 infants among whom there were 31,518 deaths, and Hamburg 49,837 live-born among whom there were 9,980 deaths under one year. From the Berlin table I have figured the ratio of each month's mortality to the total mortality for the class, and the results are seen in the following chart. In examining the chart one must bear in mind that the first month in each series shows less than a true mortality for infants in their first month. This happens because the present charts represent flowing time, while the preceding charts represent time arrested at measured intervals. At the beginning of each series (in January, for instance), we start without either a population or a mortality. The whole month is spent in acquiring the population whose mortality we are considering. At the beginning of the second month we have completed our population, having age distribution all the way from one day to 31 days old; and so, on the last day of the twelfth month, our population will have from 1 to 31 days ahead till the end of their first year. The elements of the curves are different from what they would be if we started each curve, as a mathematician would, with 12,000 simultaneous babies. These curves show that age relations are strongly affected by the seasons. The most striking feature of the chart is the August crest as it appears in the first seven curves. In the remaining five, one finds August recovering a little of its sinister eminence with each succeeding group of babies.

In the belief that a fairer view of the first month of life could be obtained by including still births, I applied Pearson's¹ formula for antenatal mortality to the whole series of births reported by Neumann for the city of Berlin. Pearson's figures are for the thirds of pregnancy; 391 deaths in the first three months, 131 deaths in the second three months, and 83 in the

¹The Chances of Death; Karl Pearson; London, 1897.



31,518 deaths under 1 year among 149,688 infants born alive in Berlin 1900-1902, distributed by months according to the month of birth. Ratios of each month's mortality to the year's mortality of infants born in the same month.



An increment of 23.8 per cent. over the mortality accounted for in the preceding chart being assumed for the purpose of including still-births, the ratios of each month's mortality to the year's mortality of infants born in the same month are shown in the above chart.

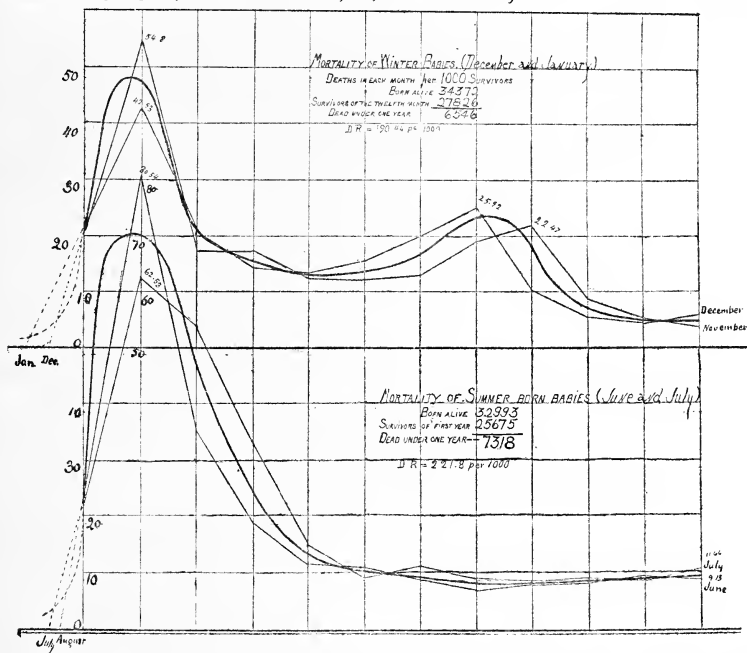
last three months. At this rate, the factor for the ninth month should be about 23.8. In this way we start each series, not with 1,000 living infants, but with 1,024 women entering the ninth month of pregnancy regularly through a given month (December, for instance), and therefore reaching the first day of the next month (January, for instance), with the date of expected delivery anywhere from one day to 30 days ahead. The first month's mortality will, in this case, include the still-born.

The only noteworthy change produced by this treatment appears in the January curve. We gain a perception that it is better to be born in winter than in summer, but there is no substantial profit in this statement of the relations. One reflects, however, that Neumann's tables must have included prematurity, which projected, into the population and the mortality of each initial month, non-viables really belonging to the following month, as well as viables with bad chances, complicating the history of the series for several months. With respect to still-births, on the other hand, there must be delay, carrying forward part of the antenatal mortality of each month into the still-birth account of the next month.

If we should include the whole of antenatal mortality, we should necessarily add to the infant's chances of death the chances of death of the mother. But, since the child's chances of continuing life after birth are seriously impaired by maternal death, and even by maternal disability immediately following childbirth, we can hardly avoid admitting the mother's chances as materially affecting the expectancy of the child. It is possible that greater than August altitude is realized, in December, by December babies whose mothers die in the first three days post partum.

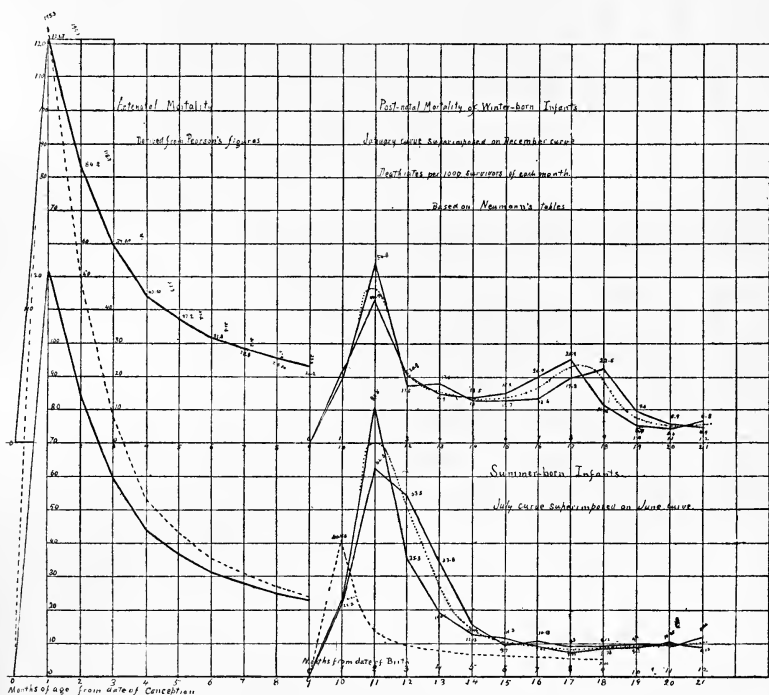
Maternal death must be required to account for part of the antenatal mortality indicated by Karl Pearson's figures. With respect to the mothers whose offspring make up Neumann's table, it can be asserted that these 199,525 women who were subject before, on, or after the date of their delivery, to a mortality tax on their own lives, and died four or five daily. They were, indeed, the survivors of a large reproductive undertaking, into which there originally entered more than 300,000 women, subject to, and paying, a mortality tax of seven or eight women and more than 350 prospective children daily. Our situation is very much as if the date of birth had somehow eluded us, having variable relations to life and death, and unsettling the conventional preconception of a biologic fixture. It seems better to examine the whole of a reproductive effort to the end of the first year of post-natal life, without particular regard to the date of birth, and allowing that event to define for itself unprejudiced relations, if not clear ones.

In order to obtain larger numbers I have combined the experience of Berlin and Hamburg for four of the twelve monthly groups, and have computed death rates per 1,000 survivors through the first twelve months of life. The four groups comprise those born in December (16,547 births; 3,244 deaths in a year), those born in January (17,825 births; 3,381 deaths in a year), those born in June (15,735 births; 3,676 deaths), those born in July (17,258 births; 3,760 deaths).



Using the survivorship death rates as ordinates one can plot four curves, two for summer and two for winter. By superimposing the January curve on the December curve, and the July curve on that for June, one should have two figures in each of which one should be able to define the limits within which should lie two new curves, fairly representing the chances of life of winter-born infants, in one case, and of summer-born infants, in the other. The formula of Karl Pearson will yield death rates of the same sort from the beginning of pregnancy. His data include males only, and mortality with respect to age only. If his figures are correct, and if I have correctly divided his three factors for periods of three months each into nine factors for nine months, the death rates should yield a curve to fit general experience with post-natal mortality at all seasons,

but not to fit seasonal curves such as we are making from Neumann's figures. Pearson's three factors are 391, 131, and 83. These are divisible into nine factors for nine equal divisions of the gestation period, about as follows, 195.3, 118.7, 77.0, 52.7, 43.2, 35.6, 31.2, 27.5, 23.8, each factor being the number of antenatal deaths occurring in the corresponding month for each 1,000 born alive. The number of necessary conceptions, 1,605, being applied to the first mortality factor, 195.3, and the number of survivors to each succeeding term in order gives antenatal death rates as follows: 121.7, 84.2, 59.6, 43.4, 37.2, 31.8, 28.8, 26.15, 23.23.



We come to the beginning of the ninth month of gestation with a mortality expectancy of 23.2 per 1,000 living unborn, and to the beginning of the month of birth with a mortality expectancy of 21 deaths per 1,000 winter babies born alive, and for summer babies a mortality expectancy of 22.3 per 1,000 born alive. The theoretical curve of antenatal mortality therefore ends very near the level at which, under the conditions of Neumann's tables, the statistical curve of post-natal mortality appears to begin. We gain some formal notion of reproduction.

The elements of the antenatal curve are time and frequency, while the post-natal curves include relations of season. The successive polygons on the prenatal side represent time arrested at intervals of one month, while the post-natal curve has the figures for flowing time.

At the end of the antenatal curve we must believe that the direction changes toward the true mortality at the end of the first month, and this we know is above 22; according to English experience, in the neighborhood of 40 per 1,000. I have therefore drawn in dotted lines the English figures for the first nine months of post-natal life, and Pearson's antenatal mortality in the same ratio; i. e., to the 1,000 born alive. In this way we obtain a graphic expression of mortality during 18 months from the date of conception, distinctions of season being omitted.¹

I have no doubt about the better expectancy of winter-born babies, after they are born, but it would be rash to assume that a better expectancy attends such children all the way from the date of conception. We cannot be sure that the seasons exert no influence upon mothers, deviating the course of pregnancy as the course of post-natal life is deviated from month to month. It is probable that the course of pregnancy is less affected by the seasons than is the course of early infancy, but it is possible that pregnancy may be deviated in some opposite way, so as to widen the difference of expectancy as between summer-born and winter-born infants. The December-January births recorded by Neumann numbered 34,027; the June-July births in the same population numbered 32,993. Assuming that equivalent numbers of women entered each reproductive undertaking, the winter group had better reproductive expectancy in the ratio of 576 to 541 during the gestative period, in addition to their advantage of 221 to 190 in the first year after birth.

The main outcome of our attempt to study infant mortality, by short intervals of time, and in close proximity to birth, has so far been the annexation of antenatal existence, together with the sickness and disability of child-bearing women. We shall get little light on antenatal deaths from the mortality tables, for still births are not recorded. With respect to maternal sickness and disability we are no better informed. In the Registration Area in 1908 there occurred 7,344 deaths of women in child-bed. In consequence, nearly as many infants were probably lost to record because they were stillborn, or else were recorded as dead from post-natal causes. But these were few in comparison with the number of infants dead before and after birth on account of maternal sickness and disability not fatal to the mothers, and few also in comparison with the number of unborn infants lost with their mothers in the general mortality of the reproductive group.

¹The recorded births include infants born before their proper birth-day. There is some excess in the assumption of 40 as the correct mortality of the first month, and error also in assuming the equivalence of 1,605 conceptions and 1,000 births.

Let us now see if the particulars of mortality will give us any approximate measurements in this obscure area.

The Census Mortality Report for 1908 contains, on page 19, a table giving average and median ages at death according to causes and classes of causes; an interesting and valuable table, which one wishes might be regularly published. Eighteen times in the course of this table we find median ages under one year, 21 times at less than two years, and 26 times at less than three years.

In Table No. 7 of the same volume the age distribution is given for deaths falling under 145 of the titles comprised in the International Classification (or tabular list) of Causes of Death for Statistical purposes. There are entries of mortality in the first year of life under 130 of these titles. I have selected those titles whose median ages are less than one year, 15 in number, and these, with the nine additional titles most intimately related to infancy, are shown in Table I.

TABLE I

	All ages	Under 1 year	Under 5 years	Over 5 years	Aver. age at death	Median age at death
(1) Premature Birth...	16,441	16,441	16,441	0	0.1	1.-
(2) Congenital Debility...	15,833	15,833	15,833	0	0.1	1.-
(3) Injuries at Birth...	3,110	3,110	3,110	0	0.1	1.-
(4) Malformations	6,907	6,525	6,808	99	0.6	1.-
(5) Whooping Cough..	4,908	2,761	4,772	236	1.5	1.-
(6) Convulsions	6,450	5,295	6,177	273	1.7	1.-
(7) Diarrhoea and Enteritis	52,206	37,049	46,842	5,364	6.6	1.-
(8) Diseases of the Mouth	324	208	257	67	10.3	1.-
(9) Suffocation	708	486	513	195	10.5	1.-
(10) Scrofula	120	64	85	35	10.6	1.-
(11) Acute Bronchitis...	7,089	4,322	5,721	1,368	13.2	1.-
(12) Broncho- Pneumonia.....	16,753	7,023	11,646	5,107	14.4	1.-
(13) Venereal	2,542	1,321	1,439	1,103	17.8	1.-
(14) Other diseases of the Skin	538	306	322	206	23.5	1.-
(15) Ill-Defined	13,507	7,193	8,373	5,134	23.7	1.-
(16) Disease of Lymphatics	126	58	82	44	17.2	1.5
(17) Measles	4,608	1,162	3,835	773	4.2	1.8
(18) Tuberculous Meningitis	3,917	999	2,650	1,267	9.0	2.7
(19) Meningitis	8,887	2,640	5,442	3,455	11.5	2.7
(20) Diphtheria and Croup	10,052	831	6,302	3,750	6.5) 3.6)	4.1) 2.7)
(21) Other Epidemic ..	153	54	97	56	12.0	2.7
(22) Scarlet Fever.....	5,576	245	3,087	2,489	6.7	4.5
(23) Tetanus	1,169	430	475	684	17.3	9.3
(24) Pneumonia	44,355	7,799	13,325	31,030	36.7	38.7
	226,289	122,155				

The remaining causes of infant mortality are assembled in another table (Table II) in 47 items, related diseases of small numerical importance being combined.

TABLE II

CAUSES OF INFANT MORTALITY NOT INCLUDED IN TABLE I.

Deaths in 1908, under 1 Year

General Diseases.

Typhoid Fever	57
Malarial Fever	101
Smallpox	22
Influenza	688
Cholera Nostras	91
Dysentery	596
Erysipelas	566
Septicemia	209
Tuberculosis of Lungs.....	810
Other Tuberculosis (Meningitis excepted).....	437
Cancer	29
Tumor	14
Anemia and Leukemia	217
Others of this class	180

Total.....	4,017
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Diseases of the Nervous System

Encephalitis	125
Apoplexy	481
Paralysis	46
Epilepsy	62
Others of this class (Meningitis, convulsions, locomotor ataxia, paresis, and tetanus excluded).....	454

.. Total.....	1,168
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Diseases of the Circulatory System

Endocarditis	127
Heart Disease	746
Others of this class (Lymphatics excluded).....	419

Total.....	1,292
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Diseases of the Respiratory System

Diseases of the Larynx.....	200
Chronic Bronchitis	128
Congestion of the Lungs.....	664
Others of this class (Acute bronchitis, broncho-pneumonia and pneumonia excepted)	272

Total.....	1,264
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Diseases of the Digestive System

Tonsilitis (other diseases of the pharynx)	106
Gastritis (including gastric ulcer-12)	996
Other diseases of the stomach.....	1,538
Obstruction of Intestines (including hernia-140).....	799
Other diseases of Intestines.....	305

Diseases of the Liver	176
Peritonitis	179
Others of this class (diseases of the mouth, diarrhoea, and enteritis excluded)	106
Total	4,205

Diseases of the Genito-Urinary System

Acute Nephritis	282
Bright's Disease	343
Others of this class.....	205
Total	830

Diseases of the Skin

Gangrene	30
Carbuncle	28
Abscess	125
Total	183

Diseases of the Locomotor System

Diseases of Bones	352
Others of this class.....	10
Total	362

Violence

Burns and Scalds	148
Heat and Sunstroke	161
Accidental Poisoning (including gas poisonings).....	221
Homicide	161
Other External Violence (injury at birth and suffocation excluded)	265
Total	956

Summary

Total under 1 year in Table I.....	122,155
Total in Table II.....	14,277
Total	136,432

Table I accounts for 226,289 deaths, of which number 122,155 occurred under the age of one year. Nearly one-third of all deaths are accounted for in this table, and nearly nine-tenths of the deaths under one year.

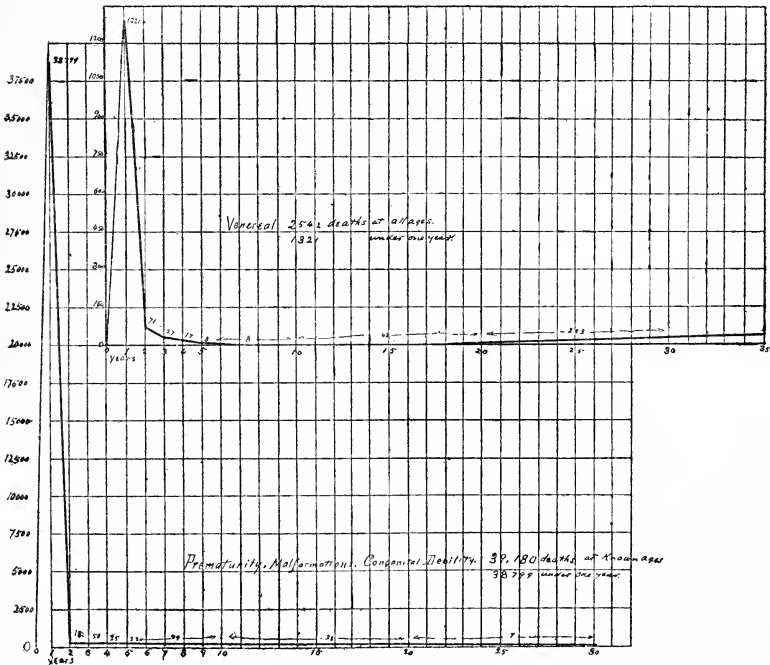
In the first four entries of Table I, we see in operation the pitiful but necessary elimination of the unfit. It is rapidly accomplished, but not too rapidly; for thirty years may pass before the last case of congenital malformation of the heart is disposed of. Not all the unfit are counted under the four titles, prematurity, congenital debility, injuries sustained at birth, and malformations. Congenital syphilis belongs in this class. With this addition we shall have separated 43,230 deaths of infants whose

causes had their origin in antenatal existence, and whose preservation alive—if it were possible—is undesirable. The ratio of preventability in this group is very small indeed, after the birthday; though a rational prophylaxis applied weeks or months earlier might mitigate the slaughter.

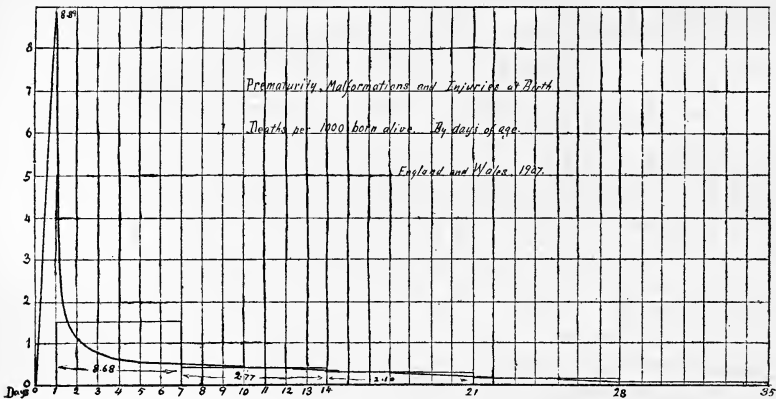
GROUP A. THE UNFIT

Premature birth.....	16,441
Congenital debility.....	15,833
Injuries at birth.....	3,110
Malformations.....	6,525
Hereditary syphilis.....	1,321
Total.....	43,230

In the accompanying chart one sees a degree of steepness which is not found in any other chart. The English mortality of 1907 permits distinctions of age by days, showing the gross imperfection of the straight line, which, in the American chart, represents the first year's mortality.



This group gives a practical hint as to the nature of the line by which the profile of antenatal mortality makes its juncture with that of post-natal mortality. Here we count some thousands whose deviation away from life and toward death occurred



long before birth, and for whom the maintenance of life in utero grew every day more difficult. In such cases the event of birth must present itself as an ordeal of elimination, through which few can pass alive. It must impart to the curve of the last month of intrauterine life that upward tendency which will fit it to post-natal mortality. This group includes the causes of antenatal death which trespass on post-natal existence, and do not in truth belong to the vital statistics of post-natal time.

"Convulsions," the sixth in the list, is a vague term which leaves the true cause of death, in 5,295 instances, poorly explained. Convulsions, with the other unknown and ill-defined causes of death (15 in Table I), are charged with 12,488 deaths which should be separated from the others.

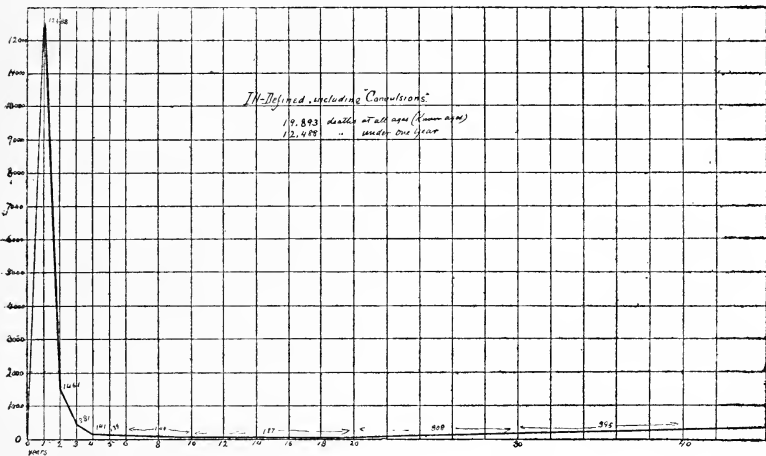
GROUP B. ILL-DEFINED CAUSES

Ill-defined and unknown.....	7,193
Convulsions	5,295

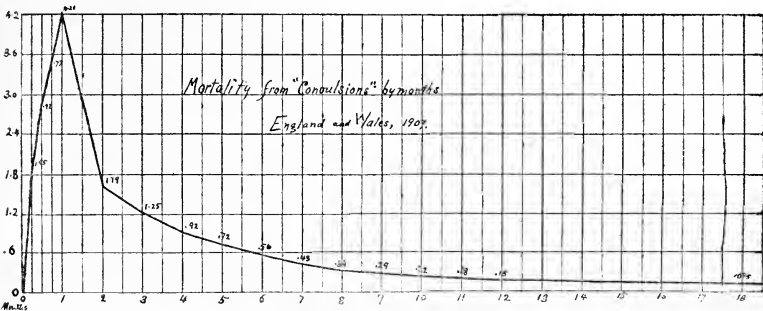
Total deaths under 1 year..... 12,488

A satisfactory resolution of this group must await future increment of knowledge. But, after all, this group is no more subject to error (perhaps it is less subject) than many of the so-called known causes of death about which confident statements are made. The distribution of unknown causes must, in any event, add numbers to the better-known causes, including

newly recognized causes; but at no time will the unknown causes become contributors to the known causes otherwise than in accordance with their previously existing and ascertainable relations of time, place and frequency. In that period of life where tetanus, for instance, is superior to meningitis, the term "convulsions" disguises more of tetanus than of meningitis; and, when meningitis is superior, more of meningitis than of tetanus. Nor will increasing knowledge ever require unknown causes of death to give up greater numbers than so-called known causes will give up, even when specific identification adds some newly discovered cause to the list.



Deaths in the Registration Area, 1908, from unknown and ill-defined causes, by years, from birth to the age of 40 years.



Deaths from "Convulsions" by single months, from birth to the age of 16 months. [England and Wales, 1907.]

With reliable numerical statements, according to minor units of age, it would be possible, it would be informing, and not

presumptuous, to fit this and some of the other vague groups to the better-known causes of death. The accompanying chart shows, among other things, how much greater obscurity surrounds mortality in infancy than mortality in later life.

We next eliminate "suffocation" (486 deaths), which occupies the place nearest to "injuries received at birth," and is clearly distinguished from the other forms of external violence. Infants under one year of age participate (passively of course) to the extent of 1442 deaths in the accidental, suicidal, and homicidal mortality of the Registration Area.

"Diseases of the Mouth" (208) are eliminated because the title is vague and the number negligible. "Other Diseases of the Skin" (306), are eliminated for the same reasons. This title, with abscess, carbuncle and gangrene, accounts for 389 deaths under one year.

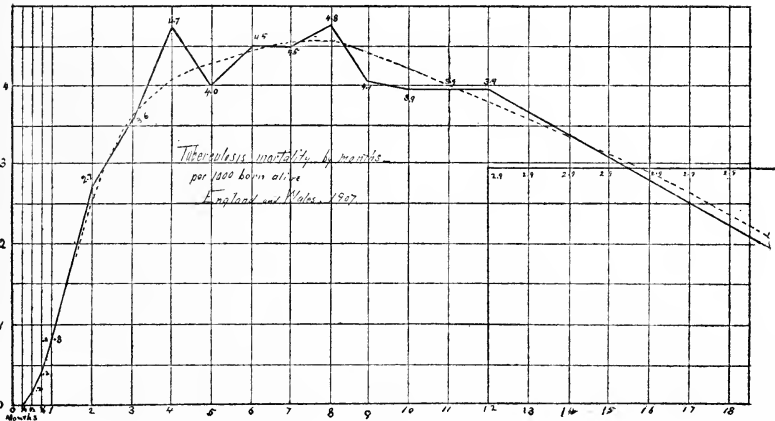
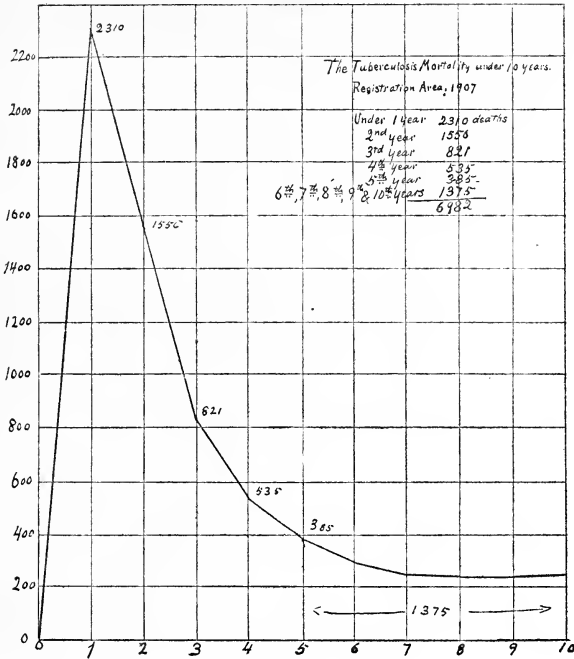
"Diseases of the Lymphatics" (58) may as well be restored to their place under title, "Diseases of the Circulatory System," which contributes 1360 to the mortality under one year.

Tuberculous meningitis and scrofula may be separated for the sake of stating the whole tuberculosis mortality under one year in one group.

GROUP C. TUBERCULOSIS

Tuberculous meningitis	999
Tuberculosis of the lungs.....	810
Abdominal Tuberculosis	230
General tuberculosis	102
Tuberculosis of the larynx (8); white swelling (10); Potts' disease (28); tuberculous abscess (17); scrofula (64); other organs (42).....	169
Total.....	2,310

The following chart shows the age distribution of Group C by single years of life for ten years. The true form of that portion of the curve represented by the straight line from 0 to 2310 is indicated by the next chart, derived from the mortality of England and Wales in 1907, which is given by months through the first year, and by weeks in the first month. The mortality begins apparently in the middle of the first month.



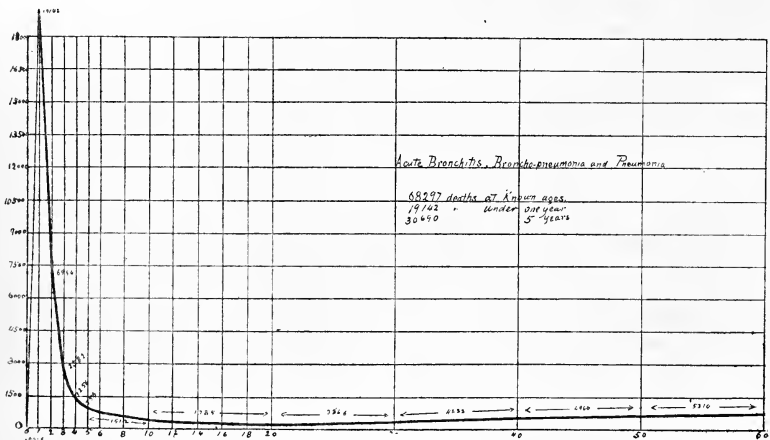
There remain now 64,316 deaths (with Group C 66,626 deaths), more than half the original contents of the 24 titles selected as bringing death closest to the date of birth. Of these deaths we can say that all are attributable to post-natal causes, and their ratio of preventability is high.

GROUP D. POST NATAL AND PREVENTABLE CAUSES.

Whooping cough	2,761
Diarrhea and enteritis	37,049
Acute bronchitis	4,322
Broncho-pneumonia	7,023
Measles	1,162
Meningitis	2,640
Diphtheria and croup	831
Other epidemic	54
Scarlet fever	245
Tetanus	430
Pneumonia	7,799
	64,316

Tetanus should undoubtedly come first in the order of proximity to birth. This proximity is indicated clearly by the age distribution in the first five years, and also by what we know of the unavoidable trauma which occurs to every placental mammal at birth. These 430 deaths even in the absence of express testimony, may be ascribed to the first month of life, and the significance of the figures will be enhanced by the probabilities associated with the mortality under one year from septicemia (209 deaths) and from erysipelas (566 deaths). Other substantial accessions are due also from the unknown and ill-defined causes of death occurring in the first month of life.

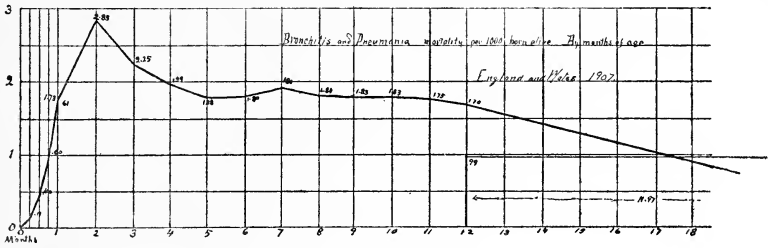
For other members of this group, I have made charts showing the time relations of their several mortalities to the neonatal period. After tetanus, meningitis is probably the first to arrive in this period, but the term is rather vague, and I therefore pass it.



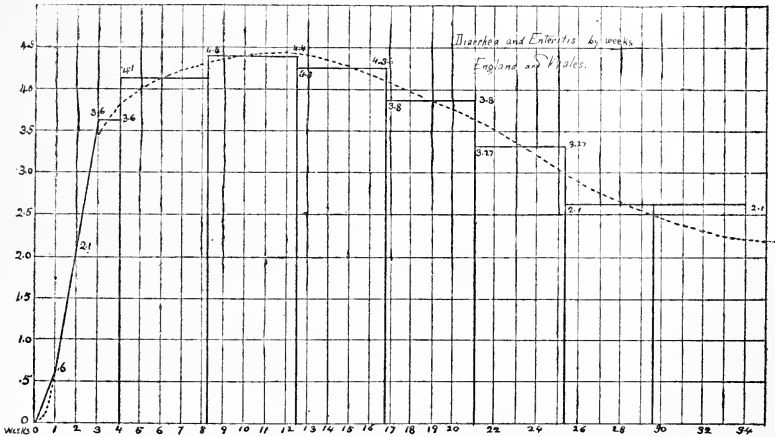
The three respiratory diseases, bronchitis, broncho-pneumonia, and pneumonia, appear to be next in order. The English mortality from these causes begins on the first day of life, and reaches the maximum at the beginning of the third month. In the second year, the mortality falls to one-third of its magnitude in

the first year, but, through the third year, is still higher than the maximum for whooping cough. Diminishing to relative insignificance through childhood and youth, these diseases gradually assume importance in middle life, and in old age become again highly important.

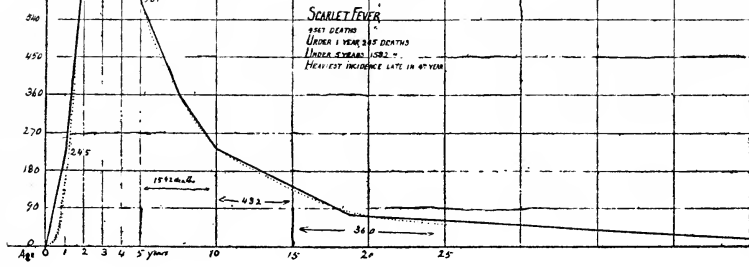
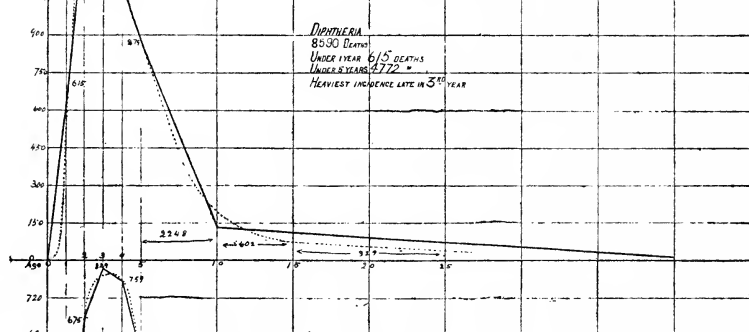
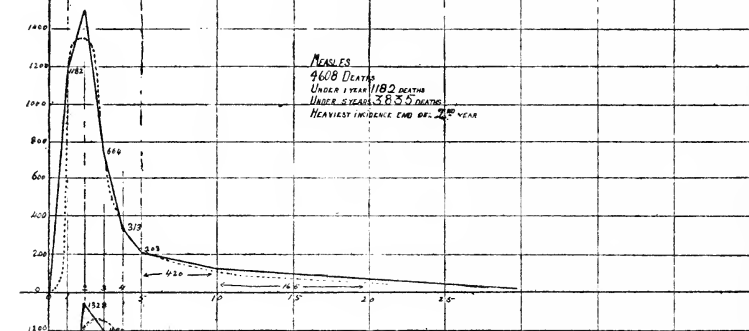
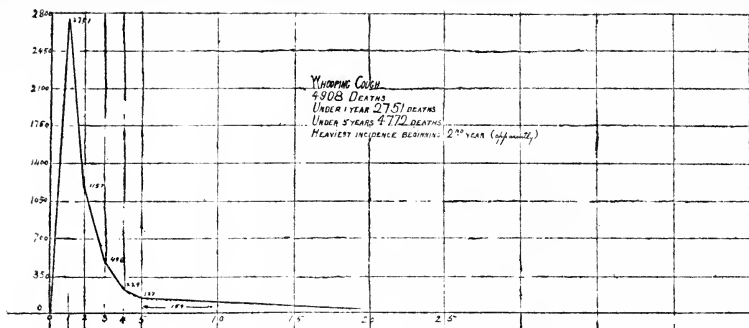
Of the components of the respiratory group, acute bronchitis has apparently the earliest access to infancy. Acute bronchitis appears to be preceded very slightly by influenza, but the recorded mortality of influenza is very small, 688 deaths in the Registration Area. It is an interesting observation, if true, that post-natal causes of death attack infants by way of the respiratory tract earlier than by way of the digestive tract.



Diarrhea and enteritis follow very closely, the mortality beginning in the first week and reaching its maximum in the eleventh or twelfth week, nearly a fortnight after the maximum mortality of the respiratory diseases as indicated by the English experience.



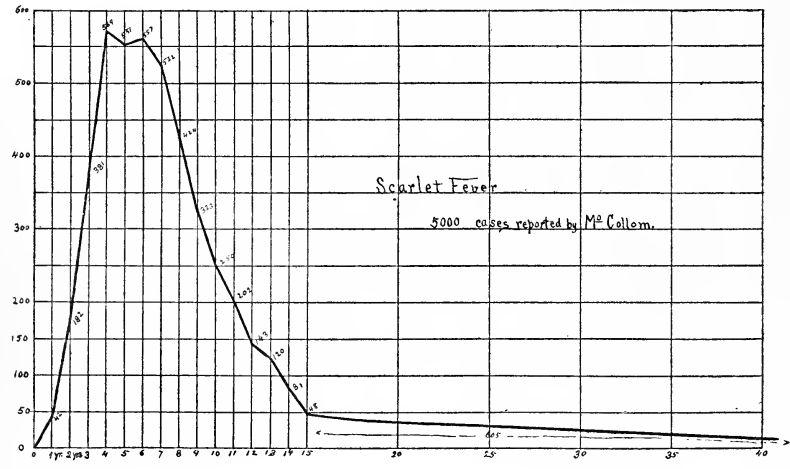
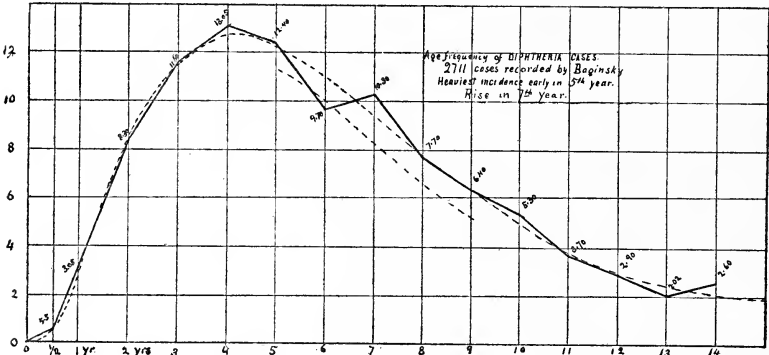
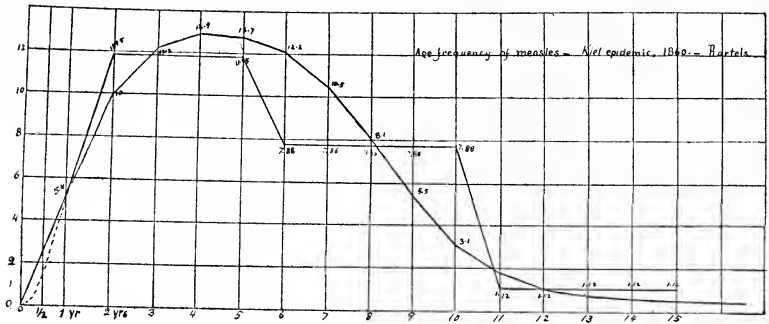
The meningitis curve crosses both these curves and does not reach its maximum until the fifth month. All three of these curves decline toward age; diarrhoea and enteritis rapidly; meningitis less rapidly; and the respiratory diseases more slowly. Meningitis has no secondary rise in later life.



In the third week of life enter four causes of death; the tuberculous diseases, whooping cough, diphtheria and measles. The tuberculous diseases cause their maximum mortality between the sixth and eighth months; whooping cough in the fifth and sixth weeks apparently, though the English experience seems to indicate a secondary mode of mortality for whooping cough toward the end of the first year. The mortality of measles reaches its maximum at the end of the first year, and declines but little through the second year. After the second year the decline is quite rapid. Diphtheria mortality reaches its maximum in the third year. A mortality from scarlet fever begins in the third or fourth month of life and reaches its mode in the third or fourth year, later than the mode of diphtheria. The tuberculous diseases are distinguished from the four acute infections by the occurrence of another mode in adult life. In this respect tuberculosis resembles the three acute respiratory infections, though an important distinction is perceived in that the adult mode of tuberculosis occurs early and is the major mode for tuberculosis, while the adult mode of bronchitis and the pneumonias is the minor mode and occurs in age.

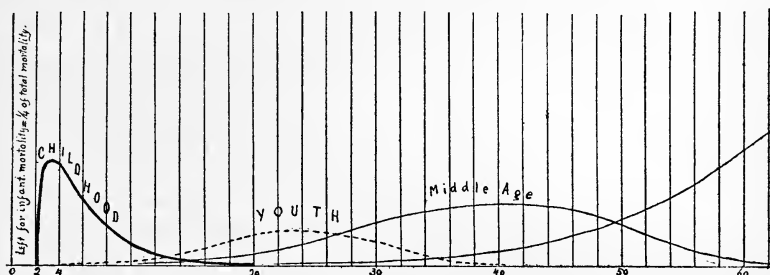
The four acute infections, whooping cough, measles, diphtheria and scarlet fever, agree in the narrowness of their range of fatality. They thrust a very thin edge into the neo-natal period, they rise to their maxima very sharply, and their descent is but little less abrupt. Their mortality is nearly all found within the first five years, and they all cease to be significant factors in the mortality or the morbidity of man before the twentieth year is reached. The frequency of attack shows different time relations in all four cases. The morbidity mode for whooping cough seems to occur about a year later than the fatality mode, perhaps only a few months later. The attack mode of measles falls on the fifth year, three years later than the mortality mode. The attack mode of diphtheria falls between the fifth and seventh years; its exact position being undefined, though well outside the period of infancy. The attack mode of scarlet fever is apparently in the sixth year. The time relations of morbidity and mortality therefore, seem to remove measles, diphtheria and scarlet fever from the period of infancy, leaving whooping cough in a doubtful position within the frontier of infancy. Yet the form of the whooping cough curve includes one suggestion—conveyed by all these four curves—that they are forced, on the side toward birth, into conformity with some medium more resistant than that on the side toward childhood.

If there is a group of diseases causing a considerable infant mortality and showing in their frequency curves, that their approach to infancy is somehow definitely resisted, it is important to identify the causes of death thus halted on the margin of infancy. Statistical evidence, measured by minor units of time,



might show us how these three or four agencies manage to insert a thin edge into the neo-natal period, and how they can be restricted to, if not within, the period of childhood to which they belong. There surely is a statistical solution, and probably an easy one, of the paradox that so much infant mortality is the sequel of diseases of childhood.

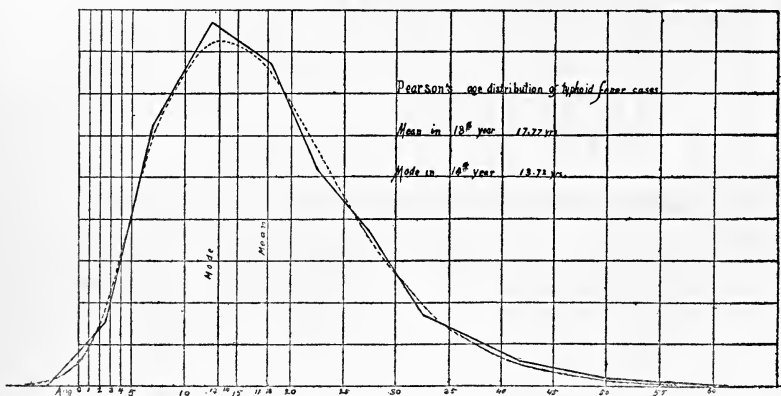
In the absence of statistical evidence we may rely on mathematical evidence that there is a mortality of childhood distinct from that of infancy, and this distinctive mortality presents precisely such a figure as we are discussing. It was a curve of this type which halted for a time Karl Pearson's study of the Chances of Death. Pearson attempted to apply the theory of probabilities to human mortality; and, believing that death from "old age" should furnish a normal chance distribution, he began at the end of life. He was not at once successful, but after other studies had supplied him with the concept of skewness in chance distributions, he was able to subtract from the total mortality an ample curve, strongly skew toward youth, and this he called the "old age" component of mortality. Next he subtracted two flatter curves, very little skew, and corresponding to the mortality of "middle age" and of "youth." He then subtracted a fourth curve which he supposed to represent the mortality of childhood. It proved to be a very different kind of curve. It was strongly skew toward age, and on the side toward birth it came to an end abruptly at the beginning of the third year, quite as if that



Part of Pearson's diagram showing the "Childhood," "Youth," "Middle Age," and "Old Age" components of the general mortality curve.

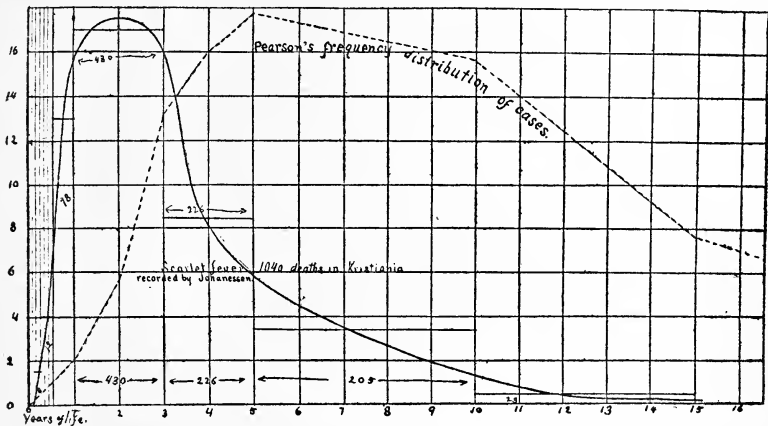
were the end of the story. Between this point—the age of two years and the age of one hundred years—he had satisfactorily accounted for three fourths of the total mortality. He had remaining the trivial range of two years, the first two years of life, in which to account for one fourth of the dead; a quarter of all the events for a fiftieth of all the time. For such a distribution there was apparently no recourse in mathematics. The status of the problem at this moment is shown in the accompanying chart. One must remember that the science of numbers had everything, and the science of medicine nothing whatever

to do with this undertaking. Later studies of chance distributions included the age distribution of several fevers, and these sent him back to his suspended task with a key to its completion. Among the "fevers" studied were typhoid, scarlet fever, and diphtheria. The typhoid curve, having the least relative altitude, is the best illustrative curve, and is presented here. Typhoid fever presents toward childhood such an aspect as scarlet fever presents toward infancy. The average of all the frequencies for typhoid falls late is the eighteenth year (17.775), but the greatest frequency occurs late in the fourteenth year (13.715). Of chief interest, however, is the foot of the curve toward birth, bending rather sharply toward that event. This curve requires that three in each thousand cases of typhoid fever shall occur in antenatal time. Pearson was able to complete the mathematical treatment of the chances of death when he perceived, first, that "there is a mortality of infancy distinct from that of childhood," and second, that the general mortality cannot be resolved into its age elements without extending the figures through antenatal time to a point which is "very approximately nine months before birth." He also noted that while the maximum incidence of diphtheria and scarlet fever fell upon the fourth and fifth year, their maximum deadliness falls on the third year. It can hardly be doubted, I think, that measles, scarlet fever and diphtheria were important factors in determining the nature of that curve which brought Pearson's investigation to a temporary standstill; nor does it seem very doubtful that these diseases are in fact as distinct from those of infancy on one hand as from those of adult age on the other.



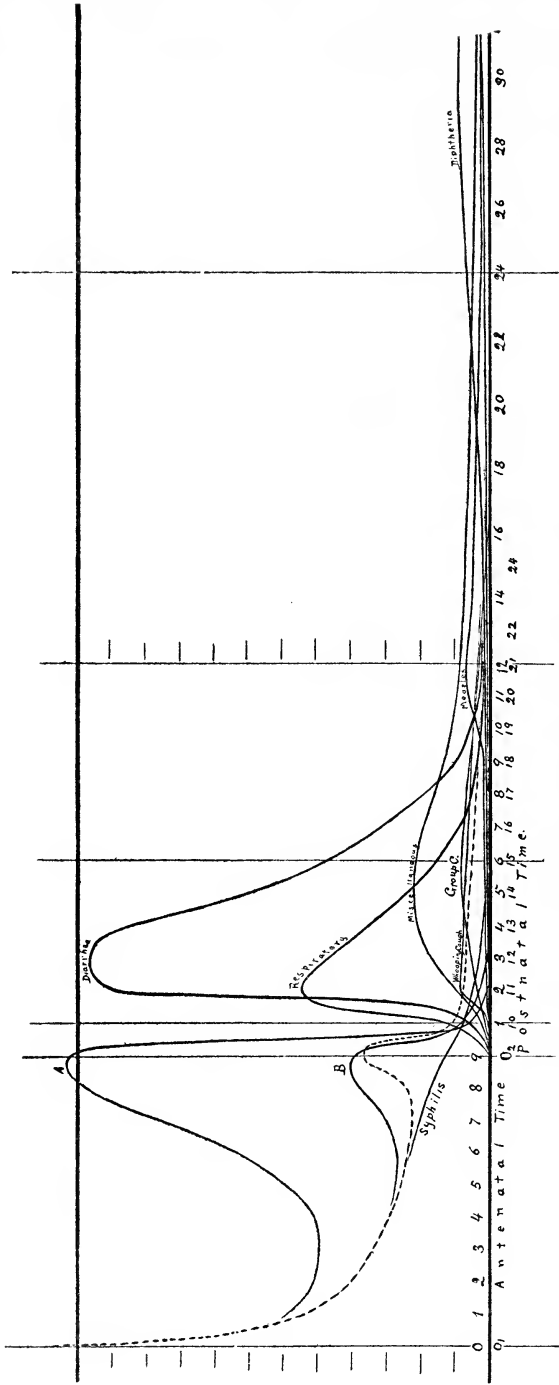
What form may we expect the distinctive causes of post-natal infant mortality to assume with respect to the antenatal causes, on one side, and to those of childhood on the other? Compressed into two years, without divisions of a year, the statistics are absolutely non-descriptive; not as intelligible as the statistics of radium in

tons. Newman says that the diarrhoeal diseases have their heaviest incidence in the second and third quarters of the first year. A quarter of a year is far too coarse an interval for the measurement of this mortality. The Registrar-General's figures for 1907 and 1908 indicate that the mode of infantile diarrhoea falls in the third or fourth month. We must expect this chief agent of infant mortality, when measured by months or weeks, to present toward birth an aspect similar to that presented by measles when measured by single years. The antenatal causes (such as those in Group A) belong to a curve of infinite range, starting perhaps from Clotho's distaff in the starry distance. The antenatal and post-natal curves intersect about a fortnight after the funis is cut; certainly not on or very near the birthday.



In the following diagram, the several groups of causes, recorded in the Census reports, are shown on a scale of weeks, the measurements for this scale being derived from such indications as are furnished by the Registrar-General's Report for England and Wales, and from other numerical statements appearing in this article. Syphilis, whooping cough, measles, diphtheria and scarlet fever are given separately. On the post-natal side, magnitudes and age distributions (except perhaps in the group corresponding to Table II) are seen in reasonable likeness to their true relations. On the antenatal side, the causes recorded as causing death in post-natal time are shown as starting at the date of conception, and their modes are located, with no pretense of accuracy, in antenatal time.

On a scale of weeks, the remoteness of measles, scarlet fever and diphtheria appears very striking, as does their loss of altitude. These altitudes, however, have been somewhat exaggerated;



The time relations of mortality, in ante-natal and post-natal time, according to causes and groups of causes, by months.

otherwise the curves, in their flatter portions, would have been invisible. On a chart twice as long the mortality mode of scarlet fever could have been shown, and the morbidity mode in three times the length.

Between the ages of 24 months and 20 years, practically all of the mortality of childhood is included. Its magnitude compared with that of the preceding two years, is as 70 to 154, or, taking the difference of time into account, as 5 is to 95. The bulk of childhood mortality is compressed into the first two of eighteen years, just as the bulk of infant mortality, in post-natal time is compressed into the first three of twenty-four months. After the mortality mode of childhood is passed, another distinctive mortality mode is not reached until the age of 23 years, the centre of the mortality curve for youth. Separate, by a very significant number of years, from the mortality of youth on one side, and by a significant number of months from the mortality of infancy on the other, and unable to trespass seriously beyond the two-year line or the 20-year line, this mortality of childhood seems clearly distinguished from the adjacent mortality on either side.

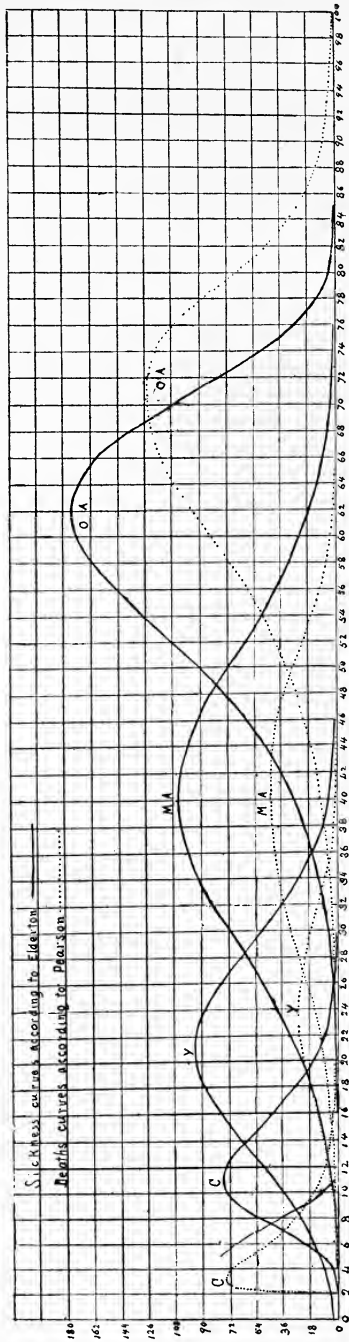
The validity of Pearson's distinction is further emphasized by the occurrence of the morbidity mode later than the mortality mode in this period. Elderton² has given to the sickness experience of the Friendly Societies of England and Wales the same mathematical treatment which Pearson applied to mortality statistics. This morbidity experience furnished no data for ages under five years. Sickness values comparable with mortality values are obtained by dividing the sickness rates (measured in weeks) by 52.167 (52.167 weeks=1 year), the quotient being the number of individuals who, by carrying equal parts of all the sickness observed during the year, would all be sick for a year, and so pass out of the group exposed, just as if they died during the year.

$$\frac{\text{Weeks of sickness}}{\text{Number exposed} \times 52.167} = \text{Probability of being sick for a year.}$$

Elderton finds that the modal age of morbidity in childhood occurs in the twelfth year, about nine years later than the mortality mode. In youth the morbidity mode comes a year earlier, and in middle age a little more than a year earlier, than the mortality mode. The sickness mode of old age comes in the sixty-third year, nine years before the mortality mode.³ Beyond that,

²Graduation and Analysis of a Sickness Table; W. Palin Elderton, *Biometrika*, Vol. II, No. XV.

³Concerning the inverted order observed in childhood, Elderton says, "When we get nearer birth it is not necessary for the origins of the sickness curves to be earlier than those of the death curves, for, if the rate of mortality is low (most obviously when it is decreasing), the fact of the sickness origin coming after the deaths origin would only indicate that the incidence of sickness in the particular period of life was such that the sickness rate was increasing at a relatively greater rate than the death rates. The only thing that seems necessary is that the sickness curve for any group should not *start* later than the deaths curve."



Elderton's four components of the general morbidity curve compared with Pearson's four components of the general mortality curve, showing that in childhood (and perhaps in infancy) the maximum morbidity occurs much later than the maximum mortality. Showing also the morbidity curve of youth starting in ante-natal time, suggesting the relation of ante-natal (embryonic and foetal) pathology to the morbidity of youth, and that the mediations of parenthood are superior to the mediations of childhood in the mortality of infancy.

toward the end of life, the sickness curve falls rapidly, becoming insignificant at eighty-five years, fifteen years before the death curve becomes insignificant.

Elderton's sickness curve for childhood makes a questionable start, abreast of the deaths curve. The other three curves start earlier than the mortality curve, the curve of youth stretching backward completely through the curve of childhood, through the two years of infancy, and on into prenatal time. Three of the curves finish later than the corresponding mortality curves, the exception being that of old age.⁴

It seems necessary to examine the probabilities of childhood mortality rather closely; for the known time relations of scarlet fever, diphtheria, measles and whooping cough prepare us to expect an after-coming morbidity mode in infancy as well as in childhood. But the late start of the sickness curve in childhood, and its very late maximum, suggest the existence of large contingent probabilities, outweighing the essential probabilities of whole life in one period, but not manifested in three succeeding periods. We must be careful not to go beyond necessity in admitting probabilities which are to be both highly potent and wholly exhausted within a narrow range. Ideas of irregularity have little place in a conception of the forces which can bring generation after generation through the life invisible in such order as to repeat time after time the familiar pattern which we see between the ligature of Omphale and the shears of Atropos. It is safer to think of life as traversing our field of vision with astral steadiness, followed (or accompanied) by an invisible twin, the dark Moira, known to us only through the mediation of sickness. If we assign to the vitality mass a parsimonious value, and to the mortality mass a like value, just sufficient to cover the whole range of probabilities, we may divide the intervening space and make a scale to which denominate numbers may be applied; mortality values diminishing in one direction, vitality values diminishing in the other direction. All the possibilities of sickness will lie between the centre of mortality and the centre of vitality, but we shall be able to measure them no farther than we can trace increasing magnitudes in the direction of the dark planet, and no farther than we can distinguish diminishing magnitudes toward the light one.

At birth life comes into view accompanied by sickness in large amounts. Pearson's figures account for 605 lethal doses of sickness in the antenatal history of a reproductive effort which brings forth 1,000 infants alive on their proper birthday.

⁴Four sickness curves finish later, if we include that of infancy, of which the tail only is discernible in Elderton's data, and furnishes a significant figure at the age of twelve years.

Experience acquaints us with other amounts of prenatal sickness becoming lethal in postnatal time. These, with postnatal sickness, amount to 40 lethal doses in the first month. Two hundred such amounts may be delivered in the first year of life, and, in the eighth year 5 lethal doses per 1,000 persons living. The numbers which we call mortality units⁵ are characteristic of the first, the eighth, or other year to which they correspond. Every remoter value being greater, and every nearer value being less, the characteristic mortality value which we observe describes the integral part of all the sickness possible to observe in that period. The sickness equivalent of a given mortality unit is a lethal dose, characteristic of the age at which it is regularly observed; enough to kill five persons in the eighth year, or two hundred persons in the first year. Non-lethal sickness (continuing through or recovering in the year) must be measured as an addition to lethal sickness, starting a new series of denominate numbers which in their sum may equal any fraction but not the whole of the characteristic lethal dose. Lethal sickness is the sum of the superior values of sickness down to and including the minimum fatal dose. Non-lethal sickness is the sum of a maximum non-lethal dose and all inferior magnitudes of sickness; a mantissa therefore of the lethal unit. With equal distribution of the causes of sickness throughout the years of life, the sickness curve should obey the mortality curve, and should always lie between it and the vitality curve (the probability of living one year).

But the causes of sickness are not equally distributed. The diseases of infancy and childhood include most of those which, once survived, make no second attack. In the very early years, when the curves of life and death are diverging, sickness is at its highest frequency and briefest duration. Its frequency diminishes and duration increases with age, and when the curves converge in later life, the sickness curve loses significance, until at length, and well within the century mark, the vitality curve becomes a sickness curve. When the probability of living a year and the probability of dying within a year reach, as they do at 86, the same relations which they had at birth, the sickness curve becomes superfluous. The vitality curve becomes thereafter a curve of permanent sickness; so that when observed sickness in old age is described by a curve attaining its maximum nine years earlier and ending 15 years earlier than the death curve, it proves no more, perhaps, than that life ends in a twilight as baffling as that in which it begins.

⁵The probability of dying within a year.

The preposterous relations of sickness and mortality in childhood and infancy, on the other hand, are associated with known phenomena of certain infections. After-coming morbidity maxima are characteristic of whooping cough, measles, diphtheria, and scarlet fever. When we descend the scale of age from 12 years, we find, in passing from group to group (reading backward), that mortality increases rather slowly, while concurrent non-lethal sickness, rising more rapidly, soon develops a spurt. But the pace of mortality is steadily mended until, below the age of five years, a winning spurt of mortality is developed. Traveling backward in this way, with each younger group we enter a zone of less vital resistance and larger numbers. Communicable sickness must inevitably be increased in passing from group to group in the direction of larger numbers and smaller immunity, unless the action takes place in a medium presenting another kind of resistance, which increases at a rate superior to the numerical increment and the declining immunity.

The paradox will be solved if we can show that in passing from one group to the next younger we enter a space which is less infectible. The period of school attendance is spent in a bounded space of relative isolation, a sociologic inclusion within which are many segregations according to age, and more stringent in younger groups, as the power of locomotion and association is less. The oldest group, leaving school, enters a more infectible space; and the youngest group, entering school, leaves a space less infectible.

The heavier incidence of measles, scarlet fever, and diphtheria on the first two years of school age, and the behavior of the sickness curves in vacation, testify that a space-equivalent of immunity is lost on entering school. Below school age the space relations of children grow narrower and less infectible until, at the beginning of the third year the curve of childish mortality piles up like a wave at a breakwater. It is a difficult thoroughfare to the isolated space of babyhood, which in its earlier divisions encloses no community, but a great number of solitary infants.

The after-coming morbidity maximum of childhood is easily understood when we realize that these space-equivalents of immunity have no relation to vitality and therefore no power beyond the moment of attack. The value of these limited inhibitions is nevertheless very great. They restrain more and more, in the descending age groups, the mediations of sickness between members of the group, so that attack rates may appear to decline while fatality rates are increasing. Notwithstanding the extreme sensitiveness of the infant organism, epidemics of childhood can not project into infancy more than a sporadic morbidity,

very fatal indeed, but infertile, insomuch that measles, whooping cough, scarlet fever and diphtheria regularly fail to attack infants in proportion to their numbers, except under conditions of institutional or other unnatural promiscuity of infants.

Within the area of infancy, babies themselves are all but impotent as mediators of infantile sickness. Here the responsibility is divided between mediations of childhood and mediations of parenthood. Without these two kinds of mediation the precincts of infancy would be almost inviolable.

But the space of infancy, isolated as it is, is subsequent to another more isolated—the biologic inclusion of prenatal existence; and this, in turn, is subsequent to another inclusion, having investments of civil, social, and religious order. These several investments enclose the reproductive group, into which young adults are admitted by twos, and counted as ones. It is not a very large group, being less than one-fourth of the total population. The function of this select group is to generate both the numbers and the characteristics of the following generation; and for this purpose the vitality of the group must be exalted to an amount exceeding current losses of the total population far enough to assure the presence, in the next generation, of a superior group of adolescents, from which a superior reproductive group may be selected. Under existing conditions, to raise the common stock of vitality to such a power, calls for a gestative effort on the part of about five and a half per cent. of the population each year (2,500,000 wives in the Registration Area). Such a gestative effort will yield an apparent increment of 3.5 per cent. on the total population; enough to withstand a heavy mortality and still provide a superior group of candidates for another reproductive group 18 or 20 years later. The gross fertility of 3.5 per cent. is about twice that required at the beginning of the next reproductive cycle, and when that time arrives it is likely that one-half of the new reproductive group will be the fruition of one-fourth of the parent group. At its best the gestative effort calls for a very severe extension of the vitality of women, impossible to be achieved without sensibly disturbing the vitality of the whole population within the same age period.⁶ The formation of a social inclusion around the reproductive group signifies a purpose to create and maintain a reserve of vitality for the benefit of the select few whose individual vitality is to be so severely extended.

⁶In this connection it is interesting to note that Elderton, having assumed the normal curve of error as an exposed-to-risk curve, and having applied the unit of sickness experience, obtained a sickness curve with two maxima, the minor mode at 38 and the major mode at 67 years of age.

CONCLUSIONS

The phenomena of infant mortality must be examined *in situ*, as they are unfolded under the biologic and social investments of parenthood; for it is on the integrity of these investments that economy of reproduction depends.

Social, economic, and hygienic conditions, which affect the reproductive group unfavorably, are in general associated with relatively short duration of marriage, more numerous conceptions, more miscarriages, more live-born offspring, greater mortality of infants and children, and therefore a lower net fertility than is observed under favorable social, economic, and hygienic conditions.

The great waste of reproductive effort occurs in the four months preceding and nine months after the proper date of parturition. The centre of infantile mortality is probably located, as Pearson suggests, in ante-natal time, about one month before the proper birthday.

The recorded post-natal mortality accounts for about half (perhaps less) of the mortality occurring in the thirteen months ending at the age of nine months.

Of the recorded post-natal mortality, under the age of one year, in the Registration Area, about one-third is due to ante-natal causes.

Of the recorded mortality from ante-natal causes, about one-half is due to faulty or incomplete utero-gestation, and might be avoided or amended by proper care of expectant mothers during the last twelve weeks of pregnancy.

The statistics of infant mortality should regularly account for ante-natal mortality occurring in the last three months of gestation. Burial regulations should be amended so as to secure this information.

Deaths should be tabulated by single years of life up to the age of ten years; by single months up to the age of twelve months; by weeks to four weeks; by days to seven days.

The age incidence of both morbidity and mortality in infancy and childhood requires statement by minor units of age, in order to disclose the mode of access of the communicable diseases to the more restricted space of infancy and early childhood. The distinctive form of several mortality curves, and the transposed time relations of the corresponding morbidity curves, indicate a certain chronologic order in the occurrence of these diseases, and suggest that the hazards of adaptation tend to diminish as the period of adaptation is prolonged.

Among the post-natal causes of infant mortality, the diarrhoeas are distinctively infantile. Infantile diarrhoea regularly increases to epidemic magnitude in June, July and August. It is most

fatal to summer-born, city-bred infants, not breast-fed. It is least fatal to winter-born infants, wholly breast-fed. It is the unique distinction of this epidemic that it searches out and attacks solitary infants, and is neither preceded nor followed by like sickness among older persons in immediate contact. It occurs during the period of adaptation of the gastro-intestinal tract to the permanent support of an abundant and varied bacterial flora. In proportion as this adaptation is hastened, the hazard is compounded.

A CITY'S DUTY IN THE PREVENTION OF INFANT MORTALITY

By **JOSEPH S. NEFF, M. D., Philadelphia, Director Department of Public Health and Charities**

In the event of cholera, yellow fever, small-pox or other publicly dreaded diseases, glaring head-lines and front-page newspaper articles arouse and alarm the community. Public and private aid is immediately placed at the command of the municipal health officer, and all the forces and energies of our best civic life are enlisted with him to combat and defeat the inroads of sickness and death. Yet, the mortality from those diseases sinks into insignificance in comparison with the mortality of infants.

Diarrhoea and enteritis are terms suggesting no alarm, yet, in 1909 in the registration area of the United States in every 100,000 of population, 72.8 infants died from this cause. Of these deaths 70 per cent. of these deaths were preventable. In the same year tuberculosis, pneumonia, and diarrhoea and enteritis (88 per cent. of which occurs in children) which are not dreaded, caused 43 per cent. of the total deaths from disease without creating any public comment. If we assume the mortality in the non-registration area of the United States to be the same as in the registration area, 19,419 deaths from typhoid fever was the record of the past year, much more publicity being given to this disease than to the mortality of infants, which was 253,268, or 19 per cent. of the total deaths, the majority of which were preventable—a much larger mortality than in any other age period or from any single disease. Tuberculosis of the lungs, against the spread of which more concentrated work, more time and money has been devoted (\$3,000,000 having been appropriated by the Pennsylvania Legislature alone during the past three years) than in any other health effort, yet, the mortality from this disease last year was 126,610, fifty per cent. less than the mortality of infants. Is it not time to demonstrate to the municipalities and commonwealths their duty in lessening this needless mortality? To best study the problem it is necessary to separate the preventable from the non-preventable deaths.

NOTE.—Where infants are mentioned without designating any particular age, those under one year of age are referred to.

The following table shows the mortality in the registration area of the United States for 1909 in children under one year of age:

NON-PREVENTABLE.						
Premature births.....	18,286,	being 13	per cent.	of total	mortality	of infants
Congenital debility....	14,988,	" 10.7	"	"	"	"
Congenital malforma- tion	7,286,	" 5.2	"	"	"	"
Violence	4,946	" 3.5	"	"	"	"
LARGELY PREVENTABLE.						
Diarrhœa and enteritis.	36,516,	being 25.4	per cent.	of total	mortality	of infants
Pneumonia	17,549,	" 12.5	"	"	"	"
Epidemics and infec- tious diseases	7,132	" 5.1	"	"	"	"
Convulsions	4,613	" 3.3	"	"	"	"
Bronchitis	4,234	" 3	"	"	"	"
Gastritis and other dis- eases of the stomach..	2,645	" 1.9	"	"	"	"
Meningitis	2,464	" 1.8	"	"	"	"
Tuberculosis	2,406	" 1.7	"	"	"	"
Venereal diseases.....	1,582	" 1.1	"	"	"	"
Congestion of lungs....	712	" 0.5	"	"	"	"
Unclassified	6,615	" 4.7	"	"	"	"
Other diseases	9,083	" 6.5	"	"	"	"

When the full duty of the municipality is performed, many of those classified as non-preventable will be classified as preventable.

Through education and legislation we should act not only in the care of the mother before the birth of the infant, but we should deal with the problem, aye, even before marriage. As eugenic law is becoming better understood, legislation for the prevention of improper marriages, for the control of the "black plague," for the prevention of the propagation of the defective classes, and for the suppression of the free traffic in liquor, which plays such an important part in heredity, would prevent the greater portion of this so-called non-preventable mortality, and be productive of better health in older children and increase vital resistance, all tending to a more moral and hardy race. Although these methods would decrease the birth rate, a serious problem now confronting this country would be solved; viz., the care of the defective classes, which are prominent factors in producing infant mortality. In a recent study of this subject in Philadelphia it was found that 41 per cent. of all children born of feeble-minded women died in infancy. The women had an average of three children each. It would be far better to prevent these births and save not only the tax-payer the burden now placed upon him in the care of the mental defective in our jails, reformatories, hospitals and asylums, but in addition, the heart-pangs of many parents in caring for such children in their endeavor to maintain them, screened from the eyes of the world. As but a small percentage of these individuals are properly

cared for in institutions, this class is increasing at an alarming rate; therefore, from an economic standpoint there is no better investment for a municipality or a commonwealth than the performance of its obligation to care properly for these unfortunates, whose cost to the public is increasing in almost geometric ratio. One of the first duties is to provide proper institutional care for feeble-minded women during the child-bearing period, and another to prevent the illegitimate propagation of the species of the criminal and defective classes by so-called sterilization laws, that are already effective in several states.

A "Division of Child Hygiene," with a thoroughly trained corps of physicians and competent nurses necessary for the education of the parents in the feeding and care of their children, in the maintenance of health and the medical care of the sick, is valueless unless the authorities insure pure water, pure food, pure air, and general sanitation, the lack of which, coupled with ignorance, is the cause today, of nearly all of the preventable deaths of infants. Legislation and a competent corps of inspectors are necessary to secure pure food, especially milk, which, in this connection, is the most important and most perishable of our food supplies. The greatest difficulty here will be found in the large cities dependent for their supply upon territory far distant. Inspection and education of all those connected with the handling of milk is necessary, from the dairyman to the transportation companies, the receiving platforms of the city, the milk depots, the delivery wagons and the consumer; the most important of which are the first and last named, for, if milk starts from the farm bad it can never be made good, and if milk is received into the home in good condition, unless properly cared for by the housewife, it will soon deteriorate and be unfit for human consumption.

It is the duty of a city to furnish pure water, and with our present knowledge of filtration there can exist no excuse for its failure to do so. The procurement of pure air is somewhat more difficult of accomplishment. The factory, the railroad, the steamboat, so important for the commercial prosperity of a community, should be compelled to so conduct their business as to prevent what is commonly known in American cities as the "smoke nuisance;" overcrowding can be overcome by statute; ventilation of public places of assemblage and public conveyance, can be enforced; but it will be almost impossible to overcome the prejudice, especially in the foreign population of large cities, against admitting fresh air into the home, particularly during cold weather and at night, night air, especially among the Italian population, being still resolutely maintained as dangerous. Education alone can overcome ignorance, superstition and prejudice.

The municipality should provide proper pavements; keep them clean and free of dust; should thoroughly and effectively dispose of all waste and should establish milk stations, which, however, would fail in their purpose unless receptacles and ice were provided to preserve and keep milk wholesome in the home; should enforce by legislation, the restriction of the practice of medicine and mid-wifery to those receiving diplomas or certificates after satisfactory examination; should instruct employers of female labor in the laws of industrial hygiene; and last and most important of all, should furnish professional municipal nurses for educational purposes in the home.

Such are ideal conditions, but as the ideal is impossible of accomplishment, what can be done where such laws and practices are not in existence? To the education of the people in rational hygiene the health officer looks as the final solution of the problem. The ignorant should be led, not driven. Force should seldom be used, and only against criminal acts.

I will cite what has been accomplished in the city of Philadelphia, not that the work therein performed is all that could be done, or better than elsewhere, but with the sole thought that the experience here related may suggest something to others that will be of advantage in furthering the purposes for which this Association was organized:

Up to the spring of 1908 no special work had been done in this line; then the newspapers were employed in general educational work, to which much credit must be given in creating public interest, which has made latter results possible. Free circularization was used and volunteer visitors were requested through the ministers of the city. Although good was accomplished, the movement was ephemeral and general interest was not maintained. Mortality during that summer, in infants under one year of age was 5 per cent. less than the preceding year.

In the early spring of 1909 a movement was started by holding a public conference, interest in which was created by a systematic series of newspaper articles, by the co-operation of the Bureau of Animal Industry of Washington, and other national and State organizations already engaged in this work, all of whom sent representatives to the public meeting. This was largely attended by representatives from nearly all the private and charitable associations and hospitals in the city, the result of which was the organization of a "Babies Alliance, under the auspices of the Department of Public Health and Charities, the Board of Public Education, the Mothers' Congress, the Home and School League, and allied associations." The public schools were used as assembly halls for lecture purposes to audiences obtained largely through the school children and their

parents. Committees were organized in different sections of the city to visit young mothers and give home instruction. The result of this movement was to a degree shown in the summer's work in the reduction of 8 per cent. in the deaths of infants as compared with the preceding year. Feeling that irrespective of the admirable work done by many of these volunteers, professionals would be more effective, the Philadelphia Bureau of Municipal Research offered to supply to the Department of Public Health and Charities a corps of professional nurses in order to demonstrate by actual results to the legislative branch of the government the necessity of appointing a corps of municipal nurses, asked for in the budget for several years, as a first step toward the formation of a Division of Child Hygiene. This thought being shared by representatives of other private associations, by a co-operation of all, a larger movement was instituted in the early spring of the present year (1910) in the organization of a "Conference on Summer Work for Mothers and Children." A remarkable publicity campaign was instituted in which six newspapers of the city gave much space; two hundred stories under headed headlines, comprising 85 columns being published in the months of May, June and July, which created great interest and added to the size and enthusiasm of a public meeting, arising from which an Executive Committee was appointed, consisting of a representative from each of the more active private associations. The Chief Executive of the city presided at the general meeting and was so much impressed with the importance of the work that he immediately wrote an urgent message to the legislative body asking for an appropriation to organize and maintain a corps of nurses, which was granted, and became effective July 1st. Thus progress was made toward the creation of the desired Division of Child Hygiene in the Department of Public Health and Charities.

A directory was published of agencies engaged in the general work, with suggestions for utilizing the facilities available; a Bureau was organized for registration of cases and exchange of information between the agencies, with a view of preventing unnecessary duplication and providing for adequate attention to all of the urgent needs of mothers and children. In this movement there were represented: 20 day nurseries; 22 settlements and neighborhood social betterment agencies, having facilities such as baths, camps, mothers' clubs, milk stations, etc.; 8 agencies providing temporary shelter for mothers and children; 10 modified milk stations; 55 hospitals and dispensaries; 30 associations providing convalescent care or outings; 21 agencies visiting and inquiring into the needs of mothers and children in

their homes; and the city, through its Bureaus of Police and City Property, the Board of Public Education, and the following divisions of the Department of Public Health and Charities,—Medical Inspection, Nuisance Inspection, House Drainage Inspection, Milk Inspection, Meat and Cattle Inspection, Tenement House Inspection, School Nurses, Visiting Nurses, Children's Agent in charge of Dependent Children, and special agents for advice and information. The Bureau of Municipal Research supplied two nurses and one clerk; the Society for Organizing Charity, one clerk; the Visiting Nurse Society, two nurses; the Phipps Institute, one nurse; the Starr center, two nurses; the Babies Alliance, one nurse, and the Lighthouse, two nurses; all of whom reported to the Municipal Department having in charge the infant mortality work.

Additional appropriations were received from City Councils covering the general expense. The Medical Inspectors of the Bureau of Health delivered lectures in the public schools, illustrated by paraphernalia used in the care of the baby, applied to living subjects, in the presence of the older girls and their parents. The education of the mother was continued in the homes by personal instructions and demonstrations by the nurses. The milk stations, too, were educational centers; in many, medical clinics were established. Exhibits on the "Care of the Baby" were most effective teachers. They were placed in milk stations, schools, the city piers, and other institutions, and consisted of graphic charts, display cards, photographs, sketches and models, which depicted the proper hygiene and care of the infant.

Classes for mothers were held once a week in several sections of the city with prizes provided by the Babies Alliance and the "Lighthouse" for those babies showing best results. The Philadelphia Modified Milk Society, without cost to the city, opened eight new stations, maintaining eighteen in all. Owing to the absence of proper facilities in the hospitals for the care of sick babies, two large city piers were altered and furnished by the city as open air hospitals, with modified milk stations, physicians and municipal nurses in attendance, and accommodations for mothers and older children. Here, too, exhibits were installed. The Philadelphia Playground Association equipped playgrounds with apparatus, and furnished attendants and instructors on both piers which provided amusement for the older children allowing the mother to give her undivided time to the sick infant. On these piers lectures were given to the caretakers in preparation of food, washing and care of the baby.

The Police Department was quite active in the campaign. Instructions to nurses were phoned to the various police stations, where they called, daily, at stated intervals for communi-

cations from the main office. Wall cards and circulars were distributed in the homes by the patrolmen, who, under written instructions from the Superintendent of Police, were compelled to immediately transmit any call for a nurse, doctor, milk, ice, or any information, by means of the street telephone, through the local station house to the main office, which made the medical and nursing attendance as prompt as ordinary patrol or ambulance service.

The newspapers did much toward the success of the movement, keeping constantly before the public all the details in connection with the work. They frequently published the phone numbers of the Central Office in the City Hall, and the fact that this office could be reached through the patrolmen or station houses. Addressed postal cards were left by the nurses in all homes to be used in case of need. A number of hospitals and dispensaries co-operated by daily mailing postal cards, furnished by the Department, containing a list of sick infants for whom treatment had been asked. There was kept a complete card index of all infants in the wards in which the activities of the municipal nurses were concentrated, and by mid-summer a complete history of every infant, its mother, housing conditions and general environment was obtained.

As the summer work was to be used as an instructive exhibit to City Councils of the need of a municipal Division of Child Hygiene, the work of the nurses was confined to certain sections; and for more effective demonstrations, actual results of these sections were to be compared with other localities not so covered. Notwithstanding the entire city profited by the publicity campaign, new milk stations and general work, including the pier-hospitals, it showed 40 per cent. greater infant mortality than the districts covered by the nurses as compared with the corresponding period of the preceding year. To make the comparison more marked, these districts were selected on account of poor housing and congestion of population. It may be said, in passing, that last summer was the most trying one, from weather conditions on babies, we have had with one exception in thirteen years.

A more complete understanding of the work of the nurses, during the summer, can be had by the following statistics:

Number of Visits by Nurses

Original visits for investigation and instruction	9,172
Special nursing visits.....	5,049
Revisits	5,735
	<hr/>
<i>Total visits</i>	19,956
Number of sick infants cared for.....	2,347
Number of expectant women instructed.....	587

Disposal of Cases

Deaths	21
Sent to hospitals.....	82
Sent to general dispensaries or district physicians	443
Sent to country or seashore.....	53

Report of Piers: Chestnut Street opened July 25th; Race Street, August 3rd

Sick infants in attendance.....	2,434
Well infants in attendance.....	2,014
Older children	3,593
	<hr/>
<i>Total attendance</i>	8,041
Caretakers instructed	2,681

Twelve thousand, eight hundred and seventeen (12,817) quarts of milk and eighty-six thousand (86,000) pounds of ice were distributed in the homes of the destitute. The Philadelphia Modified Milk Society distributed from 18 milk stations, four hundred and sixty-nine thousand, seven hundred and thirty-eight (469,738) bottles of modified milk, thirteen thousand four hundred and forty-nine (13,449) of which were used on the piers.

As results of this summer's campaign through newspaper articles and public exhibits of soothing syrups and babies comforters containing opium or more dangerous drugs, the Philadelphia Association of Retail Druggists most magnanimously passed resolutions endorsing the position of the Department, and condemning and discouraging the sale of these remedies by their members; the mayor of the city most deeply interested in the welfare of children, and impressed by the success of the work on the City Piers, has already started a movement to procure a large floating hospital for next summer. This, and more, can be accomplished by proper publicity; by securing the co-operation of private associations with the various departments of city government; by demonstrating in such a forceful way, by

such effective work to the legislative branch of a city the great benefits accruing to the community that they, too, become enthusiastic and educated to the necessity of transferring these private activities to a special municipal department in charge of the prevention of infant mortality.

RESULTS OBTAINED BY TUBERCULIN TESTING A CITY'S RETAIL MILK SUPPLY

By **GEORGE W. GOLER, M. D.,** and **F. R. EILINGER, Phar. G.,**
Rochester, N. Y.

TUBERCULOSIS FROM COW TO CHILD

"From five to seven per cent. of all human tuberculosis is ascribable to it. (Bovine Tuberculosis). Though it does not appear to play any part in tuberculosis of the lungs—the commonest type of this disease in man—yet it probably causes one-fifth of the tuberculosis of infancy and childhood."

*Theobald Smith, M. D.,
Professor of Comparative Pathology,
Harvard Medical School.*

Professor Smith was the first to discover the difference between human and bovine tubercle bacilli.

Whatever views men may hold relating to the frequency with which bovine tuberculosis is conveyed to children through the medium of cow's milk, it is assumed that every one interested in the milk supply of cities, believes it to be desirable that all milk shall come from tuberculin tested cattle, and that all cattle shall be tested semi-annually, or at least annually. To secure this much-to-be-desired test and to compel its enforcement by law, it is necessary first, to show the frequency with which cattle supplying a locality are infected by tuberculosis before a law can be framed, passed and enforced for the protection of all people against the transmission of tuberculosis through milk. Because of the large number of cattle on many farms supplying even a small city with milk, a demonstration of the frequency of tuberculosis in a given locality is a long and arduous piece of work. If a city is compelled to resort to the method of testing cattle belonging to every herd in order to get evidence sufficient for the passage and enforcement of a law against the sale of milk from tuberculosis cattle, with the small laboratory facilities and few workers in most cities, the task would be well-nigh impossible of accomplishment. The practical hopelessness of an attempt to secure the enforcement of a tuberculin test for all milk coming to a city by resort to the test of individual herds, leads us to propose that instead of attempting to test herds we test samples from retailers, and wherever a retailer's sample reacts we hold the retailer of the milk responsible for the goods he sells. If a sample of his milk is proven to make guinea pigs re-act to an injection of 2 c. c. of tuberculin two months after the animal has received a 5 c. c. injection of centrifugalized cream or sediment, then the retailer is to be prevented from

selling that milk in the city until he has a clean bill of health for all his herds from the State Department of Agriculture. In this way the city not only helps to clean up its manifestly tuberculous herds, but secures the most positive kind of evidence with which to ask for a strong, immediate, well enforced ordinance requiring the testing of all cattle.¹

This brief note is only intended to record results obtained in the work of roughly testing the milk of 185 retailers supplying the city of Rochester with milk for the purpose of securing evidence upon which to base a demand for an annual tuberculin test of all the cattle supplying to the city.

In the beginning of our experimental work we depended upon naked eye evidence in the organs of those animals dying after acute infection had passed, or, who, living two months after the injection were upon autopsy found with marked lesions of tuberculous disease within their bodies. In the first hundred animals we depended upon these post-mortem naked eye lesions, but later, owing to the test suggested by Anderson,² we were able to determine more clearly and closely the animals reacting by injecting them with 2 c. c. of crude tuberculin after they had lived two months.

We have in all, in Rochester, 185 licensed retail dealers. Taking a sample from each one of these dealers, we injected one animal with centrifugalized cream, another with centrifugalized sediment from the same sample. Where both animals died of acute infection duplicate samples were obtained and injected other animals. All told we used 242 samples and 484 animals. Of these the first 100 animals used exclusive of those dying of acute infections, 5 or 5 per cent. were found with marked naked eye tuberculous lesions. Of the whole number of pigs injected 285 received injections of 5 c. c. of sediment in milk, and of these 61 or 21.4 per cent. died shortly after inoculation as a result of acute infections. Of the whole number of animals injected 199 received 5 c. c. of cream, of which number 86 or 43.2 per cent. died shortly after inoculation. 237 pigs were injected with 2 c. c. of crude tuberculin, of which 30 reacted or 12.6 per cent. Of these animals 18 reacted that had been injected with sediment or 7.59 per cent.; 12 that had been injected with cream or 5.06 per cent.

As a result of this work 41 retailers supplied by 28 producers had 757 cattle tested. 671 cattle were tested through the efforts of the Chief Milk Inspector, Mr. W. O. Marshall. 200 cattle were tested because the owners voluntarily asked for the test,

¹For the details of this plan, both the laboratory work and that of the New York State Department of Agriculture in testing cattle and reimbursing owners of tuberculous cattle, the reader is referred to my preliminary report in the Albany Medical Annals, Feb. 1910.

²Journal Infectious Diseases, March, 1908.

and out of the total number tested 210 cattle were killed; thus out of approximately 8,000 cattle supplying Rochester with milk more than 20 per cent. of them were tested as a result of this work, and of those tested approximately 12 per cent. reacted and were killed.

Results Obtained by Tuberculin Testing the Retail Milk Supply of Rochester, N. Y.

Number of retailer.....	185
Number of samples examined.....	242
Number of guinea pigs used.....	484
Died shortly after inoculation.....	147—35.95 per cent.
Injected with 5 c. c. of sediment.....	285
Injected with 5 c. c. sediment, died shortly afterward	61—21.40 per cent.
Injected with 5 c. c. cream.....	199
Injected with 5 c. c. cream and died shortly afterward	86—43.21 per cent.
Living at the end of two months and injected with 2 c. c. crude tuberculin.....	237
Reacted	30—12.65 per cent.
Sediment	18— 7.59 per cent.
Milk	12— 5.06 per cent.
No tuberculin used, evident tuberculous lesions found	100— 5 per cent.

A STATISTICAL SURVEY OF INFANT MORTALITY'S URGENT CALL FOR ACTION

By **EDWARD BUNNELL PHELPS, M. A., F. S. S., New York, Editor,**
"The American Underwriter"

The fundamental basis of all rational reform movements being the demonstration of the conditions which demand reform, it would seem to be incumbent on this first annual meeting of the American Association for Study and Prevention of Infant Mortality to establish the *raison detre* for the organization of the Association by placing on record, and bringing before the American public in the simplest possible form, a convincing demonstration of the present appalling rate of Infant Mortality, or, in other words, of the utterly needless waste of infant life. Once the fact is proven, and burned into the public mind, investigation of the why—or reason for the fact—and the how—or means of remedying the fact—is an inevitable sequence. This logical order of procedure for this Association is succinctly stated in the provisional program for this meeting, in the first sentence of the outline for this session, which declares that: "Full and accurate information concerning the infant population and infant mortality is the indispensable basis of an intelligent effort to check the waste of infant life." Full and accurate information on these lines is not as yet obtainable, but at least a statistical approximation of the facts is attainable, and one which will convince any thinking man of the pressing importance of the movement which this Association is now inaugurating in this country. And, as indicated by its title, the purpose of this paper is to present "A Statistical Survey of Infant Mortality's Urgent Call for Action."

At the very outset, it should be clearly understood that all authorities on the subject, the world around, long since concurred in restricting the application of the term "infant mortality" to deaths under one year of age, thus indirectly relegating to the class of child mortality all deaths of children between one and, say, five years. Consequently, all figures and statements in this paper dealing with infant mortality apply only to deaths under 1 year of age. The world's specialists on vital statistics have also tacitly agreed, for good and sufficient reasons which need not here be discussed, that the rate of infant mortality shall be calculated by the division of the number

of deaths under 1 year by the number of births, per annum—still-births excluded—instead of by division of the number of deaths under 1 year by the living population under 1 year, as would be the case were the time-honored method of computing the death rates at all other ages applied to infant mortality. The infant mortality ratio being worked out on a basis positively unique, it is therefore obvious that it cannot properly be compared, or contrasted, with the commonly accepted death rates for any other ages. The basic facts—and especially the elimination of still-births from the figures for both births and infant deaths—being established, it is now in order to present in the briefest possible form the urgent call of infant mortality for remedial action.

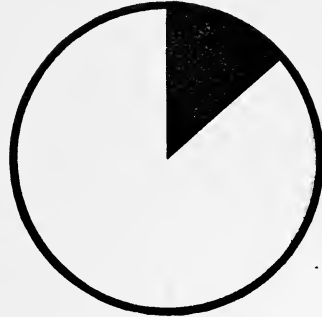
The foundation on which the call for action rests necessarily consists of statistical data on the subject, which, with references to their several authorities, are presented in the various tabular compilations appended to this paper. Fully appreciating the fact that the eye, rather than the ear, is the proper medium for conveying to the brain the force of statistical arguments, I shall not cloud this oral discussion of the subject with any confusing array of mere figures, but by a brief résumé of the final showing of the appended tabulations and certain graphic presentations of their significance shall endeavor to demonstrate that the moving cause for the organization of this Association is by no means one of the mere sociological fads of the current era of reforms practical, and so-called reforms utterly impracticable, but is one of the most essential, and most far-reaching, problems which now confront the human race.

That this problem is world-wide in scope is conclusively proven by a tabulation of the infant mortality of 31 of the principal foreign countries for the quarter-century ending with 1905, which I compiled and published about two years ago and have appended to this paper as Table 1. Summarized in a single sentence, this table shows that on a broad average for 20 of the principal countries of Europe no less than 162 out of every 1,000 babies born alive died before completing the first twelve-month, in the 25 years ending with 1905, and that in that same period the average ratio of deaths under 1 year to living births in 31 of the leading countries of the world, even including the seven divisions of Australasia with their exceptionally low rates of infant deaths, was 154 (see Chart 1). For only about one-half of these countries are the infant mortality rates for the three years, 1906-8, now obtainable, and the 16 countries in question had an average infant death rate of 133 in 1906-8, as contrasted with one of 142 in 1901-5, and one of 150 for the 25-year period ending with 1905.

Even were these records to be taken as absolutely worthy of credence, the apparent decrease in the three years ending with 1908 would indicate a decrease of less than two infant deaths per hundred living births in recent years as compared with the average for the quarter-century immediately preceding. But



AVERAGE FOR 31 LEADING FOREIGN COUNTRIES
FOR TWENTY-FIVE YEARS, 1881-1905, INC.
15.4 DEATHS PER 1000 BIRTHS



AVERAGE FOR CONN. AND MASS. AND NEW YORK
FOR SIX YEARS, 1904-1909, INC.
13.9 DEATHS PER 1000 BIRTHS

CHART I.—Infant mortality per 1,000 living births. Each circle represents 1,000 births—black sections, percentages of deaths under one year.

the figures in question can scarcely be taken at their full face value, although cited from the official vital statistics of the several countries, for the reason that in practically all countries there has been a larger percentage of improvement of late years in the registration of births than in that of infant deaths. And, as the infant death rate is calculated by dividing the number of deaths under 1 by the number of registered births, the larger the registered percentage of births the larger will be the divisor, and the smaller will be the quotient—or apparent infant mortality rate—even though the actual numbers of births and infant deaths be identical for the two periods under comparison. It is evident, therefore, that *apparent* declines in the annual infant death rates of the various countries, States and cities cannot be taken as conclusive, and should not so be taken unless carefully investigated and supported by corroborative data. This defect in the commonly accepted statistics of infant mortality is especially prevalent in those for the registration States and cities of this country, as I shall later on endeavor to make clear in this paper.

For the time being, setting aside this element of probable error, and noting only the essential showing of the world-wide tabulation, it seems to be safe to assume that in the civilized world at large outside of the United States not less than 13 out

of every 100 babies born alive die within the first year. In some countries the infant death rate is nearly if not quite twice as high as that figure, but dealing only with the broadest averages, the world's infant mortality now unquestionably amounts to 13 deaths for every 100 living births. As the tabulations for this country appended to this paper make clear, the infant mortality rate for the United States is certainly no better than that for the rest of the world at large (See Chart 1), and surely there could be no more convincing evidence of the ample justification for the present world-wide movement along the lines on which this Association was established than that one sombre fact, namely, that no less than 13 of every 100 newly-tenanted baby-carriages are vacated by death within the first twelve-month under present conditions, year in and year out. From my point of view, that fact is the basic fact of this crusade, is one which every worker in the crusade should keep clearly in mind, and one whose dire significance must be apparent to every thinking man and woman. No knowledge of either statistics or pediatrics is requisite for a full appreciation of it.

As human nature is constituted, however, it is not what is happening to the peoples of other lands, hundreds or thousands of miles distant, which most strongly appeals to us, but, rather, what is happening, or promises to happen, to us and to ours. The people of the United States have repeatedly proven in substantial form their broad humanitarian sympathy with the sufferers by the floods in China, the famine in India, and the destruction of Messina and other far-away cities, but it is not the infant mortality of the world at large, but that of Continental United States which looms up large before American mothers and fathers, and offers the problem which this Association is designed to solve, in part at least. Just what is that particular infant mortality, in so far as it can be approximately determined, why is it as appallingly heavy as it is, and how may it be materially and permanently reduced? These are the questions which now confront us, and which I shall briefly discuss in so far as such weighty questions can be even superficially considered in the few minutes which remain to me.

What is, or has been, the infant mortality of the United States as a whole? Nobody knows, and there is no means of finding out. Even including the 18 States and 54 cities in other States whose registration systems in 1909 were acceptable to the Bureau of the Census, but 55.3 per cent. of the total estimated population of Continental United States was included in the Registration Area whose returns for last year are presented in the Census Office's recent advance bulletin of Mortality Statistics for 1909, and but a single one of all the Southern States,

namely, Maryland, figures in those statistics. Not only are mortality statistics for nearly one-half of the population of Continental United States therefore unavailable, but as our national statistics for the Registration Area as yet present no birth returns—except for Census-taking years—it is a physical impossibility to compute the ratio of deaths under 1 year to living births on the one universally recognized basis, even for our Registration Area. To be sure, the majority of the Registration States do issue annual compilations of their respective vital statistics, and most if not all of these compilations now include tabulations of living births, and deaths at the various ages. Even the oldest and most reliable of these State systems of registration of births and deaths, that of Massachusetts, has been unable to round out complete annual returns of births, and in the Sixty-Seventh Report of Births, Marriages and Deaths in Massachusetts, for the year 1908, a frank admission of and partial explanation for this fact are made in these words (p. 142):

“Although the law applies to the registration of births, as well as to that of marriages and deaths, it is probable that the statistics of the births are less accurate than those of either of the other two classes. From the nature of things, marriages and deaths must be registered, in order that the former may be solemnized, or that interment be possible in case of deaths; but in the case of the births, the inadequacy of penalty for neglect, ignorance of the law, as well as topographical conditions, tend to an incomplete registration. It is therefore likely that the number of births returned in Massachusetts in 1908 was less than the actual number which occurred; hence a lower birth rate, and comparisons between births and deaths inaccurate.”

In many, if not most, of the other States which purport to present annual birth statistics, the registration of births is far more defective than in Massachusetts, and as an inevitable result of the incomplete returns of births the infant mortality rates—or ratios of deaths under age 1 to living births—presented in the annual reports of these States can only be taken in a Pickwickian sense, so to speak. The divisor being too small in every case—in some cases materially under the proper figure—of course the resultant, and apparent infant mortality rate, is above the actual rate. As the years roll by, the birth registration is doubtless improving in most cases, the margin of error is therefore continuously changing, and hence attempted comparisons of the apparent infant mortality rates of recent years with those of earlier years are more or less misleading. But, as this most glaring defect in our American system of registration of vital statistics, and most serious obstacle in the way of securing correct figures of infant mortality in this country, has

been considered at length in the report of the special Committee on the Registration of Births, scheduled on the program for presentation at this session, further discussion of that phase of the subject in this paper would be entirely superfluous. Some reference to it, however, by way of acknowledgement of the unfortunate limitations of the best available data, seemed to me necessary before summarizing the statistical tabulations of infant mortality in this country attached to this paper.

Although no birth returns have been included in the Census Office's annual publications of Mortality Statistics for the last 10 years, in all of these reports there has been a classification of deaths by ages in the constantly changing Registration Area, and some idea of the movement of the infant mortality rate in so far as Registration States and cities have been concerned from time to time may be had by a comparison of the annual ratios of deaths under 1 year with the total number of deaths at all ages in each of those years. I had some time since worked out such a comparison for the nine years ending with 1908, and now note in the advance bulletin of Mortality Statistics for 1909 just received from the Census Office that Dr. Wilbur therein suggests such a basis of comparison, and furnishes several tabulations on those lines which are of real value in any study of the infant mortality of this country. As he puts it (p. 11, Bulletin 108):

"When the proper statement of infant mortality is lacking, recourse may be had to the ratio between the number of deaths of infants under 1 year of age and the population under 1 year, although this ratio is unsatisfactory for many reasons, and the population under 1 year is not available except by estimation for intercensal years. A very crude means of judging of the condition as regards the general extent of infant and child mortality is to compare the total number of deaths of infants under 1 year and of children under 5 years of age with the total number of deaths registered. Other things being equal—that is to say, with substantially similar populations with respect to age distribution and in the absence of epidemic diseases prevailing at higher age periods—the relative proportions of deaths of infants and children to the total number of deaths should show approximately the prevalence of infantile diseases and the importance of reducing the general mortality by efforts directed toward the prevention of infant mortality."

This means, in other words, that, in default of national figures for either births or living population under age 1 in the Registration Area, at least one available means of attempting to measure the infant mortality for that area is a comparison of the annual ratios of deaths under age 1 with the total number

of deaths at all ages in that area. Such a comparison for the 10 years, 1900-1909, I have worked out and present in Table II attached to this paper (and also in Chart II), and, without taking up in detail the figures which may there be found, the general effect of that tabulation may be here shown by the citation of the average ratios on these lines for the two five-year periods, 1900-1904 and 1905-1909. In the former quinquennial period, the deaths under 1 in the Registration Area amounted to 19.2 per cent. of the total deaths at all ages in that area; in the latter quinquennial period, the ratio had risen to 19.5 per cent. thus showing an apparent increase rather than decrease. As was stated in the note from Dr. Wilbur's current report which I have just quoted, however, this method of comparison is "a very crude means of judging of the condition," and its credibility depends upon the assumption that age distribution and population conditions were substantially similar during the periods of comparison. But practically no other means of even attempting to measure the rise or fall of the infant mortality rate for the Registration Area as a whole is possible, and there are some reasons for believing that, in the main, the ratio of infant deaths to deaths at all ages affords a fairly reliable index of the infant mortality situation under normal general conditions. In the case of the comparison of the ratios of 1900-1904 and 1905-1909, the different conditions must be noted. From 1900 to 1905, inclusive, the Registration Area remained practically unchanged, no additions of area being made, whereas in 1906 the States of California, Colorado, Maryland, Pennsylvania and South Dakota were added to the Registration Area, thus increasing the population of that area by more than 7,000,000, or nearly 20 per cent. The addition of the five States in question materially increased the urban population of the Registration Area, and as the infant death rate in the cities is in general considerably larger than that of the rural districts this radical change in the make-up of the Registration Area might confidently be expected to send up the infant death rate of the area in question. But from 1900 to 1905, inclusive, the mortality statistics of the Registration Area dealt with precisely the same territory, hence are fairly comparable, and the registration returns for infant and child mortality for that period, as presented in Table II attached to this paper (and in Chart II), are worthy of careful study by all interested in the problem of infant mortality. In the last of the six years in question, 1905, the deaths under 1 year were fewer by more than 6,000 than those in the first year of the period, 1900, the deaths between 1 and 5 years showed an even larger decrease, one of more than 10,500, and of course the total of deaths under age 5

had dropped to the extent of more than 16,500, the sum of the decreases in the previously named age-groups.

Assuming that the birth-rate for the six years was substantially uniform (the birth rate in the Census year 1900 was 27.2 per 1,000 of mean population in the United States), the natural growth of the population in the Registration Area between 1900

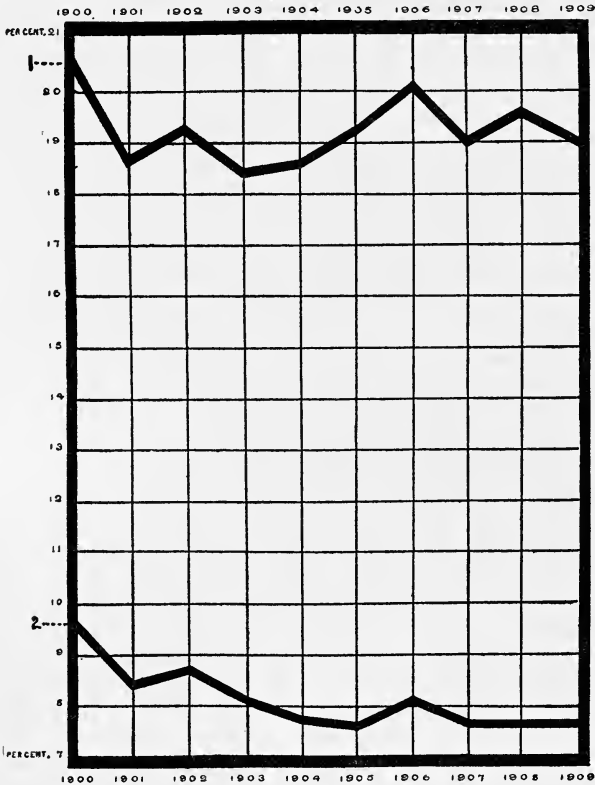


CHART II.—Annual ratios of (1) deaths under 1 year and (2) deaths between 1 and 5 years to total deaths in registration area of U. S. for 10 years, 1900-9.

and 1905 (amounting to nearly 3,000,000) would indicate an increase of about 81,000 in the probable number of births in 1905 as compared with 1900, and at the ratio of deaths under age 1 to living births in the Registration Area in the Census year 1900 (149.4 per 1,000) this increase in births would have involved an increase of more than 12,000 in the number of infant deaths in 1905 as contrasted with the number in 1900.

As a matter of fact, there was a decrease of more than 6,000 in the number of infant deaths, instead of the presumable increase of more than 12,000, and that figure would seem to signify an actual decline of nearly 23 per cent. in the infant death rate of 1905 for the Registration Area as compared with that for the Census year, 1900, as shown by the Twelfth Census. Of course comparisons of single years' mortality are open to many serious objections, but as the number of infant deaths in the Registration Area in 1905 was higher by several thousands than that of any of the years intervening between 1900 and 1905, the decrease in the actual number of deaths under age 1, in the face of a steadily increasing population and corresponding increase in the number of births, would seem conclusively to indicate at least a slight decrease in the infant death rate. The unquestionable decrease in the general death rate, from 1,755.0 per 100,000 in 1900 to 1,501.8 in 1909 in the Registration Area, the similar decrease in the general death rates of foreign countries, the comparatively slight but almost invariable decline in the infant death rate in recent years in those States and foreign countries having reasonably complete registration systems, and all collateral evidence combine to suggest a small decrease in infant mortality throughout the United States in the last decade. But positive evidence of that presumable decrease will not be forthcoming until the infant mortality statistics of the Thirteenth Census are available. In any event, it is extremely improbable that the infant death rate for the Registration Area, which was 149.4 per 1,000 living births in the Census year 1900, will prove to have dropped below 130 per 1,000 in 1910.

A study of the figures presented in Table II will reveal many incidental evidences of a decrease in the infant mortality rate, even though the ratio of deaths under 1 to total deaths at all ages was slightly larger for the Registration Area as a whole in the last five years than in the previous quinquennial period. For instance, in 1900-1905, while the Registration Area remained unchanged, the fluctuating changes in the ratio in question tended toward a decrease, the ratio in 1905 being only 19.3 as compared with 20.7 in 1900. In 1906 came the addition of five States to the Registration Area, and as these States included many large cities with comparatively high infant mortality rates the immediate increase in 1906 of the ratio of infant deaths to total deaths, from 19.3 to 20.2, might naturally have been expected, and by no means necessarily indicated any actual increase in the infant death rate. Since 1906 the Registration Area's ratio of infant deaths to total deaths has shown a downward tendency, and although in none of the last three years has it reached quite as low a figure as it had in 1901, 1903 and 1904,

before the five new States were added to the Registration list, the ratio of deaths under 1 to total deaths in 1909 was lower than that of 1900 by 1.6, and of course its complement, the ratio of deaths *over* age 1 to total deaths, necessarily increased to that extent. In short, this method of approximately measuring infant mortality by no means conflicts in its general showings with the indications of a decrease of infant mortality in the Registration Area of the United States which the decrease in the actual number of infant deaths so long as the area remained unchanged would seem conclusively to suggest.

Much more convincing evidence of the hoped-for decrease in the actual waste of infant life in this country is afforded by the ten-year study of the registered living births, deaths under age 1, and deaths at all ages, and their respective ratios, in certain States having well established registration systems, which I present in Table III attached to this paper (and also in Charts III and IV). Through the co-operation of the registration officials of Massachusetts, Connecticut and New York, I have been enabled to obtain the figures for 1909 in advance of the publication of their several reports, and in the case of Massachusetts and Connecticut have thus been able to tabulate comparisons for the last 10 years; in the case of New York State, the comparison was restricted to six years, as the New York State Department of Health did not separately classify deaths under 1 year prior to 1904.

The general significance of this table may be summarized in the statement that in both Connecticut and Massachusetts the number of deaths under 1 year was smaller in 1909 than in 1900, despite the decided increase in population and living births in each case, and the ratio of infant deaths to living births of course shows a marked decrease. In Connecticut there has been an apparent decrease of no less than 40 infant deaths per 1,000 living births in the last 10 years, and in Massachusetts there has been an apparent decrease of 29.5 in the same period. In the last six years the nominal ratio of infant deaths to living births, in New York State has decreased 21.4, and in the face of the continuous increase in the population of the Empire State the number of infant deaths recorded for the entire State has increased only about 1,100 in 1909 as compared with 1904. Lest these large apparent declines in the infant death rates of these three representative States may be taken more literally than the facts warrant, I must again at this point call attention to the unquestioned increase of late years in the percentage of registered births, thanks to the vigorous efforts of the Division of Vital Statistics of the Bureau of the Census, and various other helpful agencies, and again remind you that the actual

decrease in infant mortality is therefore considerably smaller than the figures would seem to indicate if taken at their face value.

For instance, that excellent authority of almost life-long experience with vital statistics, Dr. William H. Guilfooy, Registrar of Records of the Department of Health of the City of New York, tells me that although from 92 to 95 per cent. of

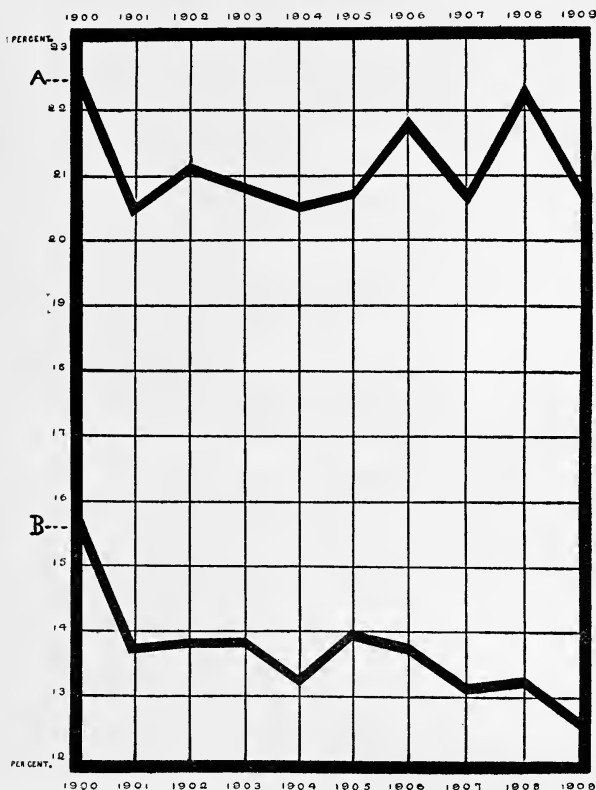


CHART III.—Annual ratios of deaths under 1 year to (A) total deaths and (B) to living births in Massachusetts in 10 years, 1900-9.

the actual births in the City of New York were probably registered in 1909, some authorities estimate that not more than 65 per cent. of the births in the same city were registered as late as 1900. Dr. Guilfooy believes that the percentage of registered births in 1900 was something like 80 per cent., but, even on that basis, there would have been a net increase of at least 15 per cent. in the registered births of the city of New York

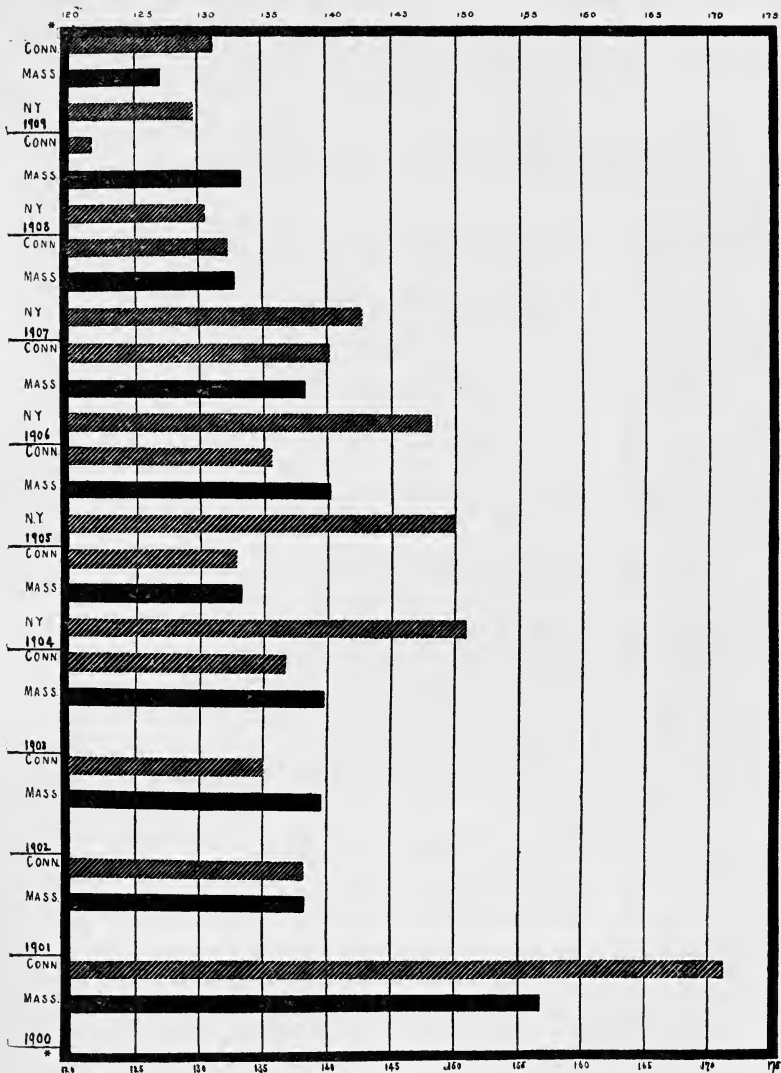


CHART IV.—Fluctuations of annual death-rates for last decade in Connecticut, Massachusetts and New York.
 *Deaths under 1 year per 1000 births.

in the last 10 years, and in many other cities and districts the increase in the percentage of registered births has doubtless been very much larger. Consequently, the actual decline in infant mortality in the Registration States of this country unquestionably is much smaller than the apparent decline, and in at least some foreign countries the same exception must be noted and taken into account in comparing their official infant mortality figures.

By far the largest percentage of deaths under age 1 due to any one class of causes is that of infant deaths caused by diseases of the digestive system, which in 1909 for illustration amounted to 29.5 per cent. That is to say, almost one-third of all the deaths under age 1 in the Registration Area of the United States in the last year were due to that one class of diseases. Deaths due to diseases of early infancy ranked second in numerical importance, footing up 23.9 per cent., or nearly one-quarter of the dread total, and diseases of the respiratory system accounted for 16.5 per cent. of the infant deaths in the Registration Area. All told, these three classes of causes carried off 69.9 per cent. of all the babies under 1 year of age who died in that area in 1909.

As that eminent authority on the diseases of children, Dr. L. Emmett Holt, put it in his address on "Infant Mortality and Its Reduction, Especially in New York City," before the Section on Diseases of Children of the American Medical Association, in June, 1909: "The fundamental causes of infant mortality, as we may call them, are mainly the result of three conditions—poverty, ignorance and neglect. The curve of diarrhoeal diseases is so important that it practically controls the curve of infant mortality. This group embraces acute gastritis, gastroenteritis, all forms of acute diarrhoea, dysentery and cholera infantum and makes up the largest part of the immense summer mortality. It is these diseases which cause regularly each year the sharp rise in the death curve in July and August." In citing these quotations from Dr. Holt's paper, I have deliberately associated, and brought together, his authoritative statement of the fundamental causes of infant mortality—poverty, ignorance and neglect—and his comment on the commanding importance of diarrhoeal diseases—especially in connection with the immense summer mortality—although they were not associated in his address. For, it seems to me, if a layman may venture to express an opinion on a phase of the infant mortality problem which the specialists in pediatrics are so much more competent to discuss, that the fundamental causes named by Dr. Holt—poverty, ignorance and neglect—in the natural course of things are much more potent factors, in the summer

months in making the infant mortality rate what it is than in any other season of the year. In his paper on "Infantile Mortality and Its Principal Cause—Dirty Milk," the late Dr. Charles Harrington, secretary of the State Board of Health of Massachusetts, remarked apropos of the seasonal distribution of infant mortality: "From the facts and figures thus shown it might be inferred that all infants under one year of age are in great danger during the hot summer months, but this is far from being the case. Not the three summer months, but the first three months of life, are the dangerous period." Unquestionably true though this statement is, so comparatively few accurate records of infants' deaths by ages expressed in months are available and there is such a wealth of information as to the seasonal distribution of infant mortality, that public attention has much more graphically been drawn to the abnormal dangers of the summer months, and in my judgment the unusual infant mortality of that season of the year offers the foremost strategic point of effective attack for movements like that of this Association.

I think it was Mr. Homer Folks who once said, in a lecture which I had the pleasure of hearing, that he was afraid there was but one really promising method of attacking tuberculosis so as to arouse the public on the subject, and that was, "to yellow-journalize the movement," or bring forward and rivet attention on the high places, the conspicuous features, of the white plague, so to speak. I am inclined to believe that the same principle applies to this infant mortality movement, and that the most vulnerable point of attack, as it were, is the infant mortality rate at the highest point, namely, that of the summer months, and the causes primarily responsible for that high rate. It is at that season of the year that the subject of infant mortality invariably receives most attention at the hands of the press, then it is that summer nursing corps—like that which has done such excellent work in New York of late years, for illustration—are temporarily at least disseminating information as to the proper care of babies among the class which most needs such information, and it is in the third quarter of the year that the infant mortality rates are most apt to set people thinking on the subject.

Of course the fundamental causes of which Dr. Holt spoke are operative the year around, but it is in the summer months that those luxuries for the poor, abundant ice and pure milk, play the most important part in determining whether the babies of the poor shall live or die. Then it is that the unbearable heat of the tenements drives their unfortunate occupants of all ages into the streets, to the fire escapes, and to the roofs, and then it is, as I see it, that poverty, ignorance and neglect, devel-

oped as it were by the summer heat, are most apt to exercise their baneful influence in raising the infant mortality rate to its top notch. Then it is, that the poor and ignorant are most apt unknowingly to bring about the death of their babies by doing the things that should not be done, and leaving undone the things that should be done, for those same babies. It is notoriously true that diarrhoeal diseases are primarily responsible for the high infant death rate of the summer months, in other words, that the greatest danger then confronting the babies of the tenements is that whose principal preventive and antidote, abundant ice and pure milk, they are then least likely to have. And for these and many other reasons, as I see it, that summer infant mortality, at once class mortality and seasonal mortality, is in every way the high spot, the most conspicuous phase, and the most hopeful mark of the crusade to which this Association is committed.

With the world at large it is the array of large figures, and not mere percentages, which makes the deepest impression. Consequently, in endeavoring to bring out the importance of the summer infant death rate I have first tabulated a comparative statement, by weeks, of the births and infant deaths in the greatest city on this Continent—and its various boroughs—in the third quarter of 1910 and 1909 (See Chart V), and have then emphasized the disheartening regularity of that sharp rise in infant mortality by a somewhat similar, though less detailed, presentation of corresponding figures for an entire State, Connecticut, for which monthly comparative figures for both years were available. These figures are to be found in Tables IV, V, and VI, attached to this paper, and not only show how conspicuously the infant mortality rate mounts up in that season of the year, but how inflexible the increase seems to be, despite all the efforts now being made to grapple with it. The contrast between the summer rate and the annual rate of infant mortality is sharply brought out by the fact that in the third quarter of 1909 the ratio of deaths under age 1 to registered living births in the City of New York was 169 per 1,000, as against a ratio of only 130 for the entire year 1909—that is to say, was larger by an even 30 per cent.—and that the infant deaths in that quarter amounted to 32.15 per cent. of the total for the entire year. In the State of Connecticut, the infant death rate in the third quarter of 1909 was 192, as compared with one of 131 for the entire year 1909, an excess of nearly 47 per cent.

But those statistical facts are mere mathematical demonstrations of a well-known truth; a much more important showing of the tables in question is the fact that, despite all the wide fluctuations for individual weeks and individual boroughs in

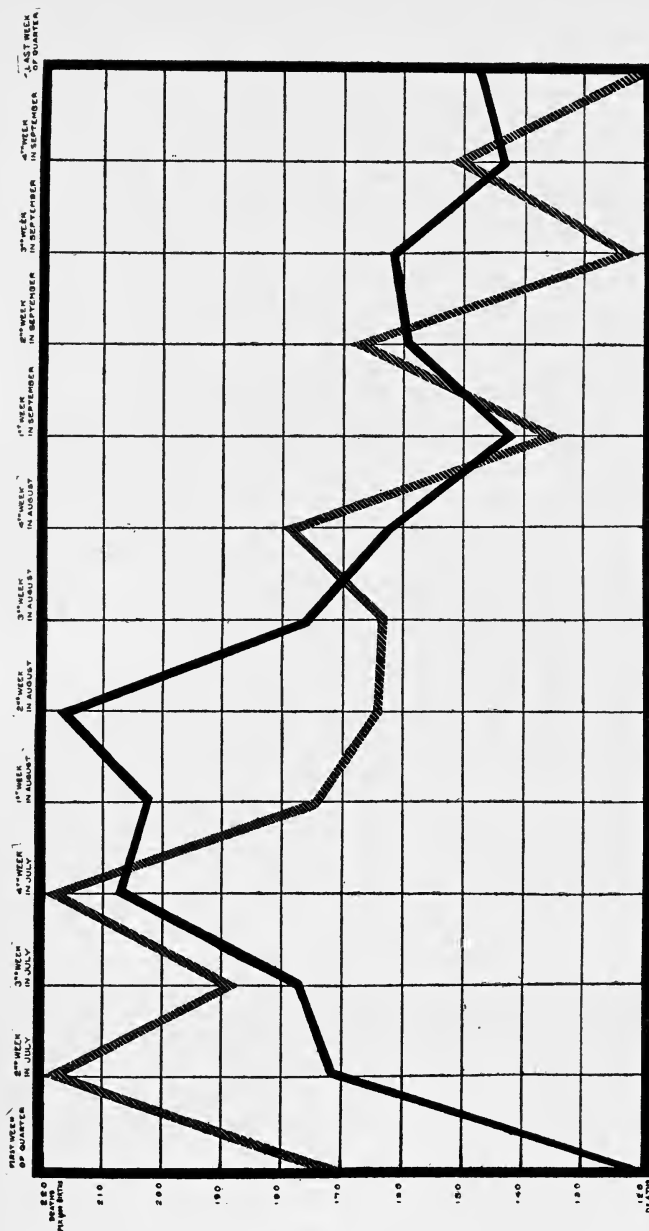


CHART V.—A graphic comparison by weeks of New York City's heavy infant mortality in the third quarter of 1910 and 1909. Lighter line, starting at middle of left border, represents weekly death rate of 1910; black line, weekly infant death rate of 1909.

1909 and 1910, the infant death rate of the City of New York in the third quarter of 1910 was precisely identical with that for the corresponding quarter of 1909, namely, 169 per 1,000 registered living births. And the seeming inflexibility of summer infant mortality is strongly confirmed by the fact that in the entire State of Connecticut, of course including the rural districts along with the cities, the infant death rate in the third quarter of 1910 was practically identical with that for the corresponding quarter of 1909, being 193 per 1,000 registered living births this year as compared with 192 per 1,000 registered living births in 1909. To be sure, comparisons for only two years are by no means convincing, but it is at least notable that in the case of both one of the world's greatest cities and an adjoining State with a scattered population barely one-fifth as large as that of the great metropolis, in the third quarter of 1909 and 1910 the respective infant death rates for both years should be practically identical. If allowance were to be made for the probable slight improvement in the registration of births in both instances in 1910, of course that would mean that the actual infant death rates for the third quarter in both cases were slightly larger in 1910 than in 1909. But, in any event, the figures would seem to show that, in so far as merely two-year records can tell the story, the infant mortality in both cases was quite as high this year as last year, to say the least.

In the final tables appended to this paper, Tables VII and VIII, I have attached a succinct statement of the number and percentage of infant deaths in the Registration Area of the United States in the last 10 years due to the four principal causes of infant mortality, aside from diseases of the respiratory system, namely, diarrhoea and enteritis, those diseases of early infancy, premature birth and congenital debility, and that cause of death perhaps more or less closely allied with the causes which contribute to premature birth and congenital debility, to wit., malformations. In the decade 1900-1909, these four classes of causes of deaths were responsible for no less than 52.05 per cent. of all the deaths under age 1 recorded in the Registration Area of the United States, and in the latter half of that period the percentage of deaths due to them was considerably higher than in the former half, namely, 54.19 as compared with 49.33. In every case except that of congenital debility, the percentage of deaths from each of these four causes was higher in 1905-1909 than in 1900-1904. Probably the inclusion of five additional States with many heavily-populated cities in the Registration Area in the latter half of the period had something to do with increasing the percentage of deaths due to these causes in 1905-1909 as compared with 1900-1904, but my recollection

is that a similar tabulation of deaths from these causes in certain large manufacturing cities for a long series of years which I prepared some years ago showed an almost unbroken increase from year to year in each of those cities. As to this phase of the subject, the statistician's work properly ends when he has tabulated, and presented in effective form, the actual figures; the discussion of the reasons for the fact, and the significance of it, does not come within his province, and that branch of the subject of infant mortality belongs to, and should be left with, you gentlemen of the medical profession.

In the preparation and presentation of this paper, I have tried to keep clearly in mind the purpose expressed in its title, or, in other words, to demonstrate by indisputable statistics an infant mortality rate of at least 13 deaths under age 1 for every 100 living births, the world around, and the existence of appalling causative conditions of such a nature as urgently to call for carefully planned, and steadfastly executed, remedial work—not only on the part of this Association, but of all thinking men and women in this country. The same conditions which cause the death of 13 out of every 100 babies born throughout the civilized world, on the broadest of averages, leave more or less permanent stamps on perhaps two or three times as many more babies who somehow manage to crawl over the infant dead line, many of whom will be the fathers and mothers of the next generation. The problem of infant mortality, therefore, is far more than one as to means of decreasing the number of infant deaths. Its scope is world-wide, and on its partial solution at least depends the welfare of posterity. The call for action on such a problem may fairly be termed urgent.

TABLE I

The Infant Mortality Rates, by Five-Year Periods, of 31 of the Principal Countries of the Civilized World for the Quarter-Century, 1881-1905, Inclusive, and the Annual Infant Mortality Rates of 18 of Those Countries for the Three Years, 1906-1908

COUNTRIES.	Ratios of deaths under age 1 per 1,000 living births.									
	1881 1885	1886 1890	1891 1895	1896 1900	1901 1905	1881 1905	1906	1907	1908	1906 1908
Norway.....	99	96	98	96	81	94	.....	.....	.....	.....
Ireland.....	94	95	102	106	98	99	93	92	97	94
Sweden.....	116	105	103	101	92*	104*	.....	.....	.....	.....
Bulgaria.....	81	95	140	143	145*	120*	.....	.....	.....	.....
Scotland.....	117	121	126	129	120	123	.....	.....	.....	.....
Denmark.....	134	137	139	132	119	132	.....	.....	.....	.....
Finland.....	162	144	145	139	131	144	.....	.....	.....	.....
England and Wales.....	139	145	151	156	138	146	132	118	120	123
Switzerland.....	171	159	155	143	134	153	.....	.....	.....	.....
Belgium.....	156	163	164	158	148	158	.....	.....	.....	.....
Servia.....	157	158	172	159	149	159	144	147	158	150
France.....	167	166	171	159	139	160	.....	.....	.....	.....
The Netherlands.....	181	175	165	151	136	162	127	112	125	121
Italy.....	175†	175†	185	168	168	175*	.....	.....	.....	.....
Spain.....	193	186*	185†	185†	173	185*	.....	.....	.....	.....
Prussia.....	207	208	205	201	190	202	177	168	173	173
Roumania.....	182	195	220	216*	203†	203*	.....	.....	.....	.....
Austria.....	223†	223†	223†	226	213*	223*	.....	.....	.....	.....
Hungary.....	226†	226†	250	219	212	226*	205	208	199	204
Russia in Europe.....	271	264	276	261	268†	268*	.....	.....	.....	.....
Averages for Europe....	163	162	169	162	153	162	146	141	145	144
New Zealand.....	90	84	87	80	75	83	62	89	68	73
Tasmania.....	109	103	94	98	90	99	91	82	75	83
South Australia.....	101†	105	99	112	87	101*	76	66	70	71
Queensland.....	136	119	103	104	95	111	75	77	70	74
New South Wales.....	124	115	111	113	97	112	75	89	76	80
Victoria.....	122	131	111	111	96	114	93	73	86	84
Western Australia.....	135†	123	130	160	126	135*	110	98	85	98
Averages for Australasia.	117	111	105	111	95	108	83	82	76	80
Japan.....	104	116	147	153	154	135	.....	.....	.....	.....
Ceylon.....	158	158	169	168	171	165	198	186	183	189
Jamaica.....	158	170	171	175	174	169	197	223	175	198
Chili.....	314†	264	336	333	332*	314*	328	297	320	315
Averages for countries named.....	184	177	206	207	208	196	241	235	226	234

RECAPITULATION

Europe.....	163	162	169	162	153	162	146	141	145	144
Australasia.....	117	111	105	111	95	108	83	82	76	80
Other lands.....	184	177	206	207	208	196	241	235	226	234
†Grand Averages.....	155	152	159	157	147	154	136	133	130	133

*Returns for one or more years wanting, and averages have been calculated on basis of returns for other years of period in question.

†Figures represent estimates for periods for which no returns were available, estimate in each case being average of actual returns for balance of entire twenty-five year period.

‡Computed by division of totals for all countries represented in table by number of countries in question.

Above table has been compiled in part from Table III, in Phelps' "A Statistical Study of Infant Mortality," in the Quarterly Publications of the American Statistical Association, New Series, No. 83 (Vol. XI), September, 1908, and data for years 1906-8 have been compiled from Seventy-First Annual Report of the Registrar-General for England and Wales (p. lxxvii).

TABLE II

A Comparison for the Last Decade of Deaths Under 1 Year, Between 1 and 5 Years, Under 5 Years, and all Over 1 Year with the Total Number of Deaths at all Ages in the Registration Area of the United States, and the Ratios of Deaths in Each of these Age-Groups to the Total Number of Deaths at all Ages, as Shown by the Annual Mortality Statistics of the Bureau of the Census for the Ten Years, 1900-1909

Years.	Deaths in the Registration Area.					Ratios to total deaths at all ages.			
	Total at all ages.	Under 1 year.	Between 1 and 5 years.	Under 5 years.	At all ages over 1 year.	Under 1 year.	1-5 years.	Under 5 years.	Over 1 year.
1900	539,939	111,687	53,450	164,137	428,252	20.7	9.7	30.4	79.3
1901	518,207	97,477	44,201	141,678	420,730	18.8	8.5	27.3	81.2
1902	508,640	98,575	44,940	143,515	410,065	19.4	8.8	28.2	80.6
1903	524,415	96,857	43,083	139,940	427,558	18.5	8.2	26.7	81.5
1904	551,354	102,880	43,022	145,902	448,474	18.7	7.8	26.5	81.3
1905	545,533	105,553	41,831	147,384	439,980	19.3	7.7	27.0	80.7
1906	658,105	133,105	53,873	186,978	525,000	20.2	8.2	28.4	79.8
1907	687,034	131,110	52,664	183,774	555,924	19.1	7.7	26.8	80.9
1908	691,574	136,432	53,433	189,865	555,142	19.7	7.7	27.5	80.3
1909	732,538	140,057	56,477	196,534	592,481	19.1	7.7	26.8	80.9
Total	5,957,339	1,153,733	485,974	1,639,707	4,803,606	19.4	8.2	27.5	80.6
1900-4	2,642,555	507,476	227,696	735,172	2,135,079	19.2	8.6	27.8	80.8
1905-9	3,314,784	646,257	258,278	904,535	2,668,527	19.5	7.8	27.3	80.5

A Comparison for the Last Decade of Living Births, Deaths Under 1 Year, and Total Deaths at all Ages, and the Ratios of Deaths Under 1 Year to Births and Deaths at all Ages, in the States of Connecticut, Massachusetts and New York, as Shown by Their Respective Annual Registration Reports

Years	Connecticut				Massachusetts				New York			
	Deaths		Living births	Ratios of deaths under 1 year	Deaths		Living births	Ratios of deaths under 1 year	Deaths		Living births	Ratios of deaths under 1 year
	At all ages	Under 1 year			At all ages	Under 1 year			At all ages	Under 1 year		
			To total deaths	To 1,000 births			To total deaths	To 1,000 births			To total deaths	To 1,000 births
1900	16,368	3,521	20,560	21.5	171.3	51,156	11,500	73,386	22.5	156.7	.....	.....
1901	14,856	2,805	20,294	18.9	138.2	48,275	9,952	71,976	20.6	138.3	.....	.....
1902	14,386	2,864	21,216	19.9	135.0	47,491	10,075	72,219	21.2	139.5	.....	.....
1903	15,490	2,972	21,751	19.3	136.6	49,054	10,269	73,584	20.9	139.6	.....	.....
1904	15,711	3,033	22,864	19.3	132.7	48,482	9,992	75,014	20.6	133.2	142,217	24,909
1905	16,298	3,159	23,271	19.4	135.7	50,486	10,519	75,022	20.8	140.2	137,435	25,827
1906	16,766	3,455	24,641	20.6	140.2	50,624	11,106	80,237	21.9	138.4	141,099	27,114
1907	17,490	3,433	25,945	19.6	132.3	54,231	11,293	85,001	20.8	132.9	147,130	28,011
1908	16,000	3,251	26,694	20.3	121.8	51,788	11,606	86,911	22.4	133.5	138,912	26,561
1909	16,460	*3,353	25,530	20.4	131.3	51,236	10,693	84,039	20.9	127.2	139,783	26,031
1900-1909	159,825	31,846	232,766	19.9	136.8	502,826	107,005	777,389	21.3	137.7	†846,576	†158,463
1900-1904	76,811	15,195	106,685	19.8	142.4	244,458	51,788	366,179	21.2	141.4	.....	.....
1905-1909	83,014	16,651	126,081	20.1	132.1	258,368	55,217	411,210	21.4	134.3	704,359	133,544
											955,315	19,0
											139.8	

*From the Bureau of the Census' advance Mortality Statistics for 1909.
 †Totals for years 1904-9, deaths under 1 year not having been separately classified by the New York State Department of Health prior to 1904.

TABLE V

A Comparative Resume of Births, Deaths Under Age 1, and the Ratios of Deaths per 1,000 Births in Each of the Five Boroughs of the City of New York in the Season of the Heaviest Infant Mortality—the Third Quarter—of the Years 1910 and 1909, Compiled from the Weekly Reports of the Department of Health of the City of New York

Boroughs of the City of New York	Third Quarter of 1910			Third Quarter of 1909		
	Living births	Deaths under 1 year		Living births	Deaths under 1 year	
		Number	Ratio per 1,000 births		Number	Ratio per 1,000 births
Manhattan.....	16,505	2,940	178	15,681	2,632	168
The Bronx.....	2,821	358	127	2,290	321	140
Brooklyn.....	11,065	1,736	157	10,324	1,725	167
Queens.....	1,781	348	195	1,571	321	204
Richmond.....	562	135	240	497	138	278
Totals.....	32,734	5,517	169	30,363	5,317	169

TABLE VI

A Similar Resume, by Months, for the State of Connecticut, Compiled from the Monthly Bulletins of the Connecticut State Board of Health

Months	Third Quarter of 1910			Third Quarter of 1909		
	Living births	Deaths under 1 year		Living births	Deaths under 1 year	
		Number	Ratio per 1,000 births		Number	Ratio per 1,000 births
July.....	2,363	587	248	2,115	407	192
August.....	2,353	404	172	2,290	483	211
September.....	2,210	343	155	2,180	373	171
Totals.....	6,926	1,334	193	6,585	1,263	192

TABLE VII

A Review of the Slowly But Surely Increasing Waste of Infant Life in the Last Ten Years Due to the Four Principal Causes of Infant Mortality, to wit; Diarrhoea and Enteritis, Premature Birth, Congenital Debility and Malformations, and the Annual Ratios of Deaths from these Causes to the Total Number of Deaths Under Age 1 in the Registration Area of the United States, as Recorded in the Annual Mortality Statistics of the Bureau of the Census for the Decade, 1900-1909

Years	Deaths under 1 year from all causes	Deaths under 1 Year from Four Principal Causes					
		Diarrhoea and Enteritis	Diseases of early infancy		Malformations	Total deaths from these four causes	
			Premature birth	Debility Congenital		Number	Ratios to all deaths under 1 year
1900	111,687	27,627	10,170	13,484	3,227	54,508	48.80%
1901	97,477	23,357	8,615	12,107	3,136	47,215	48.44
1902	98,575	21,912	9,087	12,724	3,165	46,888	47.57
1903	96,857	22,202	10,143	12,371	3,677	48,393	49.96
1904	102,880	25,286	11,361	12,640	4,046	53,333	51.84
1905	105,553	27,455	11,102	12,515	4,299	55,371	52.46
1906	133,105	35,220	14,250	15,493	5,857	70,820	53.21
1907	131,110	34,408	15,245	15,392	6,057	71,102	54.23
1908	136,432	37,049	16,441	15,833	6,525	75,848	55.59
1909	140,057	36,516	18,286	14,988	7,236	77,076	55.03
Total 1900-9	1,153,733	291,032	124,700	137,547	47,275	600,554	52.05%
1900-4	507,476	120,384	49,376	63,326	17,251	250,337	49.33%
1905-9	646,257	170,648	75,324	74,221	30,024	350,217	54.19%

TABLE VIII

A Recapitulation of Deaths Under Age 1 Due to Each of the Four Principal Causes of Infant Mortality, and the Ratios of Each of these Groups of Deaths to the Total Infant Mortality in the Registration Area of the United States in (1) the Last Decade, (2) the First Half of that Period, 1900-1904, and (3) the Latter Half of that Period, 1905-1909, as Shown by the Detailed Statistics in Table VII

Causes of Death	Deaths under 1 Year in the Last Decade					
	Ten-year period 1900-1909		First half of period		Second half of period	
	Deaths	Ratio to total	Deaths	Ratio to total	Deaths	Ratio to total
Total deaths under 1 year from all causes...	1,153,733	....	507,476	....	646,257	.....
Diarrhoea and enteritis..	291,032	25.23	120,384	23.72	170,648	26.41
Diseases of early infancy:						
Premature birth.....	124,700	10.81	49,376	9.73	75,324	11.66
Congenital debility...	137,547	11.92	63,326	12.48	74,221	11.48
Malformations.....	47,275	4.10	17,251	3.40	30,024	4.65
Total deaths under 1 year due to four above-named causes...	600,554	52.05	250,337	49.33	350,217	54.19

WHAT THE OBSTETRICIAN CAN DO TO PREVENT INFANTILE MORTALITY

By **J. WHITRIDGE WILLIAMS**, Professor of Obstetrics,
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As obstetrics deals with the care of the mother and her infant during pregnancy, labor and the puerperium, it follows that the duties of the obstetrician are not limited merely to the conduct of labor, and to the care of the mother and child for the few weeks immediately following it; but, likewise, include supervision during the entire pregnancy, as well as for so long a period after delivery as may be necessary for the patient to regain her usual health, and to leave the genitalia in such condition as will give reasonable assurance of normal pregnancies in the future.

We must learn to regard the occurrence of abortion or premature labor, as well as the death of the normal child at the time of delivery, or its loss from preventable causes at a later period, as an unnecessary economic, physical and biological waste, not to mention the personal grief or blasted hopes which may be associated with it.

Moreover, we must recognize that advice as to the prevention of conception may become a medical duty, for under certain abnormal conditions it is better for a woman not to become pregnant than to go through a series of abortions or premature labors dependent upon them. Thus, it is preferable for a syphilitic woman to remain sterile, rather than to give birth to a series of dead-born premature children or to puny offspring, which will be seriously handicapped in later life. The same holds good for women suffering from tuberculosis or advanced heart disease, in the hope of avoiding the induction of therapeutic abortion, which may later become necessary. I do not wish to be misunderstood in this regard, as I hold that one is not justified in giving such advice merely for the convenience of the patient, but should do so only in the presence of some pressing indication.

We must also learn that the birth of a puny or damaged child is a great misfortune, as its chances of reaching maturity are greatly diminished, not to speak of the additional expense to the individual or the state entailed in rearing it. Thus, it would seem that the obstetrician may aid in the prevention of infantile mortality, not only by his conduct at the time of labor and by the care of the child during the first few weeks of its life, but even more so by the institution of certain prophylactic measures

during pregnancy, or even before its inception, and later by placing the child in such environment as will offer the greatest probability for its future development.

I. BEFORE PREGNANCY. Ordinarily, the obstetrician is rarely able to institute prophylactic measures before conception, as only a limited number of patients seek advice in this regard. Frequently, they present some evident deformity, which makes them anxious to learn whether pregnancy can be undertaken with safety; while a large number desire to prevent the repetition of some disastrous experience in previous pregnancies, or to avoid the repeated occurrence of abortion or premature labor.

In the latter class of patients, great good may often be accomplished by prophylactic measures. Thus, the cause of repeated abortion is usually associated with displacements of the uterus, inflammation of its lining membrane or some other abnormality of the generative tract, and can be removed by appropriate treatment. Likewise, the occurrence of repeated premature labor is frequently dependent upon some underlying condition, such as syphilis, chronic Bright's disease, certain heart lesions, abnormal irritability of the uterus, or chronic lead or arsenical intoxication, and the only hope for a normal ending lies in their cure or alleviation.

One of the most important subjects upon which the obstetrician's advice is sought is concerning the effect of childbearing upon tuberculosis. We now believe that the occurrence of pregnancy in a woman suffering from the disease is a very serious matter; for, although she may go through pregnancy and labor without apparent harm, or even seem to improve in health, the disease tends to flare up after the birth of the child and may rapidly end fatally. For this reason tuberculous women should be dissuaded from marriage, or, if the disease develops later, they should be taught the dangers of childbearing, and induced to undergo such treatment as may lead to the cure or arrest of the disease before becoming pregnant.

With the general education of the public in this regard, the physician is frequently consulted as to the advisability of interrupting pregnancy should it occur. This is a question which cannot be dismissed lightly; and I feel very strongly that interference is clearly indicated whenever the existence of the disease is recognized during the course of pregnancy. On the other hand in tuberculous women who knowingly become pregnant, and especially after abortion had previously been induced on that account, the problem becomes more complicated; and we are confronted with the question as to whether it is justifiable to resort repeatedly to the induction of abortion in order to avoid dangers against which warning had previously been given. In such cases, I do not believe that interference is indicated, as the responsibility

for the condition rests with the patient, who has already received abundant warning; although it may become the duty of the physician to give advice concerning the prevention of conception in order to prevent such an eventuality.

II. DURING PREGNANCY. If the term prevention of infantile mortality can be understood to include the various measures which may be taken to increase the probability of a satisfactory outcome of pregnancy and the birth of a normal child, the obstetrician has abundant opportunities for giving such advice.

(a). *Hygiene of Patient*: The general hygiene of the patient should be carefully supervised and such rules laid down for her guidance as are most likely to result in the birth of a healthy child. This should include advice concerning the diet, the care of the excretory organs, and the general mode of life. It is highly important to insist upon the pregnant woman obtaining abundant rest and sparing herself as much as possible. This is particularly important among the lower classes, as it is well known that hard labor during the latter months of pregnancy tends to its premature termination and to the birth of puny and undersized children. Likewise, care should be taken that the women abstain from working in factories where arsenic, phosphorus and similar substances are used, as to do so exposes them to a much greater liability towards premature labor.

(b). *Treatment of threatened abortion and premature labor*: Wherever an abortion is threatened, it would seem axiomatic that the obstetrician should exert every effort to prevent its occurrence. The patient should be put to bed, carefully watched and subjected to appropriate treatment, which in many cases will avert the danger. In other cases, however, the symptoms may persist, or may recur after having temporarily subsided, and the question arises as to how long one is justified in attempting to avert what appears to be inevitable. Formerly, it was taught that treatment should be persisted in until the emergency had passed, or the abortion had actually occurred. At present, however, increased knowledge concerning the important part played by certain foetal deformities in the causation of abortion makes it questionable whether such a procedure is altogether justifiable, and whether it would not be better to allow Nature to take her course after a reasonable attempt at prevention had been made.

As syphilis and chronic nephritis are the most frequent causes of repeated premature labor, it naturally follows that the treatment of such conditions in the pregnant woman offers a wide field for the prevention of infantile mortality, as it is only by such means that one can hope for the birth of a viable child.

(c). *Prophylaxis of toxæmic conditions which may cause foetal or maternal death*: Under this head are included the pre-eclamptic and nephritic toxæmias, eclampsia and several other less well-known conditions. As far as maternal mortality is concerned, eclampsia is at present the most serious condition which the obstetrician is called upon to treat, and yet this is insignificant when compared with the foetal death rate associated with it. Fortunately, the disease is usually preceded by well defined and readily recognized premonitory symptoms—pre-eclamptic toxæmia—which generally yield to intelligent treatment.

Accordingly, one of the prime duties of the obstetrician is to detect and treat such conditions at the earliest possible moment, in the hope of preventing an eclamptic attack. With this in view, he should impress upon his patients the necessity for the examination of the urine at frequent and stated intervals. By so doing, it is possible to restrict greatly the occurrence of eclampsia, and thereby markedly reduce both foetal and maternal mortality.

(d). *Detection of disproportion between the size of the child and the pelvis*: Formerly it was believed that pelvic deformity occurred extremely rarely in this country, but with the rapid development of urban life and its attendant unhygienic surroundings, it has become much more common, particularly in the colored race. Contracted pelves were noted in 8 per cent. of the white and 33 per cent. of the colored women delivered in the Johns Hopkins Hospital; and, while the disproportion in most cases was not sufficiently great to cause serious trouble, yet in many instances it was so pronounced as to necessitate radical operative interference to save the life of the child. Therefore, the physician should subject all women coming under his charge to a routine examination some time before labor, in order to detect this or other abnormalities, and, being thus forewarned, to be prepared to resort at the proper time to whatever operation may be necessary. Thus, Caesarean section done at an appointed time at the end of pregnancy is almost devoid of danger, but becomes very serious when performed upon patients who have become exhausted by prolonged labor.

Moreover, equally serious disproportion may exist when the child is excessively large and the pelvis normal. The obstetrician should always bear such a possibility in mind, although unfortunately our means of ascertaining the exact size of the child are not as accurate as we could wish. Such a complication is frequently associated with a prolongation of pregnancy, and should be suspected whenever labor fails to set in within a reasonable time after the calculated date. In such cases a live child may

often be secured by the induction of labor, before the disproportion has become so extreme as to necessitate radical interference.

(e). *Rest and Food for Poor Women.* Pinard and others have clearly shown that the size of the child is to some extent dependent upon the general nutrition of the patient and the character of work which she performs during the last months of pregnancy. If the food is insufficient or the work excessively hard, small premature children are frequently born; whereas, if over-exertion is avoided and a liberal diet supplied, normal children are born at the proper time.

My own observations show definitely that the children of well-to-do patients weigh considerably more than those of free patients in the hospital wards. This difference is particularly marked in colored women, many of whom either from ignorance or lack of thrift are imperfectly nourished, and we find that their children weigh from one-half to three-quarters of a pound less than the average white child of well-to-do parents. This, however, is not an un-mixed evil, and may even be looked upon as a compensatory process; for, otherwise, owing to the greater prevalence of contracted pelves among the blacks, labor would prove extremely disastrous if their children attained the same size as in white women of the upper classes.

(f). *Preparation of the breasts for suckling:* One of the most important functions of the obstetrician during the latter months of pregnancy is to see that the nipples are so treated as to render them suitable for suckling, provided the milk supply is satisfactory. Too great stress cannot be laid upon this point, not so much on account of the actual effect upon the breasts, but because of its suggestive and educational influence upon the prospective mother. In my experience, the mere fact that the patient knows that the physician expects her to suckle her baby, if possible, is a potent means of persuading many women to do so who would otherwise seriously object to it. More will be said upon this point, however, when we take up the care of the woman and child after delivery.

III. AT THE TIME OF LABOR. By proper management at this time, and by educating the poor to make more extensive use of lying-in charities, the obstetrician can contribute markedly toward still further diminishing the unnecessary loss of foetal life.

(a). *Substitution of radical operative interference for brute force in the treatment of difficult labor:* Until the rational employment of aseptic surgical technique had rendered the major obstetrical operations comparatively safe, our only resource in the presence of serious disproportion between the head and the

pelvis lay in the use of high forceps, or craniotomy, if the former proved unsuccessful. In the latter operation the child was always sacrificed, while in difficult high forceps operations the employment of great force was sometimes necessary, with the result that the mother was sometimes seriously injured and the child born dead, or so injured during delivery as to succumb later.

At present the trained obstetrician is expected to detect the existence of disproportion before the onset of labor and to gauge his conduct accordingly. If the disproportion is pronounced Caesarean section should be performed at an appointed time, whereby all of the children and 98 per cent. of the mothers will be saved. On the other hand, in less marked degrees the patient should be allowed to go into labor and be watched in order to determine what Nature can do, when 75-80 per cent. of the labors will end spontaneously, while the remainder will require operative interference. Formerly, high forceps were employed in the latter category of cases, but are now replaced by pubiotomy or Caesarean section if necessary.

The more radical operations are undertaken in the interest of the child, and many are now saved which previously perished. My experience shows that the greater saving of foetal life is not accomplished at the expense of the mother, as in my hands the maternal mortality has been decreased by one half by the employment of such measures.

(b). *Restriction of destructive operations*: In times past craniotomy was resorted to whenever delivery could not be accomplished by means of high forceps or version. With the development of the line of treatment just outlined the employment of destructive operations has been greatly restricted; and most obstetricians now hold that craniotomy is unjustifiable except when the child is already dead, and even those less radical consider that it should be reserved for most unusual emergencies.

At present one may gauge the excellence of an obstetrician by the stand he takes upon the subject; as the better his training, the fewer craniotomies will he perform. This restriction has resulted in saving many foetal lives, and represents one of the great advances in modern obstetrics.

(c). *Use of lying-in hospitals*: In large cities a great saving of both foetal and maternal life may be effected by educating the poor to make more extensive use of the lying-in hospitals and obstetrical charities, instead of relying upon the services of poorly trained doctors or ignorant midwives. The well conducted lying-in hospital has lost the ill repute which it enjoyed in pre-

antiseptic times, and is now the safest place in which one can be delivered. I am convinced that the poorest women in the free wards receive absolutely better treatment than wealthy patients in their own homes, not to speak of the opportunity for rest, the freedom from anxiety, and the instruction which they receive in the care of their children.

We are prone to forget how great the improvement has been along these lines. Formerly from 3 to 10 per cent. of all women delivered in lying-in hospitals died from puerperal infection, as compared to a fraction of 1 per cent. in their own homes; at present, however, the conditions are reversed and fewer women now die in hospital than in private practice. This is in great part due to the fact that an appreciation of the great value of the aseptic conduct of labor has not yet permeated to the poorer type of physician, and still less to the midwife.

We hear a great deal of the necessity for improving the status and mode of education of the midwife; and, while perfectly willing to admit all of her imperfections, I am, nevertheless, somewhat sceptical of the good which may be accomplished in this respect in this country. I am inclined to believe that in the larger cities her gradual annihilation should be our aim, although I am not so certain that it will be advisable in poor and sparsely settled country districts. On the other hand, judging by my own experience, I believe that the ordinary midwife does no more harm, if as much as the poorly trained doctor. While it is true that she causes a certain number of deaths by infection, yet the latter will kill many more patients by ill judged and unnecessary operative interference. I, therefore, consider that this Association can accomplish more good, and do it more quickly, by agitating for better obstetrical training for medical students throughout the country, than by attempting to regulate the midwife problem.

IV. AFTER LABOR. Following the birth of the child, the obstetrician may contribute greatly to the prevention of infantile mortality not only by meeting such medical and surgical complications as may arise, but also by insisting upon certain educational measures.

(a). *Prompt repair of injuries to the child.* Immediately following its delivery, the child should be examined thoroughly for the purpose of detecting any abnormality or injury, as it may happen that the prompt recognition and treatment of such conditions may be the direct means of saving life or preventing chronic invalidism. This is especially necessary after difficult operative labors in order to detect the presence of fractures or depressions of the skull. In times past such injuries were regarded

as irremediable and treated expectantly, with the result that many of the children died during the first few days of life, while others, which appeared to do well at the time, later developed serious troubles resulting from brain injury, such as idiocy, epilepsy and various paralyses.

The investigations of Cushing, Commandeur and others have shown that such consequences may be avoided by certain operative procedures, and have taught us that the newly born child can survive most radical operations upon its skull and brain. For this reason, all babies presenting head injuries should be promptly seen by a competent surgeon, who should be encouraged to operate upon them in the hope of saving life or averting serious after-consequences. Occasionally, even in children who have sustained no visible injury, symptoms indicative of compression of the brain or of increased intra-cranial tension may appear a few days after birth. They should likewise be referred to the surgeon, as a properly performed decompression operation or the removal of a blood clot may save life or prevent the subsequent development of epilepsy or various paralyses.

In the past many physicians hesitated to take such action, as they felt that the condition might be attributed to unskillful treatment on their part. We now know that such is not the case, as in many instances serious intra-cranial haemorrhage may occur after comparatively easy spontaneous labor. I feel very strongly that surgical interference of this kind can be consistently recommended, as it will save many children who formerly perished; more particularly, as we know that death is not the worst termination, as many children who survive without operation later develop into idiots, epileptics or worse.

(b). *Prevention of infections of the newly born*: On this occasion it is scarcely necessary to refer to the wonderful decrease in blindness following the prophylactic employment of Crede's instillations, and the prompt and radical treatment of gonorrhoeal ophthalmia. I wish, however, to insist particularly upon the necessity for the aseptic treatment of the stump of the umbilical cord as a means of preventing infantile mortality. Prior to the introduction of antiseptic precautions, thousands of children died each year in the large lying-in hospitals from infection arising from the umbilical stump, and a small number still perish, notwithstanding every precaution. On the other hand, in the practice of many midwives and poorly trained physicians the death rate from this cause is still unabated, and the condition should be suspected whenever children die in the first days of life without symptoms indicative of some well marked disease. This mortality is almost entirely preventable, and can be done away with by employing modern aseptic technique in the care of

the cord, instead of the primitive and crude methods so generally used.

Formerly, lockjaw played a prominent part in the production of infantile mortality, and among the negro population of the South often led to the loss of 25 per cent of all newly born children. In this case, likewise, infection with the tetanus bacillus occurred through the stump of the umbilical cord, and was due to dirty dressings and general filth. Following the application of surgical principles in this regard the complication has entirely disappeared from lying-in hospitals and the practice of intelligent physicians, but it still causes many absolutely preventable deaths among the lower classes.

Very exceptionally, in lying-in hospitals, newly born children may be infected with pemphigus, or even impetigo, by means of underclothing which has not been satisfactorily sterilized. As such conditions may end fatally, care should be taken that the underclothes are of such a character as to be susceptible of sterilization, otherwise economy in this regard may result in preventable deaths.

(c). *Insistence upon maternal nursing*: Aside from the purely technical skill involved in effecting delivery in difficult cases, there is no means by which the obstetrician can so successfully prevent infantile mortality as by insistence upon the duty of the mother to suckle her child.

Before this Association it is not necessary to dwell upon the value of breast milk as the ideal food for infants, so that I shall limit my remarks to pointing out what the obstetrician may accomplish in this respect. I feel that he can probably do more than any other class of medical men, not excepting the paediatrician, to persuade the young mother to suckle her child, and thus become a centre for educating others.

As has been indicated in the preceding section, the obstetrician should see that proper means are employed during the last months of pregnancy to prepare the nipples to withstand the strain of suckling. This is most important, not only for its direct physical effect, but even more so for its educational and suggestive influence; as it serves to impress the prospective mother strongly with the idea that she is expected to feed her child, and that she must be prepared to take some trouble to do so. Not infrequently the patient may regard such precautions as useless, on the ground that she does not expect to nurse her child. In this event, it is not always advisable to lay down the law too strongly, but instead one should make the patient feel that she will be expected to do so only for a short time and then only for her

own welfare; as experience teaches that the uterus returns to its normal state more rapidly, and is less liable to become involved in disease processes when the breasts are used physiologically.

Following the birth of the child, the same argument can be used with even greater success, as we know if a woman can be induced to suckle her child for a few weeks on any pretext that she will continue to do so for as long as may be necessary. Moreover, the tedium of nursing can be greatly diminished, if one or two artificial feedings be interpolated each day, thereby relieving the patient from the slavery of being obliged to return home every few hours, and making it possible for her to have an entire morning, afternoon or evening free whenever desirable. By the exercise of a little tact and firmness it is possible to induce most private patients to do as we desire; and I can recall only a single one, with an abundant supply of milk, who refused, as compared with a large number who have been induced to suckle their children after having repeatedly stated that nothing would induce them to do so.

It is generally stated by those in charge of lying-in hospitals that, while one can usually persuade private patients to fulfill their duty in this regard, it is impossible to do so with ward patients. No doubt many women, and especially those illegitimately pregnant, do not wish to suckle their children, as they hope to get rid of them by placing them in an institution as soon as born. I have been able to overcome this difficulty at the Johns Hopkins Hospital by compelling all patients to retain their children as long as they remain in the ward. Insistence upon this rule usually kindles affection, and has resulted in many women permanently keeping and suckling children, which they had originally intended to "place out."

Great good may also be accomplished by co-operation between the lying-in hospital and some association interested in the care of children and the propaganda for maternal nursing. In my service, we have been fortunate in being able to avail ourselves of the services of the Maryland Association for the Prevention of Infantile Mortality. One of its workers visits the ward weekly and offers each recently delivered woman to supervise the care of the child after she leaves the hospital. The proposal is usually thankfully accepted, and the reports which we have received show that highly satisfactory results have been obtained, and indicate that a surprisingly large number of women have continued to suckle their children with almost ideal results. If this can be accomplished here, it indicates that those who claim to be less successful have not done their full duty by their patients, as they have failed to insist upon the most efficient and economical means of carrying out the object of this Association.

(d). *Care of illegitimate and abandoned infants*: In view of the very poor results obtained with artificial feeding in most infant asylums the obstetrician should exert every effort to persuade mothers to keep and suckle their illegitimate children instead of placing them in such institutions. Aside from the sociological and humanitarian aspects of the question, "placing out" such infants is practically equivalent to slowly murdering them, as I am credibly informed that less than 5 per cent. of those admitted to the best institutions in this city survive the first year, instead of 75 or 80 per cent. which might be saved under ideal conditions. This means that most institutions fail to do their full duty towards such children. At the same time I do not desire to criticize them too harshly, as I know that the good women in charge are doing as well as their circumstances permit. They fully realize their short-comings, and frankly attribute them to inadequate financial support. Unfortunately, it is very expensive to raise babies artificially in institutions, and if the public does not support them adequately, it has only itself to blame that they do not fulfill the purposes for which they were founded.

Among other reasons, the lack of financial support may be attributed to the fact that many charitable, and otherwise well intentioned, persons feel that illegitimacy is so serious a handicap that they regard death as a providential solution of the difficulty. For my part, I feel that they would be much more logical and humane, and at the same time more likely to realize the fallacy of their position, if they attempted to legalize the prompt destruction of such infants. This would permit the authorities to drown them decently, like worthless dogs, instead of having the community delude itself into feeling that it had done its duty sending them to institutions, where they slowly succumb to slow starvation and the absence of the individual care, which is so essential to young infants.

I have already indicated how this evil may be combatted in the case of children born in well regulated lying-in hospitals, but how to save the abandoned infant and foundling is a still more serious problem. In this event, there is no possibility of attempting to educate the mothers, as they have already abandoned the children, with the result that they often come into the hands of the authorities in a pitiable physical condition due to neglect or disease. Undoubtedly the chances of saving them would be greatly increased if it were possible to place them at once in suitable surroundings in the care of a wet nurse, but this is not feasible on account of our ignorance of their antecedents, with the possibility of subsequent infection of the foster-mother with syphilis, as well as the practical difficulty of having such women available at all times.

This being the case, I am inclined to believe that the best we can do for such children is to admit them for a short time to a specially equipped observation ward in a well conducted hospital, where they can be given every possible care, and afterwards, in case a negative Wasserman reaction shows that they are free from syphilis, to place them under supervision in the homes of poor women who are ready for a moderate compensation to suckle and care for them as their own.

(e). *Condition of the mother at the time of discharge.* Many obstetricians feel that they have discharged their full obligations to their patients as soon as the first weeks of the puerperium have elapsed. I consider, however, that they have not been fulfilled until it is possible to discharge the patient in good health and with her genitalia in such condition as will offer a reasonable guarantee for future child-bearing.

With this object in view, every patient should be subjected to a careful examination three or four weeks after delivery in order to detect the presence of any abnormality. At that time retro-displacements of the uterus readily yield to appropriate treatment; while, if not recognized until they give rise to symptoms at a later period, operative interference will usually be necessary for their cure. Lacerations of the cervix and perineum should be recognized and repaired if necessary. Similar precautions should be taken after the occurrence of abortion, and are particularly necessary if the condition were complicated by infection.

Routine examination of this kind is essential not only in the immediate interests of the patient, but also for its bearing upon future pregnancies. Many women date the beginning of their ill health to the first labor or miscarriage, and I know of no means so fruitful in preventing invalidism as the prompt recognition and treatment of such abnormalities. Moreover, their persistence is a frequent cause of future sterility, subsequent abortion or premature labor, as well as of some of the more serious complications of labor—such as placenta praevia with its ominous prognosis for the child. If we can stretch the conception of the prevention of infantile mortality to this extent, I know of no other prophylactic measure by which the life of so many children can be saved.

FOURTH SESSION

Friday, November 11, 10.30 A. M.

**MEDICAL PREVENTION OF
INFANT MORTALITY**

CHAIRMAN

L. EMMETT HOLT, M. D., New York, Professor of the Diseases of
Children, Columbia University

SECRETARY

PHILIP VAN INGEN, M. D., New York

THE MEDICAL PREVENTION OF INFANT MORTALITY

By L. EMMETT HOLT, M. D.

The prevention of excessive infant mortality is a social problem of the first magnitude. In comparison with it even the great problem of tuberculosis takes a second place if we are to estimate by the sacrifice of life involved in the two cases. The latest report of the United States Government, that of 1908, gives the mortality from every form of tuberculosis, in the registration area, as 78,289; whereas the deaths under one year total 136,432. Certainly much more can be accomplished to reduce the number of infant deaths than to reduce those from tuberculosis.

We cannot go far in our attempts at solution of this problem without coming up against the two great fundamental causes, poverty and ignorance, to which all other causes are closely related. Since poverty and ignorance can never be abolished, the sacrifice of infant life will always be great. We are not on this account to be discouraged in our efforts. Our aim should be to make the "irreducible minimum" as small as possible. Certain infant deaths are inevitable. These include children born with malformations which render life impossible or those so feeble that they cannot support an independent existence at all, or unless the most favorable conditions are furnished. Certain accidents at birth it is beyond our power wholly to prevent. But these inevitable deaths really form but a small proportion of the total.

No great progress is to be made unless we can influence to some degree the underlying causes. The tuberculosis problem of our cities is not to be solved by roof-gardens and the free distribution of milk and eggs. Better housing and better conditions of living are indispensable. One of the most intelligent workers in New York has recently said that some of them had come to the conclusion that the day of the eradication of tuberculosis would be brought nearer if every dollar now spent for relief work were saved and put into the construction of model tenements which could make hygienic living possible.

Nor is the problem of infant mortality to be solved simply by a pure milk supply or the establishment of milk depots, valuable as these are. In no previous year have so many agencies for saving infants been at work as in 1910, and yet the infant mortality during the hot months of June and July has been greater than for several previous years. We must then get out of our minds the idea that the problem of infant mortality is to be solved by attacking a single cause or two or three causes. Many causes must be taken into consideration.

What is needed is a broad, intelligent, comprehensive policy in attacking this great problem which will embrace all the factors involved. For the formulation of such a policy the organizations which are working for social betterment look to the medical profession. Before such a policy can be framed there must first be known the facts of infant mortality; for our vital statistics are still very imperfect, notably in the registration of births, the causes of death in the early weeks of life and the causes of death in still births. We must not only know the facts. It is still more important to understand the causes which underly these facts. These are not given in vital statistics and are not apparent upon the surface.

In planning our campaign it is necessary to know along what lines progress is being made, if there is any progress, and also in what direction we are losing. In New York City during the last twenty years a notable reduction has been effected in the mortality from acute gastro-intestinal diseases, also in the conditions grouped under the heading of marasmus, inanition, malnutrition over three months old. These are the results largely of a better milk supply and better methods of feeding.

However, in acute respiratory diseases we are losing ground; also in the deaths attributed to congenital debility and prematurity. These are perhaps to be explained by the great congestion of the population and the more difficult conditions of living.

The duty of the medical profession with reference to infant mortality is not merely to advance knowledge in the diagnosis and the treatment of the sick infant; this is extremely important and much has been done in these directions in the last twenty years. Of vastly greater importance is what has been accomplished along lines of prevention, and it is in this direction that progress in the future is to be made. Disease is to be prevented by pointing out its causes, indicating how these causes may be removed, and the organization of social agencies for the pur-

pose of attacking these problems. I am not one who believes that no progress is being made in the reduction of infant mortality. No careful student of the statistics of infant mortality can, I believe, reach any other conclusion than that a steady reduction is being effected; but only a beginning has been made. We do not wish to be understood as discouraging the efforts made by any organization to save infant life in any one of the innumerable ways in which this may be possible; all these organizations are needed and many more will be required before the result is reached. We do wish to emphasize the fact that all those who are working should have some knowledge of the problem as a whole so that the work of each separate organization may fit into a comprehensive scheme for the solution of this great problem.

**NURSING STATISTICS DERIVED FROM THE STUDY OF
THE INFANCY OF 1,500 CHILDREN, AND A CON-
TRIBUTION TO THE CAUSE OF THE
SUMMER INFANT MORTALITY**

**By HERMAN SCHWARZ, M. D., New York, Assistant Adjunct Pedi-
atrist to Mt. Sinai Hospital, Director of the Children's Depart-
ment of the Maternity Polyclinic (Dr. Hill's Clinic)**

The opportunity to study the infancy of 1,500 children was given me by means of a pediatric department, which I established in connection with the obstetrical clinic of Dr. I. L. Hill. The plans and results of the first year's work were reported in the *Journal of the American Medical Association*, Vol. LIV, page 1307, and in the annual report of the institution. At present the work may be divided into pre-natal and post-natal stages. The pre-natal portion is in the hands of Dr. Hill and his assistants, and consists of general medical and gynaecological care of the woman. It is our endeavor to have them apply to the clinic as early in their pregnancy as possible and put them into the best possible medical and mental condition. The latter is done by providing for their means of livelihood and giving general aid. For aid in this we have to thank the many excellent charities in New York City.

The post-natal work begins at birth. A pediatric nurse sees the child a few hours after birth, bathes it, prepares the cord in the ordinary manner, and visits the child daily until it is taking the breast well, or knows the reason why it is not taking the breast. The importance of seeing the child from birth in reference to our influence on breast feeding is very well illustrated by a report of Dr. Gerstenberger's, who had made some arrangement by which the obstetrical clinics in Cleveland sent him the babies. Of 171 babies seen by nurses for the first time, with ages ranging from 0 to 3 months, the percentage on the breast had decreased to 76. The main object of this work as a preventive of infant mortality was to encourage breast feeding. The nurses were instilled with the propaganda of breast feeding. Everything known to the science of maternal nursing was tried before the child was allowed the bottle.

We should not be satisfied with the idea that maternal lactation is a disappearing function, as expressed in a recent paper on the conservation of child life. As far as we in America are concerned, we do not know whether or not it is a disappearing function, and the more I am beginning to know about it the more I feel that this is not so. The work of this clinic, then, has a two-fold object: First, the propaganda of breast feeding, including the education of mothers, physicians and nurses, and, secondly, the gathering of statistical knowledge which might bear some relation to infant mortality.

In the following tables I will present a few statistics on breast feeding which I have compiled by following each child until it has become a bottle baby.

TABLE I
RESULTS IN BREAST FEEDING, 1908-1910

No. of Infants	Time observed Months	On breast only	Percentage on breast only	Mixed Feeding	On bottle only	Percentage on bottle only
1501	1 mo. or less.....	1454.....	96.9	11	36	2.4
1406	2 ".....	1286.....	91.3	46	74	5.
1258	3 ".....	1109.....	88.1	56	93	7.2
1148	4 ".....	979.....	85.2	64	105	9.1
1040	5 ".....	856.....	82.3	76	108	10.4
928	6 ".....	718.....	77.3	89	121	13.
823	7 ".....	615.....	74.7	90	118	13.
732	8 ".....	520.....	71.1	90	122	16.6
665	9 ".....	458.....	70.3	82	125	18.6
587	10 ".....	398.....	67.8	81	108	18.6
503	11 ".....	329.....	63.	67	107	21.3
462	12 ".....	296.....	64.	72	94	20.4

This shows that 96 per cent. of our babies were able to take the breast for one month or less, that 88 per cent. were on the breast for three months and 77 per cent. for six months. This table also gives an idea of the kind of follow-up work which is possible, for we have been able, for instance, to observe the same 928 babies for six months and at the end of our second year report upon 462 babies which we have followed for one year. Of 36 women who could not nurse at all, 6 had inverted nipples, or 3-10 per cent. of the entire number of women under observation; 11 had tuberculosis, who might have nursed if they had been permitted to; 4 had to work; 1 was insane, and 6 were in the hospital for various surgical reasons. So of 1,500 women we have to report six who could not nurse on account of inverted nipples and four who seemed to have no milk at all. All the others were capable of nursing a few weeks to many months, as will be seen from Table I. This proves very conclusively that if care is taken from the very start most women can do something toward nursing their children.

Inasmuch as there are a number of foreign women included in this series I refer you to Table II, showing the results of the observations of 221 American-born women.

TABLE II

BREAST FEEDING IN AMERICAN-BORN WOMEN

No. of infants	Time observed Months	On breast	Percentage
222	1	214	96.4
210	2	192	91.4
182	3	151	83.0
162	4	124	76.0
156	5	113	72.4
141	6	89	63.5
128	7	82	64.0
115	8	73	63.6
101	9	64	63.0
97	10	59	60.0
84	11	51	60.0
72	12	41	57.0

TABLE III

COMPARISON OF BREAST FEEDING RESULTS IN AMERICAN AND FOREIGN-BORN MOTHERS

Breast feeding Months	American mothers Percentage	Foreign mothers Percentage
1	96.4	96.9
2	91.4	91.3
3	83.	88.1
4	76.	85.
5	72.	82.
6	63.	77.
7	64.	74.7
8	63.	71.1
9	63.	70.3
10	60.	67.
11	60.	63.
12	57.	64.

From Table III you will see that there is some difference in the length of time in which foreign mothers nursed their children as compared with the American-born.

In order to show what influence such a clinic as ours might bear upon the nursing propaganda, I have prepared Tables IV and V, which show the results in 173 women of all nationalities and 34 of American parentage.

TABLE IV

ABSOLUTE NURSING BEFORE AND AFTER CLINIC RULE

Of 44	women who nursed a previous child	0 months			
10	"	8	"	under clinic supervision	
9	"	6	"	"	"
5	"	5	"	"	"
4	"	4	"	"	"
9	"	3	"	"	"
4	"	2	"	"	"
3	"	1	"	"	"
<hr/>					
Of 23	women who nursed a previous child	1 month			
2	"	8 months	under clinic supervision		
3	"	7	"	"	"
4	"	6	"	"	"
5	"	5	"	"	"
3	"	4	"	"	"
2	"	3	"	"	"
4	"	2	"	"	"
<hr/>					
Of 26	women who nursed a previous child	2 months			
3	"	9	"	under clinic supervision	
2	"	8	"	"	"
8	"	7	"	"	"
4	"	6	"	"	"
3	"	5	"	"	"
3	"	4	"	"	"
3	"	3	"	"	"
<hr/>					
Of 40	women who nursed a previous child	3 months			
2	"	9	"	under clinic supervision	
2	"	8	"	"	"
9	"	7	"	"	"
7	"	6	"	"	"
	30 women who stopped at 2 mos. could be induced to continue from six to nine months.				
4	" nursed a previous child	5 months	under clinic supervision		
7	"	4	"	"	"
9	"	2 & 3	"	"	"
<hr/>					
Of 22	women who nursed a previous child	4 months			
4	"	8	"	under clinic supervision	
7	"	7	"	"	"
2	"	6	"	"	"
3	"	5	"	"	"
5	"	4	"	"	"
1	"	3	"	"	"

TABLE V

RESULTS OF BREAST FEEDING IN AMERICAN MOTHERS UNDER CLINIC RULE

Of 10 women who nursed a previous child	0 months				
1 " " "	2 " "	under	clinic	supervision	
2 " " "	3 " "	"	"	"	"
1 " " "	4 " "	"	"	"	"
1 " " "	5 " "	"	"	"	"
1 " " "	10 " "	"	"	"	"
4 " " "	12 " "	"	"	"	"
<hr/>					
Of 10 women who nursed a previous child	1 month				
2 " " "	2 months	under	clinic	supervision	
1 " " "	3 " "	"	"	"	"
1 " " "	4 " "	"	"	"	"
2 " " "	5 " "	"	"	"	"
2 " " "	6 " "	"	"	"	"
1 " " "	8 " "	"	"	"	"
1 " " "	12 " "	"	"	"	"
<hr/>					
Of 6 women who nursed a previous child	2 months				
1 " " "	3 " "	under	clinic	supervision	
1 " " "	4 " "	"	"	"	"
1 " " "	6 " "	"	"	"	"
1 " " "	8 " "	"	"	"	"
2 " " "	12 " "	"	"	"	"
<hr/>					
Of 2 women who nursed a previous child	5 months				
1 " " "	8 " "	under	clinic	supervision	
1 " " "	10 " "	"	"	"	"
<hr/>					
Of 6 women who nursed a previous child	3 months				
3 " " "	4 " "	under	clinic	supervision	
2 " " "	6 " "	"	"	"	"
1 " " "	7 " "	"	"	"	"

As will be seen in the above tables 207 women have been induced to nurse a child for a longer period while under the supervision of the clinic than they did a previous child. This excellent result has one very obvious criticism, which I take upon myself to make—that some of these previous children were the first born and, therefore, the second born might often nurse for a longer period than the former.

I need hardly go into the importance of breast feeding as a factor in the conservation of infant life. Yet I should like to refer to Langstein's statistics for Berlin during the year 1906*, which show the great difference in the mortality of infants fed on woman's milk and those on animal's milk.

*Festschrift zur Eröffnung des Kaiserin Auguste Victoria-Hauses Zur Bekämpfung der Säuglingsterblichkeit im Deutschen Reich.

INFANT MORTALITY FOR BERLIN IN 1906 (Langstein)

In	Mothers' milk	Animals' milk	Other food	Food not given	Total
January	.....85	317	97	161	662
February	....49	238	91	164	639
March	.....65	259	80	170	566
April	.....51	257	136	193	637
May	.....66	344	111	182	703
June	.....47	325	138	210	721
July	.....56	528	204	234	1032
August	.....89	761	332	297	1487
September	...61	427	196	230	919
October	.....75	246	112	166	600
November	...73	234	92	183	586
December	...86	236	80	241	639

Furthermore, statistics published in the *American Underwriter* of December, 1909 (E. B. Phelps), show that the deaths due to diarrhoea and enteritis in the registration area were 113 per 100,000 inhabitants for the years 1900-1904 and had increased to 118 per 100,000 inhabitants from 1905 to 1908; in the rural parts of this registration area, where undoubtedly breast feeding is diminishing more rapidly, this increase in mortality has been greater, going from 73 to 93 per 100,000.

Our mortality during these two years was at the rate of 75 per 1,000 born. We do not wish to compare this with New York City's mortality, for that would be erroneous, as it leaves out entirely the many illegitimate and ill-cared-for infants, whose mothers are not likely to apply to institutions such as ours for relief. Fifty-four out of the entire 117 dying died before the age of two months. Of interest as to the causes of these deaths, I should like to mention that 12 of them, more than one-tenth of the entire deaths, were due to prematurity, and for this we have recently instituted a regime by which the children are immediately taken to an institution where proper care can be taken of them.

In the course of the work we have been able to gather some social data, which you will find in the First Annual Report of our work. Inasmuch as intelligence in preparing milk mixtures and the general care of the child bears such an intimate relation to infant mortality, I wish to present to you Table VI, which shows the relation of literacy to infant mortality. Here it is seen that where both parents could read (706 families) the infant mortality was 136.7 per 1,000 born. Where both could not read, the mortality was 190 per 1,000 born. Where neither one nor the other could read, the mortality did not differ greatly with that where both could read.

TABLE VI
RELATION OF LITERACY TO INFANT MORTALITY

	Both Literate	Both Illiterate	Mother not Literate	Father not Literate
Number of charts....	706	209	315	58
Number of children...	2,426	710	1,190	202
Infant deaths.....	326	135	138	55
Infant mortality rate.	136.7	190	116	123

The importance of the mother working during her pregnancy has often been brought before you and need not be dilated upon. In Table VII it will be seen that of 166 women who had to work the infant mortality rate was 278 per 1,000 born, and of 535 women who did not have to work the mortality rate was 131 per 1,000 born.

TABLE VII
INFANT MORTALITY IN RELATION TO MONEY EARNING OF MOTHER

	Yes	No
Number of charts.....	166	535
Number of children.....	459	1,953
Number of infant deaths.....	128	257
Infant mortality rate.....	278	131

The relation of infant mortality to nationality is shown in Table VIII. Of 225 American-born mothers the mortality was 210 per 1,000 born, as compared with 533 foreign mothers with a mortality of 117 per 1,000 born. This great difference is certainly not on account of their superior knowledge, but because of the fact that breast feeding is more common among them and they nurse for a longer time.

TABLE VIII
INFANT MORTALITY IN RELATION TO NATIONALITIES

	American mothers	Foreign mothers
Number of charts.....	225	533
Number of children born.....	839	2,024
Birth rate per family.....	3.2	3.8
Number of infant deaths.....	137	238
Infant mortality rate.....	210.9	117

The second item, which I wish to present to you in brief, is the cause of infant mortality during the summer time. As is well known, death takes place under the guise of a so-called summer diarrhœa, and what the cause of this summer diarrhœa is, is by no means clear. A pathological change in the sense of inflammation, as is understood by the terms "enteritis" and

"colitis," is present probably in the minority of cases, for we find so little change in the stomach and intestines at post-mortem examinations. Bacteria as an etiological factor might cause these deaths either by decomposed milk or by infection from one to the other child. The question of decomposed or bad milk is an important one and has been in the foreground for a number of years. By the term "bad milk" we usually mean one that is very acid or even sour. Yet during the past few years it has been clearly demonstrated that an acidified milk is certainly not dangerous to a great many infants. That epidemic diarrhoea occurs, especially in hospital services, has been shown especially by Escherich. Proper methods of feeding, no matter what kind of milk used, is a most important factor. In investigating this subject Park and Holt¹ came to the conclusion that the most important factor for securing good results is intelligent care. Leaving out the very worst store milk in the summer, the results were much less affected by the character of the milk than they had anticipated. The importance of the kind of mixtures, the amounts at each feeding and the frequency of the feeding cannot be overestimated.

Finally, the temperature of the atmosphere itself seems to be a great factor in the production of this summer mortality. In order to make this more evident I have prepared a chart by taking the daily maximum temperatures and daily mean humidity during the months of June, July and August of 1910 and comparing them with the number of children dying each day in Manhattan during these months. The chart shows very well how the temperature and mortality curves follow almost paralleled lines, lower in June, going up in July and down again in August. A day of high mortality being preceded by 24 hours of high temperature. The humidity, on the other hand, was high in June, low in July and high in August. Wherever the temperature was high and the humidity low, the death rate was high; wherever the humidity was high and the temperature high, the mortality was low. In other words, hot dry days seem to be more dangerous to the infant than hot moist ones. From the experience of Rietschel we have seen how children placed in superheated rooms soon get temperatures and intestinal symptoms. Holt in his work drew attention to great atmospheric heat and its effect upon the infant, no matter what its care. It is easily conceivable, then, that an infant improperly fed upon cow's milk is always more or less alimentarily disturbed, and when a hot wave comes is directly affected by the heat and dies.

¹Medical News, December 1903.

DISCUSSION

Dr. Samuel Amberg, Baltimore: I cannot leave this paper without saying a few words in connection with it. I think Dr. Schwarz has been extremely modest in giving us an outline of the work which he has organized in New York. Anybody who has had occasion to see the way in which the pediatric department of the Maternity Polyclinic is conducted, the thorough way in which the infants are followed, and the care which is allotted to them must give very high credit to Dr. Schwarz, who has organized this service. Particularly important, to my mind, are the figures which Dr. Schwarz has obtained with regard to the ability of women to nurse. This agrees very closely with the statement which Dr. Williams made yesterday evening on this platform. Dr. Williams stated that in a practice of twenty years, only once was he unable in private practice to induce the woman to nurse her own infant, and in that particular case, they parted company. It is unfortunate that the attitude has gained ground rapidly that the women of today are less able to nurse their infants than they were generations ago, and I think, to a certain extent, the fault lies with physicians because we have not paid the necessary attention to the technique of nursing. The fact that the great majority of physicians of today are not sufficiently acquainted with the technique of breast feeding is due to the fact that the subject has not received the attention it deserves in the medical curriculum. These figures that Dr. Schwarz has presented should make us more enthusiastic, not only to use the knowledge acquired in our practice, in the dispensary and hospital work, but also to impart it to our students that they may go out into the world and spread this very useful and important knowledge.

Dr. J. H. Mason Knox, Baltimore: Dr. Schwarz's results have been an inspiration to many of us for a long time. In his work he is having practical results which we hope will be obtained by prompt notification of births. If we had the knowledge in this city of the birth of every baby within twenty-four or thirty-six hours, and also a sufficient corps of nurses and physicians to look after the baby and the household conditions and encourage maternal nursing of the baby we would reduce our infant mortality in Baltimore tremendously. What he has said is in verification of the need of vital statistics, particularly of birth registration; he has simply acted promptly on the knowledge of the fact of birth.

Dr. Schwarz (closing): Of these 1,500 women, 6 had characteristics that prevented them from nursing and 4, as far as I could find out, had no milk at all, so really of the 1,500 women, 4 were not physically able to nurse for sometime. It is important that we should tell them that one week of nursing is valuable, two weeks is of use, once or twice a day for three or four weeks is of great importance to the child in helping it to prevent contagious diseases and to keep in good health.

DO MEDICAL SCHOOLS ADEQUATELY TRAIN STUDENTS FOR THE PREVENTION OF INFANT MORTALITY?

By **IRA S. WILE, M. S., M. D., New York**

Intellectual unrest may be said to characterize the present attitude of thinking people, as they pause to contemplate the various problems that appear throughout the educational system. Are the present educational methods efficient, are goals correct, are the educational ideas sufficiently high, are educational institutions fulfilling their purpose in the best interests of the community?

Medical schools exist, not for the purpose of turning out wage-earners, but to supply the community with well-trained men who are capable of looking out for the health of the community. If the medical schools fail to accomplish this, they fall short in the performance of their duty. Do medical schools adequately train students for the work of preventing infant mortality?

As has been frequently stated, one-fourth of the total mortality in the registration area occurs under the age of 2.68 years. In registration cities one-fourth of all born die at or under the age of 1.8 years. This is not a condition existing only in this country. Westergard has shown that 25 per cent. of the mortality of Berlin during the first year occurs during the first month and 47 per cent. during the first three months. In London 11.09 per cent. of the first year's deaths happen within the first month and 34.6 per cent. is confined to the first three months. In short, the figures carefully compiled from many countries reveal the shocking fact that the greatest loss of life from disease arises during the first two years of life, with particular periods of unusually high mortality.

Do medical colleges give proper and efficient instruction to their students to combat the diseases of that period of life that causes such a tremendous portion of the total mortality? Should the problems of infancy be placed in a subordinate position in medical curricula when they occupy the most prominent place in the category of destructive conditions? Is it fair to the student; is it fair to the community? Should not every medical college lay especial stress upon the diseases that are responsible

for one-quarter of the total mortality? I do not mean to be too harsh in my criticisms, but no one can deny that at the present time there are not over one-half dozen medical colleges in this country that are properly and fully equipped to give the medical student the education humanity has a right to demand of a physician along the lines of caring for normal infants, not merely the sick ones. When the question of preventing infant mortality is considered, the conclusion must be that the colleges have hardly begun to think of this part of the problem. There are today no medical schools that give adequate instruction in the prevention of infant mortality, and in this failure to give the merited training they are negligent of the best interests of the humanity they profess to serve. Let us be honest with ourselves. Our medical institutions as a whole turn out men and women who are seriously minded and anxious to give the best that is in them for the benefit of their patients. They are in possession of the knowledge that has been imparted to them—a feeling of confidence, a commendable ambition and high ideals. At the end of the first year of practice the shortcomings of their teaching become manifest in the mere field of therapeutics, and in the work of prophylaxis they are amazed at their own ignorance. The colleges have not enabled them to live up to their ideals, and society has to suffer the consequences.

At the majority of medical schools pediatrics is made a part of the general course in medicine. In a few schools there are some didactic lectures without any clinics; in others there are a few or moderate number of clinics and without any or a few didactic lectures. Some few colleges make the subject a required subject, while others class it as an elective. Pediatrics presents problems that are not to be included in the subject of internal medicine nor in general medicine. Infant feeding is a subject as peculiar to pediatrics as is menstruation to gynecology. The possibility of reducing the infant death rate is retarded as long as preventive work remains untaught in a special department of pediatrics. There must be didactic lectures, clinics and ward class work, so that each student may be brought into intimate relations with the patients for the purpose of history taking, physical examination and giving the advice to the mother herself who needs the education. The institution that places pediatrics among the elective studies is minimizing the importance of the subject and thus does an injustice to the student, who depends for his course upon the superior intelligence of the faculty directing his work. The Report of the Carnegie Foundation entirely overlooked this phase of the question of medical instruction, though emphasizing the disproportionate attention given to various subjects as at present taught. By

virtue of its relative importance in the welfare of the community the study of the prevention of infant mortality demands a commensurate attention at the hands of medical schools.

The crime of omission becomes more noteworthy when one pauses to realize that fully one-half of the infantile death rate is from preventable causes. Are the best schools of this country to be regarded as overlooking their responsibility in the matter of preventing disease?

The cry throughout this land has been for prevention first and cure when prevention fails. The backbone of preventive work lies in widespread education. Unfortunately, the physicians just graduated are not equipped to enter the field of education either in infant feeding or general infant hygiene. The Council on Medical Education suggested that 180 hours be devoted to pediatrics, and 120 hours to hygiene and medical jurisprudence. No schools have begun to reach this standard.

Holt in his investigations of 44,226 deaths under one year of age found 28 per cent. to be from gastro-intestinal diseases. In New York City 85 per cent. of the infantile deaths occurred among the artificially fed children. In Great Britain 75 per cent. of the infant mortality is among the bottle-fed children. How harsh these figures seem in the face of opinions such as that expressed by Holt: "It is my belief that ignorance in feeding causes quite as many deaths as bad milk." And our medical schools do not place sufficient stress upon infant feeding. I do not believe that I am guilty of exaggeration in stating that 90 per cent. of the graduates of medical schools during 1909 received too little instruction in infant feeding to allow them to take up the work of feeding infants without recourse to the widely advertised infant foods.

In an address before the Association of American Colleges, Hoxie stated "our schools of medicine are designed primarily for the education of practitioners of medicine." There are today one of these practitioners of medicine to over 113 families in the United States. It is generally admitted that the schools are turning out graduates more rapidly than the increase of the population and the death of physicians warrant. In the light of the lack of efficient training the schools are giving the public might well become aroused and seek to call a halt of this poorly drilled procession. It is time to think of the better preparation of the student with a view of eliminating some of the unfit. The first problem lies, not in raising the entrance requirements, but in raising the standard of teaching for the students at present enrolled. The teaching of pediatrics must be strengthened. Few colleges have specially prepared teachers in this subject. The pediatricist must give more attention to the hygiene of infancy in

his teaching. There is, to be sure, more of a shortage of competent teachers in this branch of medicine than in almost any other part of the curriculum. It is not necessary that an effort be made to turn out specialists, but as every physician is called upon to care for infants, he should at least be taught as much about them and the conditions peculiar to them as about performing the numerous operations that he may never have a chance to perform or even see.

The University of Michigan, for example, devotes 185 hours to gynecological clinics, 160 hours to bacteriological laboratory work, and only 60 hours to lectures, clinics, and recitations on the diseases of children.

Philanthropic societies too frequently complain of the poor services that are offered to patients. Physicians are severely criticised for giving mothers poor advice. Carry the criticism back to the teachers of pediatrics in the medical schools. At the meeting which gave birth to this organization Gerstenberger called attention to the existing conditions "which have to a very large degree prevented or rather neglected the establishment of the proper and adequate means to teach that are to blame for this shortcoming." Let the medical schools recognize their responsibility for the poor results that their graduates have shown in the realm of diseases of infancy. Let independent departments be organized for giving instruction and training in the hygiene of infancy and the treatment of the diseases of infancy.

The subcommittee of the Council on Education of the American Medical Association recommended that in a medical curriculum covering 4,100 hours 180 hours should be spent upon pediatrics. This estimate was cut down to 100 hours. Hygiene and medical jurisprudence were cut down to about 30 hours. In the curriculum advised by the Association of American Colleges pediatrics was assigned 100 hours, hygiene 30 hours and obstetrics 100 hours. If this curriculum were to be established and 60 of the 100 hours, as advised, were to be given over to clinics, would medical schools be prepared to live up to the standard? The Council on Medical Education considered one patient for each two clinical students essential for proper clinical facilities. Its estimation of 100 medical patients for a school having 100 in each class or 200 in the last two classes did not include pediatric, nervous or mental diseases. While clinical facilities are already lacking in many colleges, there is an especial lack of pediatric material under the present system of hospital management. There may be plenty of clinics, but students do not have access to them during the period of their student life. General hospitals fail for the most part to have special wards for

children. Too few institutions treating children are under control, or even under the supervision or advice of medical schools.

The possibility of using obstetric services for instruction in pediatrics as covering the conditions of the first few weeks of life has apparently been overlooked, though it would be a great mistake to have the teaching done by an obstetrician, judging from the feeding practiced by the specialized obstetrician. Speaking of obstetrics, it is hard to realize that "more than 6,000 women die annually in the United States during confinement," according to the Council. The prevention of a part of this tremendous mortality, in number at least, if not in percentage, would be possible if the teaching of obstetrics were on a higher plane.

"Thirty per cent. of the blind are so because of the insufficient knowledge of the obstetrician." This, again, is on the authority of the Council. The common midwife has made a better record in the matter of ophthalmia neonatorum than the medical attendant in the City of New York and in Massachusetts, though not in Maryland. Have the teachers of obstetrics presented the importance of this ophthalmic duty to the child, to their students? The annual loss of mothers during child birth is in itself at the bottom of no small part of the infant deaths that are roughly classed as due to artificial feeding.

The most difficult phase of pediatrics is infant feeding. Possibly that is the reason that so many colleges do not approach the subject. Even Johns Hopkins has no required course in infant feeding, nor indeed is it impossible for a student to graduate from this most excellent school without any particular training in pediatrics, for the subject is merely rated as an elective in the curriculum.

Infant feeding should not be taught dogmatically with a lot of formulæ arranged in some incomprehensible manner like an algebraic formula and as soon forgotten. The principles of infant feeding should be given. There should be ample instruction didactically and clinically, in the method of varying the constituent parts of milk, so as to adjust them to the age and digestive capacity of the individual children under observation. The evidences of incorrect feeding should be taught from a study of the vomitus and the stools, not merely theoretically in a lecture room. At the present there is too much dogmatism in the teaching of infant feeding, and too little teaching students how to feed. The result is shown in the general ignorance of practitioners upon the subject of infant feeding. Sufficient emphasis is not placed upon the dangers of artificial feeding. The high mortality among children not breast fed should be given prominence and men should be encouraged to continue babies on the

breast as long as possible. How often are students told how to improve the milk supply of the mother? Rarely. Even a lying-in hospital of the reputation of Sloane Hospital, of New York, evinces as poor judgment in matters relating to feeding children during the first two weeks as can be found in institutions that are supposed to stand for the highest teachings in medicine. Repeatedly mothers come directly from Sloane to the Vanderbilt clinic with children already on partial artificial feeding when there is no excuse for it, as may be judged from the fact that the babies are promptly placed upon the breast and no other food, and continue to gain on that milk alone for months. Yet this is part of the teaching equipment of the College of Physicians and Surgeons, though, unfortunately, having no supervision by the Department of Pediatrics.

Students are not made to appreciate the full value of breast milk, nor are they advised fully as to the conditions demanding that the child be taken off the breast, nor the best way to wean, nor when to wean. The teaching in these phases of infant feeding is intimately bound up in the question of the prevention of infant mortality. If the students fail to receive adequate instruction along these lines, how can they be prepared to take a part in the educational work that has been deemed so essential to the work for which this association was organized. Physicians must be social teachers and all the stress should not be placed on nurses and health officers. At the present time the educational institutions are not supplying them with the training to enable them to take their place.

Over 40 per cent. of the present infant mortality has been adjudged to be preventable. As a general average, there are 28 cases of sickness to each death. The amount of preventable illness is thus seen to be enormous.

From the figures presented by Dr. Holt, 25.9 per cent. of the infantile deaths are due to tuberculosis; acute respiratory diseases, as influenza; contagious diseases, as pertussis, measles and diphtheria. These different causes of death are "capable of considerable reduction, chiefly through proper housing, isolation and medical treatment." This is very true, but medical students have no training in the very important subjects mentioned as the means of securing the reduction of deaths.

From the same source we learn that 52.5 per cent. of the infantile deaths are due to acute gastro-intestinal diseases, marasmus and inanition, and prematurity after the seventh month. This type of mortal cause is regarded as "capable of very great reduction through proper care and feeding." But no teaching is given regarding boarding out babies or securing breast milk from a wet nurse or a willing mother.

Ditman has made a splendid plea for the establishment of a school of public health. There should at least be obligatory courses in the many parts of this question in every medical school. Pending the institution of such obligatory courses covering the subject of public hygiene, the responsibility for adequate training in the hygienic aspects of the various portions of the curriculum must rest upon the heads of the departments. The necessity for instruction in hygiene falls particularly heavily upon the teachers of the diseases of children. At the present time they have not given any evidence of their intention of living up to their responsibility in this regard. Many of these teachers are the first to criticise the ignorance of the young graduate in the matter of the hygiene of infancy. Proper education in the medical school should be the strongest factor in the prevention of infant morbidity.

The fundamental causes of infantile mortality may be summed up as poverty and ignorance. The physician may not be able to cure poverty, but he can correct the ignorance and its stepchild, neglect. The social aspects of this question are largely of a medical character, and the teaching of prevention has to take into account the social conditions that underlie, or the teaching must be inadequate and but half done. Pediatric medicine should be taught in its relation to community life in order to present the preventive phases to the students in the true relative importance. The relation of the infant death rate to the occupation of mothers before labor and after labor—is such a topic ever mentioned in the pediatric lecture room? The value of home nursing as opposed to babies' hospitals—is thought ever given to the types of diseases that are best treated in the hospital? Eighty-five per cent. of the infant mortality occurs among children receiving artificial foods—what stress is placed upon municipal milk supplies or milk sanitation? There is insufficient teaching of the value of breast milk. Practically no instruction is given regarding the care of the breasts in preparation for their function. Little is taught regarding the milk supply during the first few weeks after labor, the time when many women are told that they have insufficient milk. How scant is the information as to the best foods to be given to the mother for the purpose of increasing the flow of her milk? These are sins of omission that must be corrected in order to lessen the number of children that are to be unnecessarily weaned. The problem of the proprietary infant foods demands careful attention that students may receive unbiased information in regard to their constituents and their proper place in pediatrics. The recent graduate must not be left at the mercy of the representations of the retail men, whose information is largely confined to the printed information that is

upon the wrapper around the infallible food. The relation of poor ventilation, room congestion, baby farming, overdressing, vital statistics, and the countless other aspects of public hygiene merit consideration in the course that is designed to turn out men trained in the prevention of infant mortality. Illegitimacy, alcoholism, milk stations and their consultations and their work are special problems that are bound up in the lessening of the infantile death rate, and stress should be placed upon them. Nursery hygiene, boarding-out systems, convalescent houses, preventoria are worthy at least a lecture to students who later will be the teachers of the public.

To adequately teach the prevention of infant mortality the medical schools must be socialized in spirit. A proper consideration of the social origin of much of the infantile disease marks a new era in etiology. Physicians cannot escape the responsibility of having information upon this subject. The medical schools must revise their teaching of pediatrics so as to supply what is most necessary for the protection of the community from the plague of preventable disease. Students should have lectures upon social questions as related to the cause of infantile morbidity, and also training in the value of various types of the institutions for the cure of the diseases.

Obstetrics, pediatrics and hygiene should be taught in the light of the social basis of disease. At the present time medical schools do not prepare students for the work of preventing infant mortality. If physicians are to be leaders in the preventive medical work that is now the present ideal in medicine, the medical schools must awaken to their responsibility and duty in the matter of affording the adequate training to the students who go to them for the purpose of being trained in all that makes for the highest type of efficient, conscientious, humanitarian physician. In short, preventive pediatrics must be taught. This becomes possible only when it is a required course based upon the present-day needs of the community. To be successful the preventive work in pediatrics must have a foundation in the knowledge that the faulty social structure is at the basis of many of the ills that are thrust upon infant flesh.

Dr. Wm. H. Welch, Baltimore: There are so many papers to follow that it seems hardly justifiable to occupy much time in discussion. I think everyone, as evidenced by the reception of Dr. Wile's paper, must agree with the general trend of his argument. I certainly am in entire sympathy. There is no question but that the great need of medical schools in this country is the establishment of satisfactory training in preventive medicine and public hygiene. There are one or two points I wish to speak of, which I do not intend in the least by way of criticism, but to be borne in mind. We hear equally urgent pleas for almost every subject in medicine. I recall a plea for the teaching of electro-therapeutics

which stirred the audience as I have rarely seen an audience stirred. I recall a plea for training students in refraction. There is not a subject one will interest himself in that may not seem equally important. We cannot send the student out adequately trained in any subject; the most we can hope to do is to give him broad general principles and put him in a way to continue his education. He will not by any possibility be adequately trained in preventive medicine or in any aspect of it when he passes from the medical school, but he should be in a position to know the importance of the subject, and if his interest lies in that direction, he should be in a position to carry out those functions; he should be in a position, in other words, to carry on his education. Then it would be a great misfortune if a medical school without adequate facilities pretended to send its students out trained in these subjects; pretended to train men in public health. I should not like to see the Johns Hopkins announce a diploma of training in general health. We need larger resources. These results cannot be obtained without a provision of adequate facilities. A hospital for sick children should be provided for the use of the medical school. Such a hospital, I believe, would be of far more service to the community if it establishes a relation with the medical school, but experience shows how difficult this is. At the Hopkins we do not consider that our department of pediatrics is now adequate, but we hope that with the opening of the hospital for children, we shall have something excellent to show in the way of pediatrics.

Dr. Frank Warner, Columbus, O.: I was a little surprised at the statement of the speaker that the record of the midwife in New York in the prevention of ophthalmia neonatorum was better, than that of the physician. And while he was making that statement, and urging that better teaching be provided it occurred to me that inasmuch as there has already been a considerable amount of teaching in all medical colleges to the physicians, or to the students who are to become physicians, in the prevention of disease—if this is to be the result, that with this teaching already instituted, the physician does worse than the untrained midwife, what are we going to look for when the teaching is still greater?

If the midwife does better than the physician it is unfortunate. I cannot think this is the universal experience everywhere. It would be poor encouragement to study if it were true. Physicians should see to it that every case of obstetrics they attend receives sufficient subsequent attention not to permit such a charge to justly stand against them. A poor patient is entitled to careful and conscientious after care. If the physician gives this his results should show better than the midwives'. With proper care it will.

Dr. S. Josephine Baker, New York: In regard to ophthalmia neonatorum there are fewer cases in New York among the midwives than among the physicians. One reason, perhaps, that can account for that is the fact that during the past two years the midwives have been required to use silver nitrate solution in the eyes of all new born babies, and as far as I have been able to investigate, I find that this practice is not so prevalent among the medical profession. That may have something to do with the condition as it exists at the present time. We do not know of all the cases, but as far as we do know of them, and we investigate the midwife situation pretty thoroughly, there are fewer cases among the practice of midwives than among the practice of the doctors.

Dr. W. D. Hoskins, Indianapolis: It seems to me that there should be some exceptions to the statement that teachers of diseases of

children were the ones against whom criticism should be directed for the lack of time and opportunity in the course of study. I rather question the wisdom of such criticism. Dr. Wile, I think, went to the extreme in that. It is not that the teachers of diseases of children would not like to have more time, greater facilities, better opportunities to elaborate on these preventive measures, but it is impossible to accomplish better results in a short time and with limited means. As a rule the teachers of diseases of children are careful, skillful men, who comprehend the magnitude of the social problem as well as the details of their teaching and, as far as I have been able to observe, the students who are going out comprehend these things in a greater measure than we might infer from the very enthusiastic paper we have just heard. It is impossible to give the department of diseases of children all the time they want just as it is impossible to give all these other specialties all the time they want. But, I do think that a creditable showing is being made in practically all of the medical schools in the way that they are training the young physicians in prophylaxis and in recognizing the wide and far-reaching importance of the proper care of infants.

Dr. Wile (closing): I trust that Dr. Welch has not misunderstood that I am advocating that institutions put in departments of public health simply for the purpose of teaching the lessons regarding infant mortality. This is an essential part of the work belonging to a department treating of the diseases of children. Inasmuch as between 40 and 50 per cent. of infantile deaths are preventable, the stress of pediatric teaching should be placed upon preventive medicine. The same condition does not hold as true among the other diseases taught in other departments of medicine.

As to the amount of ophthalmia neonatorum occurring among the babies delivered by midwives being less than among those delivered by doctors, I may say that possibly it is due to the fact that pediatricists do not lecture about the care of the eyes of the new-born. This is only lightly touched upon in the department of obstetrics. Consequently if the teacher of pediatrics considered the importance of preventive medicine, there would probably be greater attention given to the necessity for prevention of eye infections of the new-born.

As to the criticism of Dr. Hoskins, regarding his experience in the investigation of various medical institutions, I found that the average amount of time given in a course of pediatrics in the United States was sixty to seventy-five hours; the longest, 125 hours; the smallest, none. I am not blaming individuals for the lack of instruction in preventive pediatrics; I am criticising schools that fail to give this course in their curriculum.

ERRONEOUS IDEAS ON INFANT MORTALITY AND METHODS OF REDUCING IT

By S. W. NEWMAYER, M. D., Philadelphia

The results of the past year's work throughout the country to reduce infant mortality, with but few exceptions, show that we are far from solving the problem. This association has gathered its members together for a full discussion of the knowledge acquired in the study of this vital question.

The time allotted to a paper is short and will permit only of stating some facts which should perhaps be treated more in detail. I shall, therefore, treat of our shortcomings and try to show the missing links in our chain of work.

Three great agencies have been actively working for several years to combat the great mortality among infants—Municipal and State Health Departments; the medical profession, and various allied philanthropic organizations. The work of most of these agencies has been individual rather than co-operative and, while the plans of work have been, with a few exceptions, similar, the results obtained have varied widely. The keynote of most campaigns has been education, to teach the mother with a well child how to care properly for it.

To accomplish this end tons of literature and circulars of instruction, in all languages, have been distributed; posters have been placed in houses; trained nurses and physicians have visited the homes, and mothers' meetings and clinics for the examination of well infants have been held.

"To Keep the Well Baby Well" is a good motto, but how many mothers having a well baby can be induced to attend a clinic, to spare time away from home duties and other children? Some mothers may make a first visit out of curiosity; other mothers who previously lost a baby may be willing pupils and attend every clinic. Even with the trained nurse visiting in the homes, the mother with a well child, although fed contrary to all rules laid down by the medical profession, heeds very little of the advice given by the nurse. The nurse can teach her cleanliness of both house and baby; and while the mothers usually welcome the reporting of insanitary condition of the house, on the crucial

point, the feeding of the child—No—If a baby is well and is being fed on cucumbers and fried sausage, so let the feeding remain. However, if the baby is sick, all advice is not only followed, but eagerly sought for. In fact, so eager is the mother for advice that she changes plans sometimes three or more times a day. I do not want to give the impression that I believe these educational methods are valueless, but directing them toward the well child is not profitable. Better results are obtainable in health work by the trained nurse in the field than by the dissemination of literature.

An opportunity for education, often overlooked, is the school child. The "Care of Baby" taught to the older girl pupils by lectures, exhibitions, textbooks, would have its ultimate good effects. They are the potential mothers; they know they come to school for instruction, and they learn and retain more readily information which is novel and out of the ordinary. Philadelphia's experiences showed how intensely interested these pupils were.

Our school courses on hygiene should receive careful attention, and from work along this line of endeavor much may be accomplished.

Another potent means of education, and too often ignored, is the public newspapers. We underrate their true value in campaigns against infant mortality, or any other health problem. It is surprising how often a mother says she did so and so because she read about it in the newspaper. Again, by leaving the construction of articles and stories bearing important advice, to a reporter inexperienced in medical knowledge, in many cases, some health officers who appreciate the value of the press, lose the benefit that could be derived; valuable advice is misstated or important parts omitted.

Every Health Department should have a Publicity Bureau, in charge of which should be a competent editor, one capable of writing news items on questions of public health in an interesting style that would appeal to the public. He should have a working knowledge of medical subjects, especially those which pertain to questions of sanitation. Valuable advice, flavored with scientific figures of investigation, is lost to the public. The same advice, written in a popular breezy style, attains the object, namely, the instruction of the people. The head of a Health Department of a large city, engaged on executive duties requiring his attention, can spare but little time to write articles for newspapers. Newspapers eagerly seek for articles on public health and medical questions. A glance at any daily newspaper proves this assertion. The public is hungry for this kind of

advice and education. Give it to them, but in a form that is palatable and digestible.

Most Health Bureaus are hampered in their work by lack of funds to carry on their plans. Insufficient funds for health measures are due to the public themselves. Appropriations are allotted by representatives of the people, who are usually politicians oftentimes with an undeserved reputation for selfishness and for furthering their own interests, yet they try to give the people they represent that which is asked for. These representations are guided by public opinion which is largely molded by the newspapers of the day. Use them for honest purposes, as they have done more for furthering health measures than any other agency.

It is admitted by all who have given thought to the question of infant mortality that it is mainly a question of proper feeding. We look to the attending physician for the proper feeding of the infant. If he has attended the mother in her confinement, we suppose he looks after the welfare of the child until it is truly started in life. That time being when it has passed all possible dangers following birth and is receiving its proper nourishment. How many physicians carry out but part of this contract? Few ever know afterward whether the child is breast or artificially fed. The people realize this so well that it is seldom the mother asks the physician who confined her anything about the nourishment of the child. If the first attempt at feeding is unsuccessful, the mother more often applies for advice to another physician after repeated experiments by herself and neighbors. The question then arises, Is this due to disinterest of the physician or does he not know how to feed the new born?

I believe it would be no exaggeration to assert that 50 per cent. of the medical profession make no effort to supervise or prescribe any feeding for the infant, leaving it entirely to the mother or caretaker. Of the remaining, 40 per cent. order some popular patented or proprietary food, thus allowing the mother to follow printed directions which come with the bottle. Nine of the remaining 10 per cent. of the profession follow some set rules on percentage, or other methods of feeding, based on age. The remaining 1 per cent., termed specialists, feed scientifically according to the requirements of the child. The millions of bottles of the various patented baby foods sold annually are testimony to this assertion.

By scientific infant feeding, I mean adapting cow's milk by modification, to suit a baby's digestion, and giving it in quantities and at intervals, which conform with the baby's normal capacity. Some physicians claim that the majority of patients allow them but one or two visits. The first formula in most cases is an

experimental one, to test the capacity of the child, so this class of patients places the physician at a disadvantage.

The courses on pediatrics and infant feeding, as given in most of our medical colleges, are faulty. They are not practical, and in most cases the teacher has some system, whether percentage, caloric value or otherwise, generally based on age, which leads him to teach one of the mass methods of feeding. Occasionally the professor teaches a half a dozen methods with scientific calculations which bewilder the students. There should be ward classes in this branch similar to those now used in other branches of clinical medicine.

No one physician has the only absolute method of feeding, and because he uses the top half ounce of four bottles of milk or the 16 per cent. cream he has not "cornered the market" on the right method of feeding. Infants will thrive on any of the combinations, providing the mixture is suited to the digestion of that particular child. The physician who believes that his method is the only one to use scientifically forgets that $4 + 6 = 10$, and $3 + 7 = 10$, and there are other equivalents. When he succeeds with his method, it means he has given to the little patient all the nourishment it needs and can digest. The capacity of an infant should not go any more by age limit, or rule of weight, or size, than disposition or temperament should be alike at certain ages or body weights. We have all seen infants 3 weeks old that required and digested the food of an infant 3 months old, and vice versa. I believe infants are often victims of starvation by faulty methods of feeding. The parents experiment for a while, and when things look desperate rushes to the physician, who oftentimes removes the little remaining nourishment and purges the already weakened infant. Too often the cry of the child is mistaken for pain when it is due to hunger, to food omitted for 24 or 48 hours, instead of increasing the quantity or quality of the feeding. The frail body is brought to a pier at the river front and the child is supposed to suck from the fresh air of the river the nourishment which should have been supplied by the mother.

Not only must the food contain the proper nourishment for the infant, but small details of technic in its administration, together with cleanliness and purity of food, count for much. Too few physicians observe the kind of nipple used, the size of the holes in the nipple, how long the child nurses and the condition of the child's mouth. This is all left to the nurse in charge, or the mother. Few mothers have nurses, and the average stay of the nurse with the child is two weeks after birth. Few mothers are good nurses. Many a child refuses food be-

cause of the milk flowing too rapidly through the nipple and inattention to other seeming trifles affecting the feeding. Many physicians never personally observe the bowel movements, but may occasionally ask the mother about the presence of undigested fat, curds, blood and mucus. It is needless to say how little reliance can be placed upon such reports.

We may evolve fanciful theories about the causes of infant mortality, we may show its relation to climatic conditions, humidity, location of the city, mean temperature and influx of ignorant foreign population; but we overlook the cornerstone of those preventable deaths, due to gastro-intestinal disturbances, when we ignore the relation of the medical profession and infant feeding to the problem.

Fresh-air tents, piers, visiting nurses and milk stations are all auxiliaries in this battle. Fresh air gives stimulation. The modified milk stations supply some or all of the nourishment, depending on many circumstances. Visiting nurses may correct errors of living or hygiene, but infants must have the proper diet to thrive on.

This inaction on the part of the greater number of physicians seems sufficient evidence that they would willingly give up this branch of infant feeding to their assistants, who would undertake the work. The physician could readily give it up to the nurses without feeling that medical duties were being usurped. The work of Health Departments in reducing infant mortality would be greatly augmented by the training of a corps of municipal nurses in infant feeding, or a corps of physicians similarly trained and assisted by a corps of trained nurses to teach the mothers how to prepare the food and give it to the infant.

The present method of utilizing the services of trained nurses to educate mothers in two or three visits of five to thirty minutes is a mistake. Of this time part is taken up with the recording of the history of the infant, together with a study of the surroundings. I believe, not only from an economic standpoint, but also from the more efficient services to be obtained, in the employment of trained social workers to visit the homes, to obtain histories and to aid in the campaign of education. This would leave the nurses sufficient time to spend in caring and nursing the sick infants and supervising the feeding. I believe that such a well-trained corps would make mortality from diarrhoea and enteritis a thing of the past.

There seem to be objections advanced against the giving of free medical services, and even nursing. Chief among these objections has been the fear of paternalism.

The cries of paternalism, socialism, destruction of the indi-

viduality and self-dependence, pauperizing the poor, have come from a handful of social workers, unacquainted with the true state of affairs, and from them echoed into the mouths of controlling powers of municipal governments. Through this grave mistake there is constant fear of overstepping in such charities, as giving free medicine and nursing, milk and ice, feeding the infant and, when necessary, supplying the food, probing into home conditions and the many things which make up proper healthful living. The time for believing the health of the infant is the business of the parent and no one else is past. We make it our business that the child shall have an education, how he shall be educated and how long. "The infant of today is the school child of tomorrow." If the infant is not receiving proper nourishment and care, whether through ignorance or neglect, it is the duty of the municipality to furnish the personal care and attention required. The question as to whether a so-called family physician is in attendance, when he has shown himself incompetent to manage the case, is no reason why we should shout "Hands off!" let the child die. If a physician has diagnosed a case of small-pox one of chicken-pox, the city corrects the mistake and acts accordingly. Eventually the proper authorities must take care of these problems, and only then will the question of infant mortality be solved.

Institutions and baby farms add materially to the death rate among infants, and it is only by stringent laws and active supervision that these sources of mortality can be controlled.

The value of individual feeding according to the infant, and not according to age, is very interestingly told in the history of one large institution for children located in Philadelphia. In 1909 this institution fed all the infants according to age on a series of set formulas of milk mixtures. The children were cared for by nursery maids. In June, 1909, this institution, based on the number of sick children, had about 65 per cent. of deaths. In July, 1909, about 55 per cent. and a similar death rate for August. In 1910 the managers employed a physician, who was well trained in diseases of children and infant feeding; they also substituted trained nurses for the nursery help. Each child was carefully examined and watched, and fed according to the physician's advice. The results were: For June, 1910, 14 per cent. mortality; July, 8 per cent., and August, but 4.4 per cent.

Mistakes occur in assuming that the education of mothers as to the care and feeding of their infants is sufficient. To illustrate: Birth reports are received at the central office of the Health Bureau, and within 24 to 48 hours a nurse is dispatched to the home. She may find the child being fed on the breast,

apparently normal, surroundings good—case is considered safe by the nurse and closed. One month later comes the death certificate. What has happened? The nurse's visit was made at a bad time for observation of true conditions. The mother was shifted to her own responsibilities. Wrongly or rightly, after about 10 days' trial of breast feeding, the mother is led to try the bottle. She tries mixture after mixture, thought out by herself and assisted by neighbors. She continues to experiment until the baby's condition is alarming, when she calls in a physician, who removes all food for 48 hours to give the starving baby's stomach a rest. Vitality is now so low that a few hot days sap up what remains of its strength. A second visit of the nurse would have probably prevented this death.

A study of the infants, especially of the poor and middle class, whose mothers are not influenced by social aspirations, shows that most are first fed on the breast, and after two weeks' trial for various real or imaginary suppositions, artificial feeding is resorted to. About one month after birth is the time for a nurse's visit or, still better, a revisit, in all cases, even in the safest-appearing cases.

The impression is universal that the death rate depends partly on the intelligence of the people, and that the poor, dwelling in slums and tenements, because of their ignorance, have a higher death rate than the wealthy, intellectual, social classes.

In the care of infants, excluding the question of sanitation, lack of which is more often due to poverty, the wealthy mothers have no more, if not much less, knowledge of the care of infants than the average dweller of the slums. Among the wealthy a trained nurse is employed for the infant, and, when well or sick, the advice of specialists on diseases of children and infant feeding is secured. When the hot summer months come, they can spend the entire term in the country or at the seashore.

Every city tries to compensate the poor by offering them the comforts of well-equipped hospitals, and the services of these same specialists who visit the hospitals. In summer many philanthropic and charitable organizations send children to the seashore or country for varying periods. A directory of hospitals and charitable organizations in any large city is a voluminous and imposing volume. Have you, however, studied the true state of affairs in your city?

The following information, which I gathered from all of the hospitals of Philadelphia, makes an interesting study of these institutions in their relation to infant mortality:

Total number of hospitals.....	64
General	43
Children	2
Special	19
Dispensary only.....	11
Number having free beds for infants.....	18
Admitting children at any age.....	12
Not admitting under age of 2 years.....	7
Having a separate ward for infants.....	14
Number of available free beds in summer months—	
For children of all ages.....	264
For children over 2 years.....	56
When under 15 months, with mother.....	50
Two hospitals alone, 130 beds; balance.....	134
Number of available free beds in winter.....	267
Number closing children's ward in summer.....	1
Number having a dispensary service for children.....	22
Number of free patients under age of 2 years—	
Admitted to all hospitals during July and August, 1910..	782
Admitted to three hospitals alone.....	554
Admitted to remaining 15 institutions.....	228
Number of these 782 cases which had gastro-enteritis....	255
Admitted to three hospitals alone.....	183
Admitted to 15 remaining institutions.....	72

This analysis of the hospitals of a large city tells most certainly that there are insufficient hospital facilities for the children of the poor, especially in early infancy. The reasons for this unfortunate state of affairs, I cannot state. That this condition exists to an alarming extent is evident to any physician who makes an effort to place a child in a hospital, sometimes a half dozen hospitals are asked before he succeeds. The questions which suggest themselves are, Why should only two-fifths of the hospitals doing a general class of work have beds for infants? Why should more than one-third of those admitting children refuse infants under 2 years? In a city which is considered one of the medical centers of the country, and one of the most charitable cities, why should there be so few available free beds for children? In a period of two summer months, when sickness among children is at its height, are 228 patients under the age of 2 years, with all kinds of diseases, a fair average for 15 hospitals admitting infants? This means an average of 15 free patients for each such institution in two months.

The enormous value of fresh air, country or seashore for the sick child, especially in cases of diarrhoea and enteritis, is well recognized. Every large city has a long list of seashore and

country homes for the care of the children of the poor during the summer months. Have you ever analyzed the list of these institutions in your city? You may find many that will give a day's outing and a few who take many well children over the age of 5 to 10 years for one or two weeks at the shore or country—but how many have you that take *sick* children? Philadelphia has but two, and these have limited capacities. I believe it is a great mistake to care only for the well child and ignore the sick. Two great factors in controlling infant mortality—proper hospital care for the sick of the poor, and fresh air at a seashore or country home with medical care—are found wanting.

While not desiring to discuss the value or non-value of the many advertised baby foods, their enormous sale is a direct evidence of the physician's neglect to nourish the infant. This "Food for All Babies" seems to save the doctor and the mother considerable energy in thinking out how the baby should be fed. It is easier for the doctor to order a bottle of Blank's Baby Food and have the mother follow the directions printed on the label of the bottle than it is to study the individual baby and calculate how much cream, milk, water and sugar of milk is needed. It is easier for the mother to take a teaspoonful of powder out of a bottle, add hot water and serve, than to measure accurately milk, cream, sugar, etc. It is human to try to save labor. In recent years several large cities have tried to overcome this haphazard feeding, and at the same time save labor for the mother, by establishing modified milk stations. The methods used by most of these stations are so faulty as to make them dangerous under certain circumstances. But few of these milk stations have a medical clinic at which the child is examined, formula prescribed by a physician and results noted. Most stations dispense the milk indiscriminately according to age or the wishes of the mother. An ignorant mother, knowing she can get either formula number one, which is dispensed in three-ounce bottles, or formula number four, in six-ounce bottles, for 1 cent a bottle, believes it is economy to buy the six-ounce bottle. One is whole milk and the other but one-fourth solids. It is needless to state what happens. Again there are a limited number of formulas or combinations, so the scope of proper feeding is limited. I have seen the woman in charge of a milk depot dispense a different formula to a mother, who had an order from a physician, because she was out of the formula requested. Few of the stations are open Sundays, and dispense on Saturday morning two days' supply. The food is taken to homes without any means of refrigeration. Pasteurized milk, even one hour off ice, is a more dangerous article than other kinds of milk. Some of the abuses could be remedied by refusing to dispense milk from stations without an order from a physician or dispensary.

Modified milk stations, with set formulas Nos. 1, 2, 3, try to make the baby fit the milk modifications, instead of the milk to fit the baby. It would be far better for the stations to supply milk for fewer infants and do it as near individually as practicable. The central branch having a chemist and a physician, and each station having a trained nurse in charge, would overcome many difficulties. The modification should be made on physicians' or dispensary order, similar to the methods employed by the Walker-Gordon Laboratories, which are available to the wealthier class. Such arrangements must eventually come, even if it must be under municipal ownership.

While many cities dispense milk and ice free to the poor, there is often a tendency to overlook the furnishing of milk to pregnant women, which would often assure breast feeding, when physical conditions without the milk would prevent it. Many a mother would give less table food to the infant if milk were furnished to her for this purpose.

Infant mortality work has so closely correlated with it organizations dispensing milk and ice, medical clinics and modified milk stations, baby farms, lying-in charities, seashore and country outing homes, that to attain best results, all of these agencies should be under the supervision of one competent head, with a central office as a clearing-house.

The present methods of computing the mortality among infants are incorrect and misleading. The relation should not be shown to the total population, but to the population of infants of corresponding ages.

Comparison with the total death rate is of some value. Another feature of vital statistics which has important bearing in a study of infant mortality, but for which there seems no remedy, is the inaccuracy of the diagnosis placed on death certificates by the attending physician. I venture to say that over 50 per cent. of the causes stated on these certificates are incorrect. Anyone in charge of a bureau of vital statistics, even without a knowledge of medicine, could pick out many a certificate which he could positively state was mere guess work. This is not entirely the fault of the physician, as in many cases he has made but one or two visits and must give some cause of death.

A comparison of the deaths in different wards based on supposed social conditions is misleading. Every ward, even the most aristocratic, has its byways and small streets containing the poorer element. The foreigner no longer confines himself to one section of the city, but makes small settlements in a number of wards.

When we state that the death rate among the poor, tenement or foreign population is greater than among the rich we are

not strictly accurate, for we are estimating according to location in the city, knowing little of the social conditions of the individual deaths. There is a smaller infant population by one-half or three-fourths among the rich than among the poor. When a child of the wealthy takes sick during summer it is usually out of town, and if it dies, that death is not registered against the city or that section of the city. There are more breast-fed babies among the poor, and this compensates in many cases for the lack of luxury or sanitation. The methods of investigation should include a most thorough one of all deaths of infants, including relation to feeding and social conditions. Don't make figures and statistics gathered in unreliable and haphazard ways fit your theories, but make theories proven by reliable scientific investigations.

THE EDUCATION OF THE FATHER, AN IMPORTANT FACTOR IN THE PREVENTION OF INFANT MORTALITY

WILLIAM PALMER LUCAS, M. D., Boston

"Me don't know me ask my man." How many times the man in the clinic receives this answer to some urgent question pertaining to change of food or living arrangements for the sick baby under treatment. Or again how often good results are made impossible by the same attitude. The tired mother struggling to carry out what she is usually most eager to learn—how to keep her baby well—against the stolid indifference, the good natured sneers, or perhaps actual opposition of "her man." The crowded clinics in our cities cannot give time to the instruction of the fathers, but is there not some way in which the sick baby can be a means of educating the father as well as the mother?

In our great foreign population especially, the traditional authority of the father of the family has a far deeper hold upon the life of the family than is perhaps thoroughly appreciated. Many social workers, however, are constantly testifying to this fact, and it would seem a fatal mistake not to lay hold upon it and use it to the best advantage.

The emphasis which I wish to lay upon this subject is entirely, of course, from the standpoint of the clinic. To get the best results in our out-patient departments, the need of the co-operation of the fathers is felt. Take, for instance, as a simple illustration the question of the milk supply. The mother is urged to buy only bottled milk. The corner grocery supplies only dip-tank milk. The ignorant mother follows the line of least resistance because she does not know how to bring any effective pressure to bear upon the situation.

At a father's meeting held under the auspices of the Milk and Baby Hygiene Association last winter this very question was discussed with a group of fathers who showed the most eager interest to bring their concerted action to bear upon this question in their ward.

The question of the care of the milk is another point where the mother needs the intelligent help of the father. We have

all seen the mother blamed for every mishap by the father whose assistance might have averted them all. Let a group of fathers order a push-cart man, selling over-ripe fruit, bad ice cream and dust covered sweets out of the neighborhood and it would have more effect upon the situation than all the lectures on this subject from the desk of the clinic.

The mothers form but part of the public opinion. The interest of the fathers must be enlisted if the most successful results are to be obtained. To bring home to the fathers of the neighborhood a sense of responsibility for the health of their children is the next step in the complete education of the mothers.

The reply of one father when asked what help he gave his wife with the children,—“When dey’s little, I play wid ’em; when dey grow up I beat ’em”—is full of meaning and suggestion. The average father of our foreign population indulges the baby and is “too hard” on the boys and girls, as the mothers say. Sickness and death are blamed upon the mother, often justly, but too often by fathers who have done nothing to help until it was too late.

In many cases, it has been found that only an appeal was necessary to bring out a new interest in the father. Often to maintain his authority as the head of the family, he says nothing because he is perfectly conscious of his own ignorance and the same traditions of his race which support his place as head of the family, have also given the care of the children entirely to the woman. The result is, he lets her do her worst and then blames her thoroughly for the results. All this comes back to the clinic through various channels, the mother, the visiting nurse, the gossip of interested neighbors, the children, until the doctor in the clinic begins to feel that not until he has reached the *fathers* can the ounce of prevention he attempts to plant bring forth the full pound of cure.

It would seem then that definite plans to enlist the interest of the fathers to educate them along lines of health is the next step in the fight for the prevention of infant mortality. To educate the mother, only, is to neglect, in many instances, the only channel through which the education may be effective, the intelligent co-operation of her man.

DISCUSSION

Dr. Herman Schwarz, New York: I should like to say a word in regard to the education of the fathers. I have some interesting figures taken from our charts. In 706 families where both parents could read, 2,426 children were born and there were 326 deaths, or 136.7 deaths per thousand born; where the parents were illiterate, the death rate was much higher, so it is shown by our statistics that the intelligent care of the children is better where one or the other parent, or both, could read. It does not seem to make much

difference which parent can read. In 206 families where neither parent could read and there was intense ignorance, there were 710 children born, and 135 deaths, or a death rate of 190 per thousand born.

Mrs. William Lowell Putnam, Boston: I believe the fathers are ready for education. Last year a committee of the Municipal League carried on an exhibit every afternoon and evening in Boston. We had a mother with her baby, a doctor and nurse, and the doctor lectured to the crowds that collected. At times it was very interesting to see that there were three or four times as many young men present as women, evidently young fathers. It was evident that those young men were there because they were fathers and were anxious to learn, for they watched the bathing of a doll with rapt attention.

VACCINE TREATMENT IN THE PREVENTION OF DYSENTERY IN INFANTS

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This work was undertaken during the summer of 1910 to find out, if possible, whether vaccine treatment in the dysentery of infants would have any effect on either the morbidity or the mortality of this condition. The months chosen for this work were July, August and the early part of September. During these months by far the greatest number of cases of infantile dysentery occur in this country. The difficulties of controlling such cases in giving the vaccine treatment and getting the specimens for bacteriological examinations can easily be understood.

All the cases vaccinated were under two years of age and clinically showed no signs of dysentery or of any very acute gastro-intestinal disorders. The vaccine was not administered in any case having a temperature above 38°C. In as many cases as it was possible specimens of the stools in the treated cases were obtained for bacteriological examination and an equal number of control cases were followed bacteriologically and clinically. In this way it was hoped that some conclusion could be reached which would represent the value of this work carried out under the prevailing conditions.

HISTORICAL

The history of preventive vaccination against dysentery dates back to 1898, when Shiga¹ tried the sub-cutaneous injection of small amounts of killed cultures of the *B. dysenteriae* (Shiga). This method produced such marked general and local reactions that he abandoned it in favor of a combination of killed cultures and a specific serum injected simultaneously. From 1898 to 1900² he vaccinated 10,000 Japanese in this way. These first injections were followed three or four days later by a dose of vaccine twice as large but with no specific serum. His results at this time showed no diminution in

the morbidity. The mortality diminished from 30 or 40 per cent to almost nothing. The immunity secured was of very short duration, three or four weeks.

Ludke in 1905³ published an experimental study on rabbits, in which he studied the production of agglutinins and anti-bodies and the power of the serum so produced to kill the dysentery bacillus. Both Shiga and Ludke showed that the general and local reactions after using the Shiga dysentery bacillus were very marked and at times quite dangerous. Ch. Dopter⁴ has published in the *Annales de l'Institut Pasteur* for September, 1909, page 677, a complete study on the Preventive Vaccination by the Dysentery Bacillus (an experimental study). In conjunction with M. Vaillard⁵ in 1903 he had shown that adult mice or white rats were the best laboratory animals for experimentaion with this organism. He therefore worked with adult mice weighing twenty grams, giving them .00001 of a grain of a kill dried culture of dysentery bacillae. His results showed that with mice such vaccination in 40 to 50 per cent. of cases can confer an immunity against a fatal dose and that such an immunity appearing about twelve days after the first injection lasts from four to six weeks. During the negative phase, i. e., while the animal is acquiring its immunity, it is more susceptible to a fatal dose than the control. The local and general reaction of such vaccine were quite marked. It is of great importance to note that there is a negative phase, for this fact makes it *impractical* to use this method when there is an epidemic of dysentery or when the disease is very prevalent, as it is during the summer months. Dopter cites the use of this method in several human cases. For instance, Kruse gave himself a sub-cutaneous injection of one cubic centimeter of a killed culture. At the site of inoculation there was marked swelling, oedema and pain. After about four days during which time there was slight abatement the general symptoms of fever and prostration appeared. Shiga injected into his forearm a small dose of a kill culture. In a few hours his temperature rose to 38.6° and there was marked swelling, oedema and pain at the site of inoculation. His axillary glands also became swollen. After about three days, during which time the symptoms abated slightly the swelling and temperature recurred. Rosenthal also tried this same vaccination on himself and on his laboratory boy, inoculating one cubic centimeter of a kill culture sub-cutaneously. There was a marked local reaction as well as general constitutional effect, headache and arthritis. These personal experiences show the discomfort of such a method of vaccination. The same results were obtained by Dopter by using the autolytic products of the dysentery bacillus (Shiga). The immunity lasted no longer than six weeks and

took from ten to twelve days to appear. The negative phase was also present.

Shiga has used the anti-dysentery serum to produce a passive immunity. The duration of such an immunity is very short lived and does not exceed ten days. This was shown by Kruse in 1904 when he vaccinated ten people with two cubic centimeters of ante-serum. Only one of this number took the disease, three days after the injection. This amount, he concluded, was too small. 1907 Lallemand used 10 c. c. of anti-dysenteric serum in 60 cases at the insane asylum at Quatres-Mares. None of this number came down during the epidemic. Roscule⁹ tried this method in quite a large epidemic of dysentery by giving 5 c. c. of an anti-dysenteric serum to 18 people. None of this number came down with this disease, although they were exposed; while of 18 other people who were not vaccinated fourteen came down with the disease. Michiels⁷ at Chauvigny during an epidemic gave an injection of 10 c. c. to 15 people. Only one of this number contracted the disease nine days after the injection. It would appear from this case and from Michiels' own personal experience that the duration of this passive immunity does not exceed ten days.

MIXED VACCINATION WITH ANTI-SERUM AND BACTERIAL VACCINE.

In August, 1900, dysentery broke out in a Japanese village. During one month there were 28 cases. Shiga⁸ inoculated all the inhabitants over four years of age not already infected. The first injection consisted of anti-serum and bacterial vaccine in equal amounts and four or five days later he gave a mixture of 80 parts of bacterial vaccine to 20 of anti-serum. All these injections were followed by mild general and local reactions. In this village epidemic only two cases appeared after these inoculations.

Dopter tried these same experiments on mice. He concludes from this study that vaccination with anti-serum and bacterial vaccine gives a speedy immunity which is practically immediate in the great majority of cases. Immunity, however, lasts only about four weeks. This method dispenses with the negative phase and therefore prevents the subject from being more susceptible to an infection with the dysentery bacillus. The local and general reactions from this method are also markedly less than when the bacterial vaccine is used alone. Dopfer concurred with Beinarowitsch in that the quantity of serum given affects the duration of the immunity in an inverse ratio; the less the quantity of anti-serum given in combination with the bacterial vaccine, the longer the immunity.

Dopter tried a new plan for producing immunity by using sensitized dysentery bacilli for vaccination. The vaccine was made up as follows: Shiga dysentery bacilli killed by being heated at 60° C. for an hour and dried in a vacuum, were made into an emulsion with physiological salt solution. To this emulsion was added anti-dysenteric serum of a very high agglutinating power. This was allowed to stand at room temperature for about twelve hours. By this time the bacilli were strongly agglutinated and had become sensitized and had fallen to the bottom of the tube. The supernatant fluid was clear and was decanted. The precipitate was washed and centrifugalized twice in physiological salt solution and the last sediment was made into an emulsion with physiological salt solution. Dopter carried out a long series of experiments with mice, using this sensitized vaccine and he concludes that mice vaccinated by sensitized bacilli acquire an immunity in about four days; and second, that there is no negative phase, the animal being no more susceptible than the control. The immunity persists at least four and one-half months. There are practically no local or general reactions from this sensitized vaccine. These are practically the same conclusions as those arrived at by Besredka¹⁰ from his studies with the cholera vibrio and the plague bacillus, where he used sensitised cultures. The only possible objection to this means of producing immunity is that the immunity does not appear for four days, though there is no negative phase during this period. This method and the method of anti-serum in combination with bacterial vaccine seem to be the two methods of choice.

The latter method was chosen for this special investigation, for the following reasons: This method had been tried in human cases with apparent good results, whereas the first method, which, however, seems the more likely method of producing the best results, had not been tried out on any human cases. An experimental study, however, of this method is being undertaken and we hope to be able to say something further concerning this method as a means of preventive vaccination. The second reason for using this mixed vaccination is due to the fact that in a previous study¹⁰ it had been found that the main cause of infantile dysentery was the Flexner organism rather than the Shiga dysentery bacillus, which is the organism used in all the previously noted experiments. During this study we found as have also other investigators, that the Flexner dysentery bacillus is far less toxic to the ordinary laboratory animal than is the Shiga type of the *B. dysenteriae*. This we found in trying to produce an anti-serum of high potency in rabbits. Whereas we were fairly successful in producing an anti-serum to the Flexner

type of the *B. dysenteriae*, it was extremely difficult to do so with the Shiga type. Further, we found, as have also other investigators, that the Flexner organism may be present in the intestinal tract without causing the characteristic clinical symptoms of acute dysentery, thus showing that even in the human system this type of dysentery bacillus can exist without producing marked toxic symptoms. It seemed fair then to conclude that a vaccine made from such an organism recovered from a case of infantile Flexner dysentery would be the most appropriate organism to use for preventive vaccination. The following plan was therefore adopted: A vaccine was made from a 24-hour agar growth of *B. dysenteriae* Flexner of the strength that one cubic centimeter of the emulsion equalled 100,000,000 bacilli. At the first injection one cubic centimeter of an anti-dysenteric serum was used in combination with 50,000,000 bacilli or one-half cubic centimeter of the standard emulsion. The plan was to give a second injection five days after the first. This was not always possible, however, from the character of the clinic and the time of the second inoculation varied from five days to three weeks. It was planned to give three inoculations, but the majority of the cases received only one or two injections. Fifty-one cases received one injection and forty-four two or three. Ninety-five cases in all were vaccinated. The reactions from the vaccinations varied from a slight local reaction and a temperature of 99° with slight fussiness to a very marked local swelling, oedema and considerable tenderness. In no case was there any abscess formation and usually the most marked reactions disappeared within 24 hours. All the vaccinations were given in the morning and each case was visited from four to six hours later when the local condition and temperature were noted. The highest temperature noted was a hundred and three. In all cases where the temperature was over 101 the case was visited the following morning and in no case did the temperature remain above 99° on this second visit.

Thirty-one of these vaccinated cases had from one to four fecal cultures taken. These were taken by the method used by Kendall, which consists of a small glass tube with rounded ends about 12 cm. long with a 3 mm. bore and plugged with cotton at one end. This was sterilized inside of an ordinary thick-walled culture tube. These tubes were kept in stock in the clinic and the cultures were obtained by passing the sterile tube into the rectum. At the end of the clinic these tubes were expressed to the laboratory where the contents of the tube were discharged into a tube of plain broth. From this emulsion the isolation of the *Bacillus dysenteriae* was carried out by a modification of the method used by Kendall and Walker.⁹ Two large

plates were made, using varying amounts of the emulsion according to the character of the stool and the strength of the emulsion, with bent glass rods on Endo's medium and incubated for 18 hours. On these plates *B. dysenteriae* appear as slightly elevated, clear, colorless colonies measuring in diameter from .5 mm. to 1.5 mm., according to the total number of colonies on the plate. All suspicious colonies were fished into litmus-mannite-semisolid media and incubated 18 to 24 hours. If at this time there was growth characteristic of the Flexner or Shiga type of *B. dysenteriae* a tube of plain broth (reaction+.5) and a tube of litmus milk were inoculated with the culture and incubated for a day. If at the end of this time the litmus milk showed the characteristic lilac color microscopic agglutination of the broth culture at a dilution of 1-200 was made. Later in these investigations, in order to make a diagnosis more quickly and for the reason that a large number of specimens were being studied, suspicious colonies from the plates were fished directly into plain broth (made from meat extract reaction+.5) and incubated for about 18 hours, when a drop of agglutinating horse serum was added to the tube. First, Flexner serum was used and then if in three or four hours there was no agglutination, a drop of Shiga anti-dysenteric serum was added. If either agglutination was positive the supernatant broth was drawn off and sterile bouillon was added to the tube, the tube shaken and a loopful transferred to another tube of broth and plates made from this. After incubation the colonies were fished and carried through mannite, semisolid, litmus milk and the agglutination test made a second time. The strains were finally transferred to agar slants for preservation. By this method a tentative diagnosis was reached in about 36 hours. It was found that a positive microscopic agglutination could be allowed to stand for several hours and the agglutinated organisms would grow when transferred to fresh broth. Of the 33 cases that were studied culturally, six cases proved already to have the dysentery organism. Five of them had the Flexner type of the dysentery organism and one the Shiga. Two of these cases received three vaccinations, as follows: The first vaccination consisting of 1 c. c. of anti-serum and $\frac{1}{2}$ c. c. of the standard emulsion, 50,000,000 bacilli, on the second inoculation they received simply 50,000,000 bacilli; no anti-serum; on the third inoculation they received 100,000,000 bacilli, or 1 c. c. of the standard emulsion. Three of the cases received only two injections, the first with anti-serum and the second without. One case received only one injection of anti-serum and vaccine. In none of these cases was the dysentery organism suspected before the vaccine was given, as it was the intention at first to avoid giving any case having

dysentery infection this vaccine treatment. The future history of these cases, however, showed very clearly that no harm was done. The immediate reaction in all these cases was very mild, the highest temperature being 101.5° F. All the local reactions were of the mildest type and there was no general reaction noted beyond slight fussiness. In no case was the immediate intestinal condition aggravated and in all but one case no further intestinal trouble has appeared up to the present. One case receiving two doses of vaccine, the last being given August 7th, did well until September 8th, when the child developed an acute intestinal infection and was entered in one of the hospitals as a case of acute infectious diarrhoea. This attack was only of moderate severity and the child, when last seen October 24th, was in the best of condition. These six cases show very clearly that vaccine made from the *B. dysenteriae* Flexner is not contra-indicated in those cases which may have this organism in a clinically unrecognizable form.

Out of the 95 cases vaccinated there were two deaths. Both these cases received two vaccinations. In both of them the original cultures were negative for the *B. dysenteriae*. One, case 7, contracted acute infectious diarrhoea 17 days after its last inoculation and died ten days later. The outcome of this case is interesting from the standpoint of hygiene. The family or rather several families, lived under conditions of the worst kind, with flies in superabundance. The utter lack of intelligence and indifference to the sickness of the child were features which were impossible to cope with and which undoubtedly led more than any other thing to the fatal result. The second case was that of a very delicate child who lived under the worst sanitary conditions of filthy people and with numerous flies. This child did well for one month after its last inoculation, when it also contracted acute infectious diarrhoea and died two weeks later. All the other cases did perfectly well throughout the whole summer and when last seen, sometime in the latter part of October, were in the best of condition.

It is interesting to compare these cases with 97 cases which did not receive any vaccination and which proved culturally to be negative as far as the presence of the *B. dysenteriae* was concerned. Of this number three died, apparently of acute infectious diarrhoea, after comparatively short illnesses, from three to five days. No bacteriological examinations were made on these cases and autopsies could not be obtained.

There were 25 cases studied culturally, but not vaccinated, which proved to have the *B. dysenteriae* present. In 24 of these the Flexner type of the organism was present and in only one the Shiga was found. There has been one death from this group

of 25 cases. In only one or two of these cases was the presence of the *B. dysenteriae* suspected at the time the culture was taken and in the case which died the final acute attack was very short and severe. This is interesting when compared with the type of the acute attack in the three cases that developed acute infectious diarrhoea later in the summer, in which the infection took the sub-acute form.

AGGLUTINATION

Agglutinations were done in 36 of the 95 vaccinated cases. The agglutinations ranged from negative at 1 to 50 in some of the vaccinated cases to positive at 1 to 400 in several of the cases. No difference was noted in the agglutinating power of the 6 cases in which the dysentery bacillus was isolated. A few control agglutinations were taken from some of the cultured cases in which the dysentery bacillus was found but which were not given the vaccine. One of these cases agglutinated very strongly up to 1 to 100, another only mildly at 1 to 100 and a third only mildly at 1 to 50. Several control cases which were culturally negative, gave negative agglutination reactions. One case which was neither vaccinated nor cultured and which was clinically not one of infectious diarrhoea gave a strong agglutination at 1 to 100.

The home conditions of all the vaccinated cases were studied and recorded. There can be no question that whatever the treatment outlined at a clinic may be, nor what preventive measures are instituted, they are more or less of no avail in the unsanitary conditions under which a fair majority of these children were compelled to exist. The question of the presence of flies appeared to be a most important one and toward the end of the summer an attempt was made to discover how far the fly entered into the carrying of the dysentery infection. To this end sterilized fly traps were placed in several of the homes of cases from which the dysentery bacilli had been recovered. In two out of three such attempts the dysentery organism was recovered from an emulsion made from these flies. The manner of procedure was as follows: An ordinary wire fly trap, sterilized by heat, was left at the house for two or three days. The traps when brought to the laboratory were set in a cold room (4° C.) for 15 minutes. The cold numbed the flies to such an extent that they could be picked out of the cage with sterile forceps and placed in broth. The drowned flies were ground in sterile mortar and plates made from the emulsion a part of which was plated on Endo's medium. Any suspicious colonies were run through the ordinary media for isolating the dysentery organism, and finally tested for agglutination. In these two cases in which

the Flexner organism had been recovered this same organism was also recovered from the flies. It is interesting to note that the *B. dysenteriae* are carried by the ordinary house fly and may be one of the causes for spreading this infection during the months when flies are so abundant.

This investigation is very limited and the number of cases treated are entirely too few to draw any conclusions from, yet the following conclusions may not be amiss: First, the vaccine in no case did harm and the reactions in the majority were very mild and of short duration. Second, cases which bacteriologically were proved to have the *B. dysenteriae* present, but in a clinically unrecognizable form, were not affected in any way different from the cases which were culturally negative. This may in part be due to the fact that this mode of vaccination produces an immediate passive immunity, while the bacterial vaccine is producing an active immunity. In conclusion, the work was of enough interest and holds out a possible means of preventing the great mortality from infantile dysentery during the summer months.

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THE POSSIBILITIES OF MATERNAL NURSING IN THE PREVENTION OF INFANT MORTALITY

By **THOMAS S. SOUTHWORTH, M. D., New York**

While many measures for the ultimate reduction of infant mortality which cannot be expected to bear fruit in the immediate future, must be discussed at these sessions, it is my good fortune to deal with a measure which has a daily and even hourly application if a larger number of babies born are to survive their first year of life.

In presenting my subject, three questions naturally arise:

What advantages has maternal nursing?

Why is it less common than formerly?

How may it be encouraged and made successful?

Were this audience made up entirely of medical men, and not in a large part of laymen earnestly intent upon the solution of this serious problem, it would be unnecessary for me to restate the well-known fact that competent maternal nursing offers the new-born infant the best chance of survival. In support of this, I must state certain other accepted truths, namely, that as before birth, so after birth, there is a physiological dependence of the infant upon its mother which does not cease until the infant has made considerable progress in the extra-uterine phase of its existence. The breast milk of the mother, being expressly adapted by nature to the peculiar needs of the human infant, stimulates its digestive processes, is digested and absorbed with less effort and waste, favors more immediate and well-rounded growth, and contains certain principles apparently not present in other milks, some of them of a protective nature, which render the nursing infant practically immune to various infectious diseases.

The influence of maternal nursing does not, however, stop here. No statistics of infant mortality give us any real clues to the full influence of breast feeding, unless the deaths of infants from all causes are separated upon the fundamental lines of whether they were nursed or whether they were bottle-fed. Physicians know, and have known for a long time, that a vastly greater proportion of bottle-fed infants die of malnutrition, sum-

mer diarrhoea, and other gastro-intestinal disorders; but the public at least do not appreciate that a host of deaths ascribed to pneumonia, convulsions, diphtheria, measles, whooping-cough, suppurative affections—and, in fact, nearly the whole gamut of infantile diseases—take place because these infants lack the stamina and recuperative power possessed in much greater degree by infants who have been nourished at the breast. These deaths are rarely traced to the really important contributory cause. Add to this mortality in infancy the starved bodies, the stunted development, the narrow rachitic chests, the anaemia and disturbed digestions which the less fortunate of the survivors carry with them into childhood, and it becomes apparent that the morbidity of bottle feeding must play some part in the mortality of later years also.

Nevertheless, artificial feeding is on the increase and breast feeding is decreasing. Two factors more than others contribute to this popularity of artificial feeding. The first of these is the progress made in the improvement of the milk supply, and more especially in the methods of its preparation for bottle feeding. Both have been of undoubted service in lessening infant morbidity and mortality where the use of cows' milk was imperative, but we should not overlook the fact that in many quarters this popularization has created an unwarranted confidence in their use. This has taken the form of a belief that an infant may be as satisfactorily and as safely fed upon the bottle as upon the breast.

Still more unfortunate in its bearing upon maternal nursing has been the influence of the so-called "infant foods." Valuable as some of these are when limited to their proper sphere as aids in the feeding of infants who cannot be nursed, and granting that by their use infants who have previously been ignorantly or injudiciously fed are at times enabled to make better progress, we regret that the commercial exploiters of such products have not hesitated in their literature and advertisements to create the impression that such feeding equals, or even exceeds, the value of breast milk. When hundreds of thousands of dollars have been spent in promoting the use of infant foods and scarce as many mills in promoting the knowledge of the value of breast milk, it is not surprising that the same public which buys a soap, a baking powder, or a breakfast food on the strength of lavish advertising will come to believe that some particular infant food possesses almost miraculous properties and guarantees to the infant health and development not surpassed by maternal nursing.

Although much has been accomplished of late years in the scientific adaptation of cows' milk and artificial food products

for the bottle feeding of infants, and granting that the best results are obtained only when there is a high degree of intelligence on the part of the mother and close observation and direction by a skillful physician, the fact remains that no perfect substitute for breast milk has been, or in the nature of things can be, devised by art. Of any two considerable groups of infants—the one group nursed at the breast and the other fed upon the bottle—there will always be better development, less illness and fewer deaths among the nursed infants. If these facts were placed clearly before every mother in the land, so that she could not escape the knowledge that in putting her infant upon the bottle she was electing to make much greater chances of illness and death, there would seem to be little doubt that the number of mothers who would endeavor to nurse their infants would be considerably increased.

Salutary as such a movement might be, it would not wholly solve our problem. Seen from the standpoint of the thoughtful medical investigator, more important questions lie beneath the surface. The people of our country may—for our present purposes—be divided roughly into several groups:

1. The ultra-social group.
2. The educated classes of means, large or small.
3. The great middle classes, including well paid artisans.
4. The very poor and the ignorant, including the foreign immigrants.

Conditions for successful nursing vary widely in these groups. Good food, comfortable homes, and a reasonable freedom from worry, though not always essential, have a desirable influence. Unfortunately, however, education and successful nursing do not always go hand in hand. We sometimes find that it is the stolid ignorant mother who is best able to nurse her baby, and the educated and intelligent one who has the most difficulty.

Among both laymen and physicians the opinion has until recently prevailed that many mothers refused to nurse their children because they were unwilling to give up social pleasures and devote themselves to their offspring. This may have been true some years ago, but obstetric physicians agree that such instances are less numerous today—possibly because of a larger knowledge of matters pertaining to children among the intelligent classes. In any event, such women are in very small minority among the women of this country and would be negligible as a factor in this discussion were it not for their prominence in the public eye and the possible effect of their example. Moreover, in consequence of ample means, skillful nurses, and expert medical attention, the limited number of such bottle-fed children shows less mortality than in other ranks of life.

Having disposed, to some extent, of this charge of willful refusal to nurse, the question is still unanswered why so many mothers who are both willing and anxious to do so do not nurse their infants. A number of these cannot or should not nurse their babies. Among those who should not, are mothers with active pulmonary tuberculosis, advanced diseases of the kidneys, insanity, severe epilepsy, some abscesses of the breast and puerperal fever. Prolonged febrile conditions lead to loss of milk and relieve us of any choice in the matter.

Under proper management, however, the vast majority of other mothers whose children are bottle-fed, upon various pleas of the mother's unhealth, would be definitely benefited rather than injured by performing their natural function. While extremely neurotic mothers do not secrete the best of breast milk, a ridiculous number of women are excused or restrained from fulfilling their maternal duties upon this and the other insufficient grounds.

Another small proportion of mothers cannot nurse because of actual insufficient mammary development, or of malformed and depressed nipples. While the prevention of these conditions is to be sought in better hygienic and physical care of the rising generation of potential mothers, the number of the former class is unquestionably smaller than it now appears, and more of the latter could nurse if they really received intelligent and skillful care both before and after the birth of the child.

Yet the classes of mothers hitherto mentioned—even if we add to them those who from shame abandon their babies and those who are obliged to give them over to the bottle in order to earn their daily bread—do not, when taken altogether, constitute any large majority of those who do not nurse their babies, or else wean them in the first weeks of life. What then, of the large remainder? As the result of an earnest inquiry into all cases coming under my observation, I am prepared to affirm that it is chiefly due to general and lamentable ignorance of the whole subject of human lactation. Astounding as it may seem, I am convinced that as many infants are removed unnecessarily from the breast as there are those whose mothers are actually unable to nurse them. No function of the human body has received, in all its important relations, so little study as that of the secretion of milk by the breasts. Even collateral information and methods offered by much more extensive study of certain lower animals, have not been generally accepted or applied.

The human race has always taken it for granted that a woman either could nurse her infant or could not. There was no middle ground. Milk either came into the breasts abundantly and was good, or it came in scantily and was useless. There have

been no profound studies of the important possibilities of making a seemingly scanty milk good and abundant. Since scanty milk was assumed to be bad or useless, it has been the rule—and is today in many quarters—to discard it entirely as soon as the infant seemed to show by its behaviour that the quantity or quality was not sufficient. Circumstances, or some temporary indisposition of the mother, often causes a sudden diminution in the milk, and no proper measures are instituted to restore it. Thousands of babies are weaned each year on the plea that the mother's milk is bad or insufficient, when a little common sense investigation would result in the discovery that such is not the case. Almost any abnormality in the behaviour of the infant, and almost any apparent abnormality in its stools, is seized upon as sufficient reason for inaugurating bottle feeding. Unfortunately, many of the criteria upon which such judgments are pronounced have no scientific basis, and upon careful investigation would be found to be fallacious.

No claim is made that every mother can nurse her child, but that many more can do so than has been thought possible in the past. Under no other form of feeding do so many newborn infants make so favorable a start in life, and while some supplementary feeding may at times be helpful, the breast should not be abandoned until at least two weeks of effort has been given to intelligent attempts to build up the mother and increase her supply of milk. Short of that time many infants have not learned to nurse properly not to extract all that is possible from the breast. Regular stimulation by the infant of the breasts also causes them to respond to the increasing demand. Scanty milk often results in stools which look bad. This is no sign that the milk disagrees, for on giving additional food with the breast, the stools become normal. Even when the milk is scanty or of poor quality, it is exceptional for it to be bad, and it is only rational that when the mother is below par attention to her health and diet should improve the secretion of her breasts.

Successful as such methods, when properly applied, have proved to be, it is not always possible to make the quantity meet the full needs of the infant. What should we do under such circumstances?

Those who stop to think, will realize that even partial breast feeding favors an undisturbed digestion in the infant, and a safer and more continuous development. Yet many a mother whose milk could readily be made to assist in the early nutrition of her infant is ignorantly advised or allowed to discard it for the greater uncertainties of total bottle feeding. The forces which are behind this organization can do much, not only to forward a campaign of education concerning the advantages of

breast milk, but also to foster studies which should make it even more possible in the future for the willing mother to continue nursing her infant.

Where then, does the responsibility rest for the ignorance concerning lactation? Aside from the deficiencies in medical education, it rests first with the State, which spends thousands of dollars in experiments to improve the feeding and lactation of cows, but whose scientists, best equipped by their training to give us further light upon human milk, tell us regretfully that there is no appropriation for such purposes. It rests with the managers of hospitals for mothers and infants, in which the material and opportunities for such studies are always present. In many of these institutions the dietary is not selected or regulated with any special reference to the needs of nursing mothers. Similar methods on a dairy farm would mean financial loss, or possible bankruptcy for the farmers. These women are there primarily to furnish milk to their babies. The diet of a nursing mother is certainly entitled to as much thought as would be bestowed on that of a cow. Many of these women, if properly fed, would be capable of furnishing enough milk to safeguard the life of another infant beside their own. This should be required of them, when possible, since they themselves are receiving the benefit of public or private charity.

That puny infants suffering from malnutrition may often be saved by such temporary wet nursing is so well recognized as to need no argument. If this be true of infants who have been born at full term, it is even more imperative that feeble infants, born prematurely, should receive breast milk if any reasonable proportion of them are to survive. Yet there are many institutions equipped with incubators, which regularly receive such babies, but whose routine reliance upon artificial feeding and the failure to provide wet nurses results in an excessively high mortality. There is an incalculable loss to the community if the methods of our hospitals do not offer object lessons of the most approved ways of caring for the nursing mothers and the infant inmates. The medical graduates who, in constant succession, serve as internes in these hospitals will in the future care for many babies in their private practices. We cannot blame them if they continue to use the only measures with which they have had the opportunity to become familiar during their hospital days.

The responsibility also rests upon the educator. Popular education should be approximated to the prospective needs of the scholars. Each rising generation of young women should acquire some of the fundamental principles of the care of infants, which eight out of ten of them will certainly require, either for their own children or for those of others. A blind and prudish

optimism should not decree that our daughters shall assume the grave responsibilities of maternity almost without previous instruction.

In such work as is being done to correct these blunders of the centuries, the physicians must be the leaders, but the laymen have no less important responsibility. Let us hope that the day is not far distant when fewer breasts which were intended to suckle shall be wantonly dried through ignorance of the value of breast milk or of the means of maintaining it as a part if not the whole of the infant's nourishment.

**A METHOD OF DETERMINING THE INFLUENCE OF
MEDICAL PHILANTHROPY IN REDUCING THE
MORBIDITY AND MORTALITY
OF INFANTS**

By HENRY L. COIT, M. D., Newark, New Jersey

There is no work to which physicians devote their time and thought, with the object of securing results in preventive medicine, which yields so satisfactory a return for their labor as that performed in infants' hospitals, milk dispensaries and consultations for mothers with nursing or sick infants, especially if this work is done in conjunction with facilities for gathering reliable statistics.

Physicians give their time to medical charity, not alone for the experience gained (the motive usually ascribed to them), but they contribute their knowledge, judgment and supervision for the broader and more humanitarian purpose of reducing sickness and death among the helpless, and they also entertain the hope that their labors will increase the viability of their fellows.

In the study of the problems of infant morbidity and mortality, it does not matter whether the investigator be a physician working in hospitals or among the sick of his own community or whether, as an economist, he is studying the wider national problems in this field, the facts gathered through the agency of medical philanthropy become a most valuable asset to himself and the public.

There are many different organized agencies employed for the reduction of infant morbidity and mortality. These are hospitals and clinics where infants are treated for a short time or intermittently and then returned to their homes, milk dispensaries, consultations, infant or foundling asylums, orphanages and bureaus for placing out homeless or abandoned infants, schools for the training of infants' nurses, philanthropic associations not under hospital supervision for the training of mid-wives and maternity assistants for the protection and ante-natal care of expectant mothers, municipal and other agencies which employ nurses to teach infant hygiene in the home and State and federal agencies which, by ordinance and law, attempt to influence

infant morbidity and mortality by gathering statistics, regulating the food supply and making more sanitary the homes of the poor.

The value of each of these agencies in their influence upon the reduction of sickness and death has been variously estimated by those who are actively engaged in one or another of the many departments of this work with a tendency to over-estimate the influence of the agency in which they are personally interested.

There is no efficient method at our command for determining the amount of sickness in a community or of analyzing the figures obtained as to the incidence of conditions causing death. Morbidity statistics are difficult or impossible to obtain even through the compelling agencies of municipal or federal ordinance. Mortality statistics, for the most part, teach only economic facts in the numerical data furnished, yet these general facts concerning mortality are useful to those dealing with sickness in helping to determine how far their own work has influenced mortality among a similar class under their supervision and treatment.

The work of infants' hospitals, babies' wards, dispensaries, consultations, and institutions or associations which extend their labors beyond the hospital to the home by giving instruction, assistance, material help, food, clothing and shelter and which are prophylactic rather than remedial, represents powerful influences, the value of which cannot be measured by mortality records.

All these efforts are directed against the causes of sickness and some reliable method is needed to determine how far the work done influences morbidity as well as mortality. Moreover, it is important to follow the work beyond its prophylactic influence and, if possible, measure the progress of the individuals benefited toward an improved environment, a normal nutrition, immunity to disease and a maximum viability.

When these various methods of work are combined under the same direction, it would be desirable if some simple system could be formulated for the collection of facts which would show the relative value of the various kinds of work in their influence upon the reduction of infant morbidity and mortality.

In this way only can it be learned how the many causative factors of mortality are related to one another: Whether poverty or ignorance is the most potent; or which method of procedure is the better in our charity work. At present it is a matter of individual opinion and many questions cannot be satisfactorily answered.

The percentage plan of scoring has been employed to determine the status of social, scientific and commercial investiga-

tions, but no comprehensive scoring plan has been adopted which would include in its scope all conditions which influence the care, the physical condition and the living powers of the infant.

The method herewith presented consists of a statistical score card and is designed for the collection of facts to determine the influence of environment, of management, of nourishment and of morbidity upon the viability of the infant and by a graphic chart to show the improvement in viability during a given time through the activities of medical philanthropy and educational work directed to the betterment of the conditions which influence the lives of infants. (*See pages 261-264.*)

Such a plan should be flexible enough to be easily adapted to any line of medical work with infants either in the hospital, the clinic or institution and through which the children may be followed to their homes and kept under observation for a considerable period after the institutional treatment has been terminated.

On general principles, the larger the number of individuals tabulated, and the wider the area from which statistics are gathered, the more accurate the results in estimating the value of factors in sickness or death. In this way the findings of federal agencies may be more accurate than when smaller numbers within narrower limits are tabulated, but while such official statistics are of great value in the determination of mortality, they lack certain important features of accuracy which characterize all data which depends for its collection upon the willingness of the individual reporting to comply with the letter of the law.

It is also true that when investigations are voluntary, there is usually more attention paid to detail and they may be extended to include facts impossible to obtain through the compulsory method directed by municipal and federal bureaus for gathering vital statistics.

In order to make satisfactory use of the method herewith presented, it is best to carry the investigations beyond the hospital, clinic, or consultation. It will require the work of a physician to determine the physical condition of the child and to write its medical history. It also requires the service of a visiting nurse to see the case periodically in its home, to weigh it and mark the weight chart, to make records of the environment, the hygiene, the management and care; to instruct the mother or care-taker, to note any subsequent or intercurrent illness and to make records of progress in any or all of the conditions involved.

The scoring, which should be done once each month, requires the physician's judgment to correctly estimate the value of the

different factors as based upon the records of the visiting nurse. It is also necessary that the nurse should interpret her records for the statistician who marks the score card.

The maximum score being one hundred in each line of investigation, it is easy to determine the progress due to the influence of the physician's work, nurse's work, or their work combined. The total score for the month, if averaged, will represent the same ratio and this figure with the subsequent monthly scorings will show the improvement in the physical condition of the individual.

The total score for the month, expressed in figures and averaged, is transferred to the graphic percentage chart designed to show the improvement in the case during the possible period of one year.

This graphic chart may also be used to express the viability of the individual at the beginning and at the end of the year and the average of the first and last scorings of those who have been under observation during the entire year will show their average viability and the gross advantage of the work of the philanthropy.

An attempt at simplicity has been made both with respect to the comprehensiveness of the data to be gathered and the method of recording it. Very little writing is required: negative answers require no entry; positive answers, except in a few instances, may be indicated by a check or cross and the medical history may be written with very little labor.

The difficulties in estimating the value of some of the factors in a scheme like this are apparent. Pre-natal causes are not included in the score except as the expectant mother was considered as she came under the influence of the educational system at the consultation, but the baby cannot be scored until it has arrived and is presented to the medical agency for its welfare.

It seemed necessary to estimate the value of ample money support and its opposite condition—poverty; but it was found that these were both indicated in the environment of the home, the facilities for good care available in each case and the adequate or inadequate food supply.

Under management and care, after estimating the values of type in the care-taker, it was found that the number of other children in the family was an important element in lowering the living prospects of the infant. After discovering that a twelve-year-old child would be able to help the mother, it was necessary to carry this cancelling of numbers down to the age when a child could be of no help to the mother which was determined at six years. The problem of numbers begins to be

unlocked at this age so that the scoring includes only a possible six children under six years of age.

Under nourishment, the maximum score is based upon the possibility of normal breast feeding and the classes or kinds of food are scaled down to a minimum in the order of their relative nutritive value as compared with good breast milk. The principle used in fixing these values is our personal estimate of what the increase in the general infant mortality would be if all babies were deprived of breast milk and were compelled to depend upon mixed feeding, rational bottle feeding, patented food with good milk, patented food with poor milk, dried milk, condensed milk or carbohydrates only. Scoring the mixed diet in the second year is a simple matter of judgment.

The morbidity score is based upon the integrity of the various organic and functional systems in the body. An attempt has been made to allow a value for organic integrity when its function only is impaired. Impairment of either the organ or its function at the time of marking the score should eliminate or lower its maximum value.

The initial scoring of each case is based upon the medical history taken at the hospital or consultation when the child comes under observation and then from month to month the initial record should be checked on the intercurrent excursions from normal organic and functional integrity as indicated by the records of the visiting nurse, the variations being determined by the physician.

HISTORY BLANK

Double page, inside of weight chart and nurses' record

CASE NO.	THE BABIES' HOSPITAL NEWARK, NEW JERSEY						WHERE SEEN OR TREATED HOSPITAL STATION HOME			
DATE	NAME			ADDRESS			AGE			
Date of Birth	Sex			Father			Mother			
Is wedlock?	Birth normal?			Necessity			Necessity			
Condition	Nativity			Nativity			Nativity			
Condition at birth	Occupation			Occupation			Occupation			
Care Taker	Age			No. children			Living			
Money paid Care Taker	Health of Father			Adults			Children			
Breast fed	Mother			Wei nurse			Health of Mother			
Wesed.	Age			Why?			No. in family			
Condition	No. in family			Adults			Children			
MANAGEMENT AND CARE										
TYPE OF CARE TAKER: Intelligent Ignorant Thoughtful Negligent Attentionless Unconcerned Methodical Careless										
Glibly Ugly Industrious Indolent Patient Impatient Self-reliant Helpless Competent Incompetent										
NO. OF CHILDREN, under 8 years, per care taker: _____ Number sick: _____										
FEEDING: Regular Irregular Intervals, day time at night If over one year, how many meals? Fed between meals SLEEP: Regular										
Irregular When put to bed Day-time eggs Night-hour Hours of sleep THE BED: Crib Cradle Carriage										
Curt Mattress Pillow Comfortable Clean THE BATH: Daily bath In tub soaped										
CLOTHING: Overdressed sufficient less/least Clean DAILY EXERCISE DAILY AIRING TIME										
THE ENVIRONMENT										
ROOMS: Number cubic space per person Separate sleeping room Open Closed LIGHT: Living rooms awfully all day										
Hail dry No sun Dark AIR: Ventilation, good Bad Window area per person Room air fresh Foul										
SINK Satisfactory good drainage WASH TUB: Stationary Movable BATH ROOM TOILET Good Poor										
CARE OF FOOD: Satisfactory Unsatisfactory ICE BOX Ample Clean Dirty CELLAR Ventilated Clean										
HOUSE: Clean and tidy Unclean In disorder										
THE NOURISHMENT										
UNDER ONE YEAR: Breast fed No. Wee. Mixed Method No. Wee. What fed										
Bottle fed No. Wee. What, and how long given										
Present food										
Food besides milk What										
When Total milk 24 hours oz. Amt. at feeding etc. OVER ONE YEAR: Food besides milk; breakfast										
Dinner										
Supper Food easily accept Poverty Neglect										
Injurious food given: What Drink used										
MEDICAL HISTORY										
General appearance Temperament Physical type parents										
Vitality Congenital defects Deformities										
Previous sicknesses Hospital with illness Who What										
New abnormal conditions in the following: Eyes Sight Ears										
Hearing Nose Mouth										
Teeth Throat										
Body temperatures The lungs Respiration										
Heart Circulation The pulse										
The blood Nervous system, Motor Sensory or Functional										
Coordination Sleep Quiet Restless Waking hours Cheerful Fearful Faint										
The stomach The intestines Gastric digestion										
Intestinal digestion The anus Daily No. Character										
The urine Uro-genital system Glanular and lymphatic systems										
Muscular, articular and osseous systems The skin Mucous membranes										
Nutrition Development Frase Length										
Weight Examination of excretions or excretions										
Summary of morbid conditions										
DIAGNOSIS										
RECORD OF VISITS DURING FIRST MONTH										
MILK MIXT.										LIVING 1
AGE										
DATE										NOT LIVING 0
WEIGHT										

Reduced (size 9x13 in.)

WEIGHT CHART (reduced)
Obverse (6½ x 9 in.)

No.		ADDRESS												DATE AND WEIGHT	
* DATE RECEIVED	NAME													END OF SERVICE	
MONTH														END OF	
187	878													SERVICE	
1	28													STATE OF NUTRITION	
4	30														
11	32														
16	34														
2	36														
10	38														
15	40														
1	42														
10	44														
15	46														
1	48														
10	50														
1	52													AVERAGE MONTHLY GAIN	
10	54														
1	56														
10	58														
1	60														
10	62														
1	64														
10	66														
1	68														
10	70														
1	72														TOTAL GAIN
10	74														
1	76														
10	78														
1	80														
10	82														
1	84														
10	86														
1	88														
10	90														
INITIAL														LIVING I	
WEIGHT															
WIK	NEXT													NOT LIVING O	
AGE															
DATE															
WEIGHT															

Reverse (reduced)

RECORD OF MONTHLY VISITS OR WEEKLY INSPECTIONS

MONTH	DAY												
RECORD OF MORBIDITY													
	RECORD OF ENVIRONMENT												
RECORD OF MANAGEMENT													

PROPERTY OF FEDERAL BUREAU OF INVESTIGATION, WASHINGTON, D. C.

MONTHLY SCORE CARD

THE MANAGEMENT											
TYPE OF CARE-TAKER											
INTELLIGENT 5, IGNORANT 0.											
THOUGHTFUL 5, NEGLIGENT 0.											
AFFECTIONATE 5, UNCONCERNED 0.											
METHODOICAL 5, CARELESS 0.											
CLEANLY 5, UNTIDY 0.											
INDUSTRIOUS 5, INDOLENT 0.											
PATIENT 5, IMPATIENT 0.											
SELF-RELIANT 5, INCOMPETENT 0.											
NO. OF CHILDREN.											
SIX CHILDREN UNDER 6 YEARS, 0.											
FIVE CHILDREN UNDER 6 YEARS, 2.											
FOUR CHILDREN UNDER 6 YEARS, 4.											
THREE CHILDREN UNDER 6 YEARS, 6.											
TWO CHILDREN UNDER 6 YEARS, 8.											
ONE CHILD ONLY, 10.											
SYSTEM IN CARE											
FEEDING—REGULAR 10, IRREGULAR 0.											
SLEEP—REGULAR 10, IRREGULAR 0.											
THE BED—GOOD 5, POOR 0.											
THE BATH—DAILY 10 TO 0.											
CLOTHING—PROPER 5 TO 0.											
EXERCISE—DAILY 5 TO 0.											
AIRING—PROPER 5 TO 0.											
THE ENVIRONMENT											
ROOMSPACE, 10 TO 0.											
SUNLIGHT, 10 TO 0.											
FRESH AIR, 10 TO 0.											
SINK AND DRAINAGE, 10 TO 0.											
WASH TUBS AND WATER, 10 TO 0.											
BATH ROOM AND TOILET, 10 TO 0.											
HOUSEKEEPING, 10 TO 0.											
PREPARATION OF FOOD, 10 TO 0.											
PRESERVATION OF FOOD, 10 TO 0.											
CELLAR AND CONTENTS, 10 TO 0.											
THE NOURISHMENT											
NORMAL BREAST MILK, 100.											
GOOD BREAST MILK AND BEST BOTTLE, 80.											
RATIONAL BOTTLE FEEDING, 60.											
PATENT FOOD AND GOOD MILK, 50.											
PATENT FOOD AND POOR MILK, 40.											
DRIED MILK 30, CONDENSED MILK 20.											
CARBOHYDRATES ONLY, 10.											
MIXED FEEDING 2ND YEAR, 100 TO 0.											
MORBIDITY											
Maximum score, Organic and Functional Integrity.											
RESPIRATORY SYSTEM, 10 TO 0.											
CARDIAC SYSTEM AND CIRCULATION, 10 TO 0.											
NERVOUS SYSTEM, 10 TO 0.											
DIGESTIVE SYSTEM AND ABSORPTION, 10 TO 0.											
HEAT REGULATING SYSTEM, 10 TO 0.											
THE BLOOD, 10 TO 0.											
URO-GENITAL SYSTEM, 10 TO 0.											
GLANDULAR AND LYMPHATIC SYSTEMS, 5 TO 0.											
CUTANEOUS SYSTEM AND MUCOUS MEMBRANES, 5 TO 0.											
MUSCULAR AND OSSEOUS SYSTEMS, 5 TO 0.											
ORGANS OF SENSE, 5 TO 0.											
WEIGHT AND MEASUREMENT, 10 TO 0.											
TOTAL SCORE											

Reduced (size 6½x9 in.)

VIABILITY CHART
Obverse of Monthly Score Card (6½x9 in.)

DATE RECEIVED		No.										END OF SERVICE		
MONTH		NAME										ADDRESS		DATE
100														100
95														95
90														90
85														85
80														80
75														75
70														70
65														65
60														60
55														55
50														50
45														45
40														40
35														35
30														30
25														25
20														20
15														15
10														10
5														5

NATURE OF CASE _____ **RESULT** _____

MEDICAL DEPARTMENT ALBANY HOSPITAL, NEWARK, N. J. (FOR COPY & RETURN PART 5)

FIFTH SESSION

Friday, November 11, 2.30 P. M.

EDUCATIONAL PREVENTION OF INFANT MORTALITY

Topic: Healthy parents, right customs and wholesome environment being essential factors in preventing infant mortality, how are normal institutions fitting teachers to establish through public schools better practices in hygiene and sanitation and higher ideals of parenthood?

CHAIRMAN

HELEN C. PUTNAM, M. D., Chairman of the Committee of the American Academy of Medicine to Investigate the Teaching of Hygiene; Providence.

SECRETARY

PROF. ABBY L. MARLATT, Department of Home Economics, University of Wisconsin.

A STUDY OF FORTY NORMAL SCHOOLS

Address by the Chairman, HELEN C. PUTNAM, M. D.

In planning the work of the committee appointed by the American Academy of Medicine to investigate the teaching of hygiene in public schools, after the first two obvious steps were completed, detailed studies of laws requiring its teaching and of textbooks,¹ the decision was promptly made that no method of questionnaires would serve our further purposes. Its advantages are comparative ease and inexpensiveness; its disadvantage in this instance is comparative valuelessness. This apparently hinges on failure to accurately define or standardize terms necessary to use. What some report as teaching hygiene others find pitifully inadequate, and even teaching unhygienic practices and ideas.

In personal search for this teaching in over six hundred schools in over forty cities during the last five years two vivid impressions have been received; one of the wonderful plasticity of children, the other of the earnestness of teachers, who are almost invariably doing the best they know or the best they are permitted to undertake. It was soon realized that the cause of the great poverty in this instruction must be looked for "higher up," in institutions training teachers and in officials administering schools.

Therefore very early in the study of children's schools was begun also study of normal institutions with reference to the teaching of hygiene, interpreted to include sanitation and teaching by practice as well as by precept.

Twelve normal schools were visited because of accessibility. From annual reports of 50 others 28 were selected to be visited because of inviting statements concerning this instruction. With but few exceptions special emphasis is placed on their being professional schools. A brief outline of this study of 40 schools in the committee of the Academy will serve to answer in part the question of our topic this afternoon, "How are normal institutions fitting teachers to establish through public schools better practices in hygiene and sanitation and higher ideals of parenthood?"

Experience proved that the majority of these reports greatly exaggerated the worth of the preparation in hygiene; that, in fact, several courses were conspicuously poor, one or two surpassing anything I have chanced to find in public schools. Few were worth a journey to see good methods.

¹Published in Bulletin of American Academy of Medicine, 1905 and 1906. Address Easton, Pa.

Several heads of schools said with compunction that they were doing very little, not what they wished they could do. With some there was an attitude of comic despair, as if the possibilities and difficulties were beyond solution with so many other demands from commissioners and examining boards. A few were emphatic over what they believed their special merits; but it was not always possible to agree with them. As it proves good for public school teachers, it would be very profitable here, too, if the custom of studying other schools systematically were more common, with detailed written reports of the practice and teaching of hygiene. One group of seniors was doing this for the first time. The advantages are mutual—stimulus to the school studied (it seems that “there’s the rub”) as well as education of the visitors and their school.

Usually no attempts were made to see presidents, as instructors, classes, notebooks and premises gave more detailed and authoritative information “at first hand.” One instructor to whom was said, “You are doing better work than your report states,” replied, “I have been here only a few years. They don’t know what I am doing.” Several instructors whose attention was called to the discrepancies between the work done and the published statements explained that they had been prepared some years before when it was expected to carry out that program. Others protested that no one in the time allowed could do “all that.” One principal, after an hour about “book animals” of other climes, said that they had recently decided to cut down the time given to science (including physiology and hygiene) and next year give it to English instead for “that sort of thing doesn’t seem to *amount* to anything.” This was not the only class where it seemed fortunate that the time allowance was no more, for it was wasted.

Statements about the time given to “physiology and hygiene” in normal schools are even less indicative of the work done than they are in public schools. A little instruction may be given by the principal, or by instructors in pedagogy, biologic science (botany, zoology, biology, physiology, nature study, school gardening); gymnastics. Regular classes are assigned sometimes to the teacher who happens to have least to do: it may be the art teacher this year, the teacher of manual training next, the teacher of history another, or the teacher of physical training who with pupils wears the confined dress and high heels of “the crowd.” Some of these lack even the elementary vocabulary needed, and have among their pupils those who have brought from high schools better information; “instruction” consists in reading questions from a book and comparing the replies elicited with the text—the “parrot work” we find in chil-

dren's schools. The foregoing fragmentary work is unco-ordinated, feeble and wholly unequal to the needs. Here as elsewhere the subject suffers from extra demands that require something to be side-tracked temporarily—this being the choice.

Next to complaints about time, that in some cases must be translated to mean incapacity to use effectively the time assigned, came the justification of unwise work on the ground that students must be prepared to answer the questions asked in examinations for licenses to teach. If we include this statement from new graduates, it was much the commonest. Several graduates told me that they did not take this course—"it wasn't any good"—they read over a child's textbook answering the questions usually asked, and "got through all right." Compilations of "questions usually asked" are at hand as in other "professional schools."

These facts led to a study of many sets of examination questions for licenses. Some contained no questions on physiology and hygiene, although the law specifically requires it taught in children's schools. In several hundred questions on it 93 per cent. were on anatomy, less than 7 per cent. on function or health. In certain States the number of questions on this subject equalled the number in each of several other departments—perhaps 10 in each; in the majority of examinations two to four questions (usually in anatomy) were inserted under the head of "science."

Ten of these forty schools specially claimed to teach "school hygiene." In three it was elective, and not all elected it. In the remaining seven it received hardly more than academic mention in one, or possibly three or four lectures on pedagogy (usually). It seemed chiefly perfunctory compliance with an edict. Three schools were beginning experimental studies in it—progress in a hopeful direction.

In certain schools, particularly city normal, "method" only is taught, not "content" or "instructional" studies, i. e., their graduates obtained their knowledge of hygiene from high school (where if elective they may not have elected it) or from grammar grades. The question asked in two such schools, "How many elected," was answered "Not one-third," or "About one-third."

The best instruction found was in home economics in seven schools of 40, reaching only women, and them in part; in certain laboratories (biologic, chemical), not always required; and in a few departments of physical training (very limited in scope, uncertain, and by lectures only), depending more on the physician in charge than on established demands. Each of these courses was good in its special limited direction. But no school

gave any teachers a well balanced education in elementary principles of hygiene, sanitation and biology.

Very few teachers of biologic sciences carry in these "professional schools" the conception of communal, family, and personal biologic science as a fundamental need for teachers of children. A brief glimpse of collegiate work (devised for collegiate aims) is the usual course. Conversations with students about to be graduated revealed a surprising blindness to the practical applications of biologic principles to the welfare of children, and a surprising remoteness from the present great social movements that intimately touch their profession in these lines.

Almost more impressive education is given by the environment in normal schools, as is the case in children's schools. There is time to speak of only those details in rooms and corridors more or less within the control of the teacher, viz., cleanliness, temperature, humidity, dust, effluvia, fresh air, and light. Whatever words are recited, the habits formed by actual conditions more often prevail in later life.

In no public school have I seen more unhealthful practices than are to be found in some normal schools. Some details were worse than it has been my fortune to see in children's schools, and it is my impression that normal instructors have more control over such than grade teachers usually have. One can find large assembly rooms vacant all day in the same building with small class rooms packed with humanity until no passage ways are left, temperature (winter) high in the eighties, and atmosphere literally sickening. One can find janitors sweeping halls and even rooms while school is in session, or while scores of children (of the practice school) are doing required work out of regular hours; vulgarly defaced walls and toilets; splintered, dirty floors that could be easily made sanitary with a little linoleum; the common cup and towel and grimy wash bowl; these things in schools whose claims for hygiene distinguish them above the average claims.

On the other hand, one finds a few buildings as nearly immaculate as it seems possible for public buildings to be, with air as good perhaps as it can be in any but outdoor or "fresh air" schools (there was curiously little interest and no experimenting in this kind of school). Such teach by practice as by precept; not by precept in contradiction to practice.

The inadequate professional standards in most of these 40 schools east of the Mississippi and north of Mason and Dixon's Line is what we find reflected in public schools and thereafter in homes. As the courts are increasingly holding municipalities liable for injury to health or person through departments having charge of sidewalks, streets, sewers, and, recently, water

supply (typhoid fever); so the idea is growing that departments of education also should be held legally responsible for injury to any child's health by the slow poisoning of unsanitary schools. A large part of the unhealthfulness comes from ignorant and careless management, due to improperly prepared teachers, and principals, and to janitors not prepared at all.² It would seem also that earnest young women and men who have accumulated a little money with which to pay for a professional training should have legal redress for the waste of it through governmental misrepresentation and inefficiency either in city or state normal schools.

Licenses to teach in elementary schools mean widely different qualifications according to the institution in which the candidate prepared, whose pace is set by the examinations given. Schools for training teachers have the same humanitarian need to be standardized as have medical schools. Leaders in medicine have worked for this for many years, and are recently re-enforced by the Carnegie Foundation whose study of medical schools reports similar exaggerations and similar inadequacies.

Some of the fine possibilities in professional instruction we are to hear this afternoon from those who are really doing things; at least I have urged each to give us his own work, not opinions of what ought to be done—of which we have already so many. Their success opens up paths along which we may hopefully push in our work for healthy and wise parents as the chief factor in preventing infant mortality.

I beg to express the very great appreciation of the Association for their kindness in coming, some of them from long distances; taking time from crowded days to help us with their experience. We thank each one heartily.

²See "Janitor Service," Putnam, Proceedings National Education Association, 1910 and 1911.

I. BY THE STUDY OF SCHOOL SANITATION AND HYGIENE

Subject introduced by HERBERT BURNHAM DAVIS, Ph. D., President of the Southwestern Normal School of Pennsylvania

A gentleman whom I once knew used to say, "If you want to be a good man, begin by getting a good father and mother." Unfortunately this is not always possible. "While the youth of this country are taught the beauty of freedom; that individual rights are supposed to be the essence of civilization, the rights of the unborn are neglected, unrecognized. Thousands are existing today in a supposed land of freedom under the fearful and desperate tyranny of a bad inheritance which knows no laws, no mercy."

It is just here that a very significant educational problem arises. Since the fundamentals of personal hygiene—bodily cleanliness, tasteful and attractive dress, simple diet and the power of nervous relaxation—are essentials of right living, what may the normal school do for the development of an alert, intelligent and sensible exemplar of sanitary principles?

First, a thorough physical examination might be established for those entering upon a normal course of study, such examination to be repeated at least annually. Such a certificate of physical soundness offers a proper criterion of judgment as to the physical resistiveness of the individual. Such a qualified teacher is quite likely to look for the cause of falling physical tone, mal-nutrition, and lack of nervous control among pupils. To such a teacher problems of retardation become of special interest. It is astonishing that where the body combines so much of beauty, delicacy, and strength of architecture, it is often treated with so great a lack of appreciation. We are quite prone to forget that the brain and nervous system have other functions to perform than that of mental activity—that these have an extremely important hygienic significance. It is not always easy to convince the would-be teacher that the study of mental and physical hygienic conditions should have a place in technical preparation. An attempt to talk to young men and women of average intelligence on matters of hygiene

will quickly convince the speaker that his hearers are absolutely ignorant of physiological, anatomical, and dietary conditions. One might almost believe that the field of physical knowledge had become as dead as the classic languages are supposed to be. The teacher seems to think little of the fact that "on a man's ancestors depends whether he is to be a fool, a genius, or a madman, or whether he is to be a success or failure in life." They should know that it is doubtful if any child is born in a civilized country without some inherited brain and mental weakness of some sort or in some degree. And that this is not in the least inconsistent with the other fact that the brain cell and its function of mind are more amenable to the effects of environment and education than any other cell in the human body.

We are coming to believe that many precious lives that would have done much for the world have been lost through early preventable death or bad training and through want of mental and bodily hygiene. Woe to the people, therefore, who use up too often their surplus of brain inhibition. They will be angels or demons just as they are fresh or tired.

Again, the entire biological curriculum should contribute to an enlarged and more definite knowledge of sanitary science. It is in the unification of physics, physiology, biology, psychology and the like, that we may hope to lay a foundation for the study of medical inspection, thus introducing the teacher naturally to the fields of oral hygiene, infections and contagious diseases, and sex hygiene.

Where physical examinations have been given, they have resulted in securing a higher sense of personal cleanliness. As soon as the examinations begin, the children are more careful of their dress, more sensitive as to the conditions of their hands and faces, and quite reticent in regard to the use of the common family tooth brush or tooth rag with its coating of ashes. They give their hair a more careful daily dressing and shun any comment indicating diseases of the scalp. If the examination had no other value than that of producing an annual cleaning up, it fulfils a highly efficient function, but it serves also as a practical clinic for apprentice teachers. In addition to physical examination blanks, apprentice teachers should be furnished with a printed outline of symptoms that indicate the onset of such contagious diseases as scarlet fever, mumps, whooping cough, chicken pox, measles, diphtheria and influenza. This outline should be supplemented by a course of lectures on the cause, complications and sequelae, and treatment of children's diseases. Such a course should be given by a physician. Practical demonstrations should be given in the use of disin-

fecting agents, especially para-formaldehyde, not only for the purification of rooms, but also for books, pencils, and other school articles which may have been used in common.

Closely allied to physical cleanliness is the matter of sex hygiene. The experience of physical examiners show that more than 75 per cent. of the young men examined confess to experiment with themselves, while about 66 2-3 avow that their parents have never mentioned sex and its significance to them. As soon as the child passes the sexually neuter period and interest arises, he should receive instruction suited to his age. The whole field of biology offers its wholesome contributions of material to such instruction. While it may not entirely obviate the child's accumulation of vocabulary of indecent words and stories, yet properly given it may keep the mind from moral miasma and free from the needless "fears associated with the misunderstood sexual rhythms and their spontaneous nocturnal experiences." There is no excuse for the community allowing its youth to grow up in ignorance of the dangers of infection and its consequent enormous evils, for this part of the study of the brain and the mind is one that may be fruitful of the highest practical results, and it admits to a much larger extent than is realized of a popular treatment, on scientific lines, which would steer a happy mean between a too great attention and a deplorable ignorance. If the parents neglect their duty, then the need must be met by properly qualified teachers.

While the out-of-door school is the most ideal because of the free air and the absence of furniture, thus allowing the child free play of muscle, yet for the present the schools of America will be compelled to face the problem of the school-room. These problems of ventilation, proper lighting and heating, care of floors, freshening of walls and ceilings, movable and fixed furniture, are not only vexatious, but, because of their real hygienic significance, demand the most minute and prolonged study. Near-sightedness is undoubtedly on the increase. Other eye defects result from the use of improperly printed books held at an improper distance and angle, by virtue of construction of the school furniture in which the pupil receives his daily torture. One investigator found that in 1,000 children examined, over 10 per cent. had a beginning curvature of the spine. There is not a single piece of school furniture in use in our schools today which does not contract the chest, thus interfering with respiration and at the same time producing improper posture. Why may this field not develop profitable hygienic problems? Who besides Burgerstein and

a few of his German contemporaries has given serious consideration to the construction of furniture which should reduce to a minimum the physical and mental fatigue resulting from its use? Some time has been devoted to the desk, but the seat has been woefully neglected.

The sanitary treatment of floors and ceilings, as well as provisions for ventilation and lighting has been left to the judgment of a group of school officials who know nothing of its requirements, and so are placed at the mercy of contractors who wish to install devices which will net the most profit. Much of this might be permanently avoided if those preparing to teach were given sane instruction and had the opportunity of practical laboratory experiment and observation.

Finally we ought not to make the labor of the school so engrossing as to prevent play and exercise in the open air. The winds of heaven not only cure consumption—they strengthen the nerves and promote nutrition at all ages. The proper exercise of the leg develops the lungs and tones up the circulation. Thus the whole field of playground supervision is given significance—the emphasis of the course being placed on play—an art which I fear is fast being forgotten. The average teacher lives in mortal terror lest the loss of hours for play may interfere with the educational system, and so “labors at the manufacture of the required number of yards of learning, per pupil—crucifying the little people every 60 days in the attempt to discover whether the raw material is being worked up with celerity and thoroughness,” never realizing that the work done at experimental schools, both in this country and abroad, seems to show that with good teaching, children working half the school hours make quite as rapid and satisfactory progress as children driven at full pressure.

In summary—we are trying to give our teachers a practical knowledge of the hygiene of childhood. The flushing of the school room with fresh air depends upon the teacher, not upon the system of warming and ventilation. The desks will never adapt themselves to the pupils, but the teacher must look after matters of posture, and should be thoroughly acquainted with signs of fatigue. He should understand the dangers of eye-strain and should be able to test the eyesight and hearing to the extent of being able to gauge their efficiency for school purposes. “He should be able to recognize when laziness results from ill-health, unruliness from want of out-door exercise, and stupidity from the possible existence of adenoids.” He should know the infectious possibilities of the pocket handkerchief and unmanicured fingernails. He should know the laws of sleep

and their significance. Above all he should be able to make practical application of this knowledge to the different problems presented by the home and parents of the individual child.

Perhaps the normal school fulfills its highest function when it gives some instruction to those who in the majority of cases are to be the home makers for the next generation, and proper information well assimilated makes for a better parenthood and a stronger childhood.

The Chairman (introducing Dr. Whipple): You will appreciate the following paper better if you bear in mind some of the conditions found in public schools. In 600 rooms where I noted this detail, there were only 210 thermometers, 72 of which were out of order. The remaining two-thirds registered in winter months with almost no exception, from 71 to 72 degrees to 80 degrees, in a few instances above 80 degrees. In one large normal school 70 to 72 degrees was the "official temperature;" in many public schools, 70 degrees or above, in others, "about 70 degrees." In a very few schools individual teachers had secured permission to regulate their rooms, and with the co-operation of their children kept registers closed practically all the time, some windows open, and were rosy cheeked, vigorous groups. These were beginnings of the open air school idea.

Also bear in mind the conditions of floors and the dustiness of rooms with resulting atmosphere. I visited one famous normal school graduating many thousands of teachers where the floor of its practice school was oiled to retain the dust as we oil roads. It gave the sensation of walking on paste: children were not required to wipe their feet on entering (the floor held the dust), a habit in which mothers were trying to train them; the air was odorous, skirts were soiled, and certainly it was education in slovenliness, not in cleanliness. In certain schools I found janitors permitted to sweep corridors while school was in session; in one normal school, even the schoolroom with twenty-one children and the teacher present. "This wet sawdust keeps down the dust" was the excuse, but the dust was visible in the air, and could be felt parching nose and throat.

It is therefore with the greatest satisfaction that we welcome an effort at Cornell University to standardize details of sanitation.

INSTRUMENTS OF PRECISION AS ADJUNCTS IN THE TEACHING OF SCHOOL HYGIENE

By GUY MONTROSE WHIPPLE, Ph. D., School of Education, Cornell University

Madame Chairman, Ladies and Gentlemen: My purpose today is to explain certain phases of the work given in school hygiene in the School of Education at Cornell University.

The modern development of education has for one of its most characteristic features the adoption of the spirit of scientific research. In place of opinion and speculation, we search for facts and principles. The modern science of school hygiene is one result of this zeal for careful study of the conditions attending the education of children; and, in my opinion, this science is

the most valuable subject (apart from courses that give information in the subject-matter to be taught) that can be incorporated in the professional training of teachers. Indeed, if a prospective teacher in training had to choose between the history of education and school hygiene, I should say, "Take school hygiene," or if between educational psychology and school hygiene, much as I believe in educational psychology, I should say, "Take school hygiene."

But this view is by no means common. In a discussion at the twentieth anniversary of Clark University, I was surprised to note that many professional men, whose interests lay in closely related fields, were quite unacquainted with the recent development of school hygiene and had no conception of the fact that this latest phase of educational science has become a special discipline, not only worthy of careful study by all those who intend to teach, but also worthy the name of a science. And similarly, in educational circles, there prevails, as has been pointed out by the previous speakers today, an unfortunate amount of ignorance, or of disregard of the claims of our subject. In many courses for the training of teachers school hygiene holds as yet no part in the prescribed curriculum, or, if taught, is regarded as a subsidiary and relatively unimportant topic: the instruction is perfunctory and the interest incited is but meager.

The prescribed training for college graduates, who are to receive certificates from the New York State Education Department, as outlined in the Department's syllabus, makes but incidental reference to hygienic problems and no recognition of school hygiene as a specific branch of study. We have, nevertheless, organized and developed at Cornell University an elective course on school hygiene that is taken yearly by many prospective teachers. Of the general organization and content of this course, I do not propose to speak at this time.¹ I have brought with me for exhibition a booklet entitled, "Questions in School Hygiene," which is used in lieu of a textbook in the course and which will indicate the general scope of the topics that are discussed.

We are also endeavoring at Cornell to further the study of school hygiene by making use of certain instruments of precision, not only for demonstration experiments in the classroom, but also for the prosecution of original investigation, for I believe it to be entirely possible for well-trained advanced students in the larger normal schools, normal colleges, and schools of education to make contributions of value in school hygiene.

As an example of what I have in mind, I have placed on exhibition here a typewritten report on the hygienic conditions of a

¹ The whole question of content and method in a course on school hygiene has been discussed by the writer in an article upon "The Instruction of Teachers in School Hygiene," *Pedagogical Seminary*, March, 1910, Vol. XVII., pp. 44-50.

school building.² This investigation embodies a thorough scientific examination of a single school building and unearths defects in site, playground arrangements, illumination, heating, ventilation, use of window shades, construction of urinals and closets, janitor service, and other important phases of sanitation. The air of the several classrooms was tested at three different levels or strata, under varying weather conditions, and after varying lengths of occupancy. In this work it was soon discovered that practically all of the so-called simplified methods for testing schoolroom air were unreliable, and that the Pettersson-Palmqvist apparatus was necessary for accurate results. We also tried and discarded a number of devices sold for schoolroom use in determining relative humidity, since we found these similarly unreliable—some of them, indeed, exhibiting errors of 40-50 per cent. when compared with the results obtained with the standardized form of whirling hygrometer with which all of our final determinations were made. The velocity of air-currents in heating and ventilating flues was tested carefully by anemometers similar to the instrument which I have before me today.

Naturally, no single piece of investigation like this one can pretend to solve the ventilation problem, even for the single school building in question, though we were able to recommend a number of improvements. There are numerous general principles involved in schoolroom ventilation, which are as yet unsettled and which offer a good field for research work, some of which may be undertaken by teachers in training classes.

To take another instance of the use of scientific instruments, the ordinary schoolroom tests of eyesight should be explained with care to the embryo teacher, but a little additional time spent in explaining a few refinements of method, particularly the use of simple test-lenses, will add appreciably to the value of the teacher's examination of the pupils.

When studying the problem of schoolroom lighting, we demonstrate the use of Weber's stereogoniometer (also exhibited today), and some of our advanced students are now working out modifications of Cohn's and other simple illuminometers which we hope will ultimately furnish a fairly reliable and inexpensive means for testing the illumination available at any school desk.

Finally, I may mention another attempt that I am making, with the aid of my students, to introduce greater exactness into certain phases of the work in school hygiene: I refer to a projected "score card" for school buildings, the idea being to arrange the scoring of the hygienic condition of a schoolhouse or schoolroom in a similar manner to the scoring of a dairy by the agricul-

² This report, prepared by Mr. W. A. McGown, under the writer's direction, will appear in the December, 1910, issue of the *Pedagogical Seminary*.

tural expert (a plan which, if I am not mistaken, had its inception at the Agricultural College of Cornell University). If this project is successful, we shall be able to rate the condition of any school building, down to the last detail, in quantitative terms, and we shall hope to accomplish an improvement in schoolhouse construction and sanitation comparable to the improvement in the condition of dairies that has followed the work of the milk expert and his score card.

In giving this brief account of the use of instruments of precision in our course in school hygiene, I would not be understood to imply that work with instruments of precision constitutes any very considerable part of the regular instruction of undergraduates, or that we intend in any sense to make experts in school architecture and sanitation of the rank and file of our teachers. On the contrary, the center of emphasis is, and must always be, the physical and mental health of the child himself.

DISCUSSION

Prof. C.-E. A. Winslow, Associate Professor of Biology, College of the City of New York and Curator of Public Health, American Museum of Natural History: Dr. Putnam has asked me to open the discussion of these papers, and then she has carefully pointed out that no one has a right to be heard who has not had practical experience in teaching teachers, which I have not. I think, however, from the standpoint of a practical sanitarian that teachers should have a fundamental training in bacteriology and sanitary science besides the usual courses in biology and physiology if they are going to take care of the young human bodies entrusted to their care. They should have first a course of some thirty hours in elementary bacteriology, the structure and physiology and mode of spread of bacteria for their own information, and because that subject is going to be introduced in the future into the schools in connection with hygiene or nature study. Second, there should be a course of approximately the same length on sanitary science or the general relation of the individual to his environment in regard to the spread of communicable disease. Third, should come a practical course such as has been so admirably described on the specific problems of hygiene and sanitation. This course should include inspection of school buildings, a study of the waste disposal system, the lighting, desks, etc., and particularly a discussion of the problems of ventilation. The use of the wet and dry bulb thermometer and of some method of determining the carbon dioxide in the air should be emphasized. In this connection I should like to call your attention to a report made a year ago on standard methods for the examination of air by the American Public Health Association which sets forth some of these methods in detail. If Dr. Putnam had given statistics of the schools where there was apparatus to determine humidity it would not have been a long list. It is the combination of saturation and temperature which has the worst physiological effect, and yet we have almost no information about the conditions which exist.

Such a course of study may sound Utopian; but Utopia is not so far off as it used to be. We have gone in the campaigns for public health about as far as we can without the help of the teachers in the public schools, and I can assure you the campaign for public health is not going to be stopped by over conservatism on the part of superintendents or other educational authorities. We are going to have training for the teachers to enable them to do their work properly; the way will be found, and the normal schools have got to be ready for it.

Perhaps the most encouraging feature of the whole convention has been the evidence presented this afternoon that some of the normal schools and teachers' colleges have made such splendid progress in solving their part of this problem.

The Chairman. Dirt and dust are two other important factors in school sanitation that also need standardizing. In connection with every normal school there is a practice school where normal theories are tested on children themselves. It is usually difficult to interest children profitably in the subject of cleanliness. We are so fortunate as to have here this afternoon Miss Moore, who is instructor in biology at the State Normal School at Trenton, New Jersey. She will tell us how she makes her pupils quite fascinated with the subject in a very practical way.

Miss Emmeline Moore, State Normal School, Trenton, N. J.: Every year I find in my class in biology students who are addicted to certain habits. Some of them suck the end of their pencil or pen when it is not in use. Others chew their finger nails at odd times or pick at an eruption of the skin. Still some others have habitually very dirty hands or carry about books with very dirty book covers. I think I may safely say that our teachers are vigilant above the average in attempting to check these difficulties, but they prevail in spite of the teachers in many cases. A good deal of discussion is given before the classes in biology of the possibilities of danger in the continuance of such practices, but during the year we find very frequent lapses into the old habits. The question that has always been raised is, What can we do to reduce the number of lapses?

I had the hearty co-operation of my class, the worst offenders as well as those who did not offend, in trying some experiments. The moisture-soaked, chewed end of a pencil was taken and drawn across the surface of agar and this was placed aside with a control. Thumb prints were made on the surface of agar in a petri dish. The girls I must confess, objected to presenting their thumbs for this experiment, but the boys vied with each other in presenting thumbs for the experiment. Pieces of soiled book covers were taken and with sterile forceps drawn across the surface of agar; bits of finger nails were taken from the students and cultures made from them; petri dishes were exposed in the corridors during the time the classes passed and before the classes assembled. Our floor was becoming somewhat splintery, so a splinter from the floor was taken and a culture made from it. The relation of germs to disease was illustrated in a highly imaginative way by a local Sunday newspaper, and it was suggested that some further experiments be undertaken. Other experiments followed, for example, a dirty dollar bill was drawn across the surface of agar. These cultures were put in a little dark closet off the laboratory, adjoining which there was a hot air flue giving a favorable temperature for growth.

I must confess that I was amazed at the enormous number and variety of flora that were produced by these experiments. The cultures produced from the soaked end of a pencil were taken to our State Bacteriologist for identification. He returned the report that most of the cultures were the common pus forming variety. A demonstration was given from the bacteria developed from the finger nails; microscopical examinations were made, with the result that the worst offender in chewing her finger nails kept steadily from it for six weeks. With the help of her associates, this summer she developed finger nails of passable length, but I am sorry to say that upon inquiry before I came here the finger nails were gone again. Clean book covers appeared in that class as if by magic. Altogether, the demonstrations served their purpose in not only emphasizing and giving force to the discussions on this subject, but in introducing into the discussions an element of reality, and of tangibility—an element very desirable I found in our campaign against dirt.

The Chairman: As was found in examining Miss Moore's cultures, the commonest organisms in dirt are pus forming ones. Disease-producing organisms, such as the bacilli of diphtheria and of tuberculosis, are rarely found in dust, being easily killed by drying and light. They are more likely to be found on the common drinking cup of the school. But dust invites tuberculosis and other germ diseases by the large quantity of **inorganic** material it contains along with the pus forming organisms. These minute particles irritate the respiratory passages, causing catarrhal conditions. Disease germs lodging on these congested surfaces find soil ready for their multiplication without normal hindrances. In this way our schools, with their dry overheated air and dust, invite germ diseases, especially tuberculosis.

The death rate from tuberculosis among teachers is above the average death rate from tuberculosis, and is higher than in any other profession. Between one-third and one-half of school children have tuberculosis, either latent or active. This fact is based on many thousands of autopsies where children have died of diphtheria or other causes, tuberculosis not being suspected; also on X-ray, tuberculin and other tests of delicate children. As vital statistics show, tuberculosis rates in childhood increase steadily through school years until in years of parenthood it is the commonest cause of death. This is an essential factor in infant mortality—the ill-health and the ignorance that schools do not **PREVENT** to the extent that is possible.

There was another good result following Miss Moore's study of which she told me. The janitor began to take notice when he found the cleanliness of the rooms was being studied by cultures and class discussions. Some educators have said to me, and perhaps they do not exaggerate, that janitors are ninety per cent. of the whole problem of school sanitation. Certainly there seems no right season for a government collecting all conditions of children in public buildings cared for by men wholly untrained in sanitary methods of housewifery and without even trained supervision.

Dr. C. O. Probst, Secretary State Board of Health, Columbus, Ohio: We have heard a good many papers at this meeting referring to the education of the public. You can scarcely attend any meeting that the question of "educating the public" does not come up. I think we fully realize the old adage that it is "hard to teach an old dog new tricks." It is very hard to educate the public along certain lines connected with health matters, and we naturally go back to the schools.

And this brings me to a matter I have in mind as to whether the teacher of today is going to be able to fill all that we expect of the public schools in teaching health matters. I am inclined to think that we must have a specialist, what I am inclined to call a school physician, who must be something more than a physician, who must have medical education and also special knowledge of the child. I do not conceive it possible for a public school teacher to recognize beginning cases of scarlet fever, diphtheria or other contagious diseases. If we want our children protected from these diseases there should be a daily inspection of the schools, and a school physician could accomplish much. Education has a three-fold object, not only to bring out the mental side, but the highest possible moral and physical development of the child, and I think a physician working along with the school teachers would bring greater results. I think the day will come when in every large school building in this country, along with the superintendent of the school, will be the school physician, devoting all his time and attention to looking after the physical welfare of the child, even to the extent of interrupting his studies when he thinks it is necessary for his health. So I believe that we must have still further progress. This public school education should go into questions of municipal, State and national hygiene.

A community is called to vote on a bond issue for water supply, and it will often be voted down year after year until possibly a severe scourge of typhoid fever teaches that community to put in a better water supply. If every child were thoroughly grounded in municipal, State and national hygiene and sanitation we should have great improvements along all health lines.

II. BY THE STUDY OF HOME MAKING

The Chairman, in introducing Professor Rose: Over forty years ago certain medical women in New England opened the first training school for nurses in America; opened it in their own hospital that has always ranked among our best, particularly in its maternity department and school for nurses. This is one of the greatest gifts of the nineteenth century to medical and social progress—women trained in the art of applying science to the restoration and maintenance of health, to guarding infant life and older life. About twenty years ago, again by New England women, one of the greatest contributions to our national system of free education was instituted. It is due very largely to college women that the science and art of making homes has been introduced in the curriculum of public schools. "Domestic science" in the grades, "home economics" in higher courses mean much more than the crude sewing, cookery, memorizing receipts that incapacity in the selection of teachers permits in some places. We shall hear today something of what the women who are fostering this instruction understand concerning home-makers' responsibility toward infancy, maturity and the nation.

EDUCATION AS A MEANS FOR PREVENTING INFANT MORTALITY

By Prof. FLORA ROSE, Department of Home Economics, Cornell University

The editor of one of the most widely circulated household journals once said, "In shaping the policy of my magazine, I have always kept in mind one woman who was to me the type whom I wished to help, and to whom I wished to appeal."

The Home Economics Department at Cornell University is building itself around a central idea, that of shaping conditions for the child, both in the home and, through the home in the community.

This work is being accomplished in several distinct ways. First and foremost through class-room instruction. It is the intention of the department to give to every student in the department specific instruction in those matters which vitally concern the habits and welfare of the next generation and to make it possible for a large number of students to receive this teaching. As the courses are now planned, any student registered in the university may obtain more or less instruction of this sort.

The following brief outline is suggestive of a part of the work which deals specifically with the child. As will be seen at once, such a course is based on a knowledge of biological and physical sciences, and of the principles of human nutrition. It is in point of fact given at the close of a course in human nutrition.

A brief outline of work as given by the Home Economics Department on the Child.

1. The cell, a comparative study of the vital powers of all living things.
2. The human being, a type of specialization—
 - Mortal and immortal body cells.
 - How nature secures variation in reproduction.
 - Heredity.
 - Environment.
3. The human family—
 - The father.
 - Possible influence, hereditary and environmental on child.
 - The training of fathers.
 - The mother—
 - Possible influence, hereditary and environmental on child.
 - The training of mothers.
 - The child—
 - Its source.
 - Care and feeding before birth.
 - Its birth.
 - Care and feeding during first year.
 - Care and feeding during childhood and youth.
 - Training and development.
4. The community—
 - The family, the unit of influence in the community.
 - Parenthood and race culture.
 - Social problems.

Many of the girls who leave the department become teachers of Home Economics, and when reinforced with this knowledge, they are enabled to accomplish incalculable good in their ability to direct the trend of public opinion. Many others, will go into their own homes carrying with them a changed point of view. What this point of view has become is illustrated by the following answers to the question: "In what way has this course impressed you most?" "It is impossible for me to tell, the impression has been so deep. I realize what my share in the coming

generations is and how this should enter into and influence every part of life." "The importance of knowledge in caring for the child." "This course has meant to me more than any work I have had in the university. I realize the fundamental importance of a knowledge of children and for the first time I look forward to having children of my own." And again, "I do not see how any woman would dare to undertake the care of children until she has had a course of this kind." The girls who gave the above answers were taking what we have entitled a Survey Course in Home Economics, because it includes in four hours a week through one year only a glimpse of the whole field with final emphasis given to the care of the child.

It is interesting to compare the attitude toward life of the Home Economics student and the "outside" student. In a course in house planning taught from the home standpoint by a woman architect deeply imbued with the Home Economics spirit a problem somewhat as follows was presented for solution:

"Given so much floor space make an economic plan for a house for a family of five persons, mother, father and three children, taking into account that the woman must do all her own work and care for the children."

The atmosphere became immediately charged. The "outside" girls regarded it as a personal problem and objected to the thought of any woman doing such a stupendous amount of work. To the Home Economics students it represented a situation which it was perfectly possible to shape in a satisfactory way should it ever present itself to them individually, and in the meanwhile the problem of planning a convenient house for the busy mother delighted them.

While classroom instruction is regarded as the most important part of the work done by the Department since it will ultimately be most far-reaching in its effects it is by no means the only work done.

As the Department is a State Institution one of its objects is to make it possible for every woman in New York State to obtain the knowledge necessary for more intelligent care of the family. This is accomplished through publications, exhibits and public lectures given in all parts of the State.

We have a kind of correspondence course called the Farmers' Wives' Reading Course, published under New York State appropriation in bulletin or leaflet form and sent free on application to residents of New York State. A question paper goes with each bulletin and the subscribers are asked to return answers and to ask questions if they wish. From the first these bulletins have been written in response to a demand which came in the form of letters and questions. They have treated in a simple

way such subjects as Household Sanitation, Bacteriology, Rural Schools, Nutrition, and Care of Children. The last bulletins on Care and Feeding of Children were written because requests such as these came from all over the State, "Give us some specific instruction as to how to care for our babies and children." "Tell us how to care for ourselves so that our babies may be born healthy and how to care for our babies so that they may attain healthy manhood and womanhood." No bulletins which we have sent out have met with such general interest as these, and in our trips through the State we find that they are doing a good work for the babies.

There are a great many opportunities for a department of a State institution to make exhibits. At the New York State College of Agriculture one of the chief of these is made at the college itself during what is known as the Homemakers Conference and Farmers Week. Last year one of our largest exhibits consisted of tables spread with typical dietaries to be served to children of different ages; illustrations and demonstrations showing ways of modifying milk and types of bottles and nipples. A trained nurse was put in charge. The room was a center of interest for the passing crowd of people all during one week. The comments were many and varied and a deep interest was shown by both men and women. The following episodes were typical of many others: A man going through the room stopped at one table showing the dietary suitable for a baby eighteen months old. In his arms he carried a sound, rosy cheeked year-and-a-half-old child, who belied any idea of poor feeding. His glance swept the table contemptuously. "Look here," he said, "this baby eats sausage and pancakes for breakfast every morning, and I'd like to see a healthier specimen." We had nothing to say in the face of such evidence and the time was too short to point out that the end was not yet. The second story is that of a woman who examined each food carefully and missed no word of the legends hung above the tables. When the crowd had thinned she went to the nurse and said, "If you had only started this thing five years ago I could have saved my babies. I realize now I have lost two children through sheer ignorance."

In spite of the progress of what we may call a new rationalism there still lingers in the minds of many intelligent persons a doubt as to the actual necessity of including the sort of training above outlined in the higher education of women. Not only its need has been doubted, but I have heard the fear expressed that girls would object to it. It is our experience that no work given in the university is more welcome or more enthusiastically received than that dealing with those subjects given under the head of Home Economics.

The Chairman: Some States are so fortunate as to have at the head of public education a university. Wisconsin is one of those States which enables instructors in the university to carry their ideals down into the public schools pretty effectually. Professor Marlatt will tell you of the work in that State.

"HUMANICS"

**By Prof. ABBY L. MARLATT, Department of Home Economics,
University of Wisconsin**

In any study of human conditions as affected by social forces there must be, as a foundation, a working knowledge of the laws of biologic science, hence what is called in the University of Wisconsin a course in "Humanics" is offered to students who have had general courses in chemistry, physics, biology, bacteriology, physiology, food chemistry and dietetics.

From study of the needs of woman in her attempt to solve some of the problems met in the making of a home and rearing of a family it seemed wise to focus in one course such discussion as might lead to a wiser understanding of the fundamental laws of heredity and environment, as typified in the human race.

Beginning with a review of the life processes involved in the division of the cell which forms from the unicellular parent the new organisms which continue in themselves the old without changes; through to the factors which enter into the complex cell life of the higher life forms, the forces which make for change are discussed.

Historic theories of heredity are read and modern data which have led to the re-discovery of Mendelian laws are discussed in their bearing on plants and lower animals. What data in history of the human race that bears upon these facts are studied without prejudice? Studies of Havelock Ellis, Galton, Pearson, medical and criminal records, all are bases for study in the huge problem of the germ-plasm as influenced by alcoholism, drug habits, insanity and the social evil on one side and so-called genius and "family" on the other.

The growth of the child after birth, the factors which help and hinder more nearly normal development with the comparative study of childhood in historic races are bases for discussion of infancy, its care and protection; childhood and its freedom from nervous strain of overwork; adolescence with its training

in that body of knowledge which shall lead to sane, normal physical and mental growth.

The effect of environment as typified in town vs. country life and their effect on physical and moral standards, emotional states and intellectual life is used as basis for a plea for return to suburban and country life for children. Educational theories and practice as shown in the United States, England, France and Germany are reviewed not from the point of view of the system but of the child so that the student may arrive at a basis for judgment in training the individual child so that he may best develop his own individuality in conformity to social demands.

The relation of the state to the problem of the family is studied under the topics infant mortality as affected by race, poverty, social evil, other diseases, woman in industry.

The methods used in this and other countries for saving babies are studied and the problem of the education of the ignorant or foreign in our own country so that there may be a reduction in infant mortality is discussed. The problem of pensioning expectant mothers and new mothers as in France so that they may be properly fed and nursed, the district nursing system, free milk depots and maternal clinics form part of the subject.

The housing problem as found in our large cities and attempts to remedy the evil and in a measure prevent its spread are important topics. Child labor with its evils; reforms necessary; institutional life with its death rate, and low physical standard; the cost of these to the country, lead to a discussion of what the home life should mean to the child, with its opportunity for growth in individuality, obedience, thoughtfulness, and development of the will in response to all that is best in inheritance and environment.

The central thought of the course is conservation of human life by improving individuals, homes, cities so that future generations may reach higher levels of efficiency than those preceding them have reached. One of the effects after one year of work is a vital interest in the study of inheritance and infant mortality which has led one graduate to take the study of the vital statistics of her own town for the past few years as the subject for a thesis for an advanced degree.

OUTLINE OF LECTURES ON HUMANICS

- I. Embryology
Development of the infant, with a study of cell division
- II. Theories of Inheritance
Physical basis of theories
Modern development of Mendelian law

- III. Effect on the germ-plasm of social diseases, alcoholism, and the drug habit
 - The inheritance of acquired characteristics
 - The effect of mental diseases in parents
- IV. Study of social evils and problem of education with regard to
 - V. Development of child after birth
 - Physical development
 - Mental development
 - Adolescence
 - Race characteristics
 - Effect of country life and town life on physical and mental development
- VI. Review of theories of education as applied to types of children
 - School statistics showing rate of growth in boys and girls
- VII. Emotional development
 - Education during adolescence
- VIII. Problems of city and State with reference to infant mortality
 - Effect of woman's industrial work on infant mortality
 - Study of laws of Europe and America as affecting woman in industry
 - Study of death statistics showing diseases and effect of the race on same
- IX. Civic efforts toward education of the foreign population of the poor and ignorant in the large American cities so as to reduce infant mortality
 - French system with reference to infant mortality
 - Pension system for mothers
 - Necessity for survey of cities
- X. Institutional life
 - Effect on death rate
 - Effect on physical development
 - Effect on mental development
 - Cost to the country
 - Remedies
- XI. Reduction of birth rate and effect on population
 - Duty of the educated in the preservation of the race
- XII. Child in industry
 - Effect upon State laws and necessary legislation
- XIII. Study of environment
- XIV. The housing problem
- XV. The education of the will with reference to environment
- XVI. Study of nervous states and their hygiene

DISCUSSION

The Chairman: One of the strongest and most efficient supporters of this movement for teaching home making has been the United States Department of Agriculture. We are glad that Dr. Charles Ford Langworthy represents the Department this afternoon.

Charles Ford Langworthy, Ph. D., Expert in Nutrition, Department of Agriculture: If the question should be raised as to the relation of nutrition investigations and other work in home economics to the prevention of infant mortality, it may be answered by recalling the fact that the mother must be well nourished if the child is to have a fair start. Furthermore, the mother must not be broken down by overwork as she easily may be if her household is not rightly managed. From the time the child is born the problem of nutrition is one of great importance throughout his whole life.

The Department of Agriculture considers that the study of nutrition is one of its functions, since all food products, both animal and vegetable, are primarily of agricultural origin, and surely the utilization of agricultural products is as important a feature as their production and their distribution. Another reason for the Department's interest in this work is found in the fact that a large proportion of the agricultural colleges, or, to give them their right name, the colleges of agriculture and mechanic arts, give courses in home economics, in most cases similar to the work which has been described in the papers by Miss Rose on the home economics work at Cornell and Miss Marlatt on the work of the home economics department, College of Agriculture, University of Wisconsin.

The nutrition investigations of the Office of Experiment Stations of the Department of Agriculture were instituted some twenty years ago by Professor Atwater and have had for their object the accumulation of data regarding the composition and nutritive value of American food materials, studies of the digestibility of foods of different sorts, effects of different methods of cooking on composition and nutritive value, the relative value of foods as sources of energy in the human body, and other related questions. An important feature of the work has been the preparation of technical bulletins reporting the results of investigations and popular summaries designed to present the results of experiment and research in such a way that they may be useful to the housekeeper and home maker. Some of these popular bulletins have to do with milk, with eggs, with cereal foods, with fruits, and with other common food materials. The care of food in the home and other topics which have to do with household management are also discussed. That the bulletins have proved useful and are appreciated by the people at large is shown by the numerous demands made for them by pupils in high schools and in colleges, by institution managers, and particularly by home makers.

In connection with the nutrition work of the Office of Experiment Stations a very valuable piece of apparatus has been elaborated, which is called the respiration calorimeter. With this instrument it is possible to measure with great accuracy the total income and outgo of matter and energy in the human body and to study many problems which have to do with the utilization of food and its value as a source of energy in the body, and other matters connected with the body considered as a machine. Though the method of experimenting is very technical, yet homely problems of everyday interest are studied as well as those which are more abstruse. For instance, at the present time studies are being made of the energy which the body expends in digesting cheese in comparison with meat, in order that something definite may be said regarding the ease of digestion of these two important foodstuffs.

With the methods already in use it would be possible to study many questions which have to do with the saving of labor in carrying on household tasks. Several bulletins of the Office of Experiment Stations contain data on such subjects. A house may be so planned and the necessary articles in the kitchen and other rooms so placed that the amount of walking which the housewife does is reduced to a minimum. This means that she is spared a considerable amount of unnecessary work. Labor-saving devices are as important in the home as on the farm, and those which experience has shown to be really worth while should be provided.

The lightening of her burdens by means of a well-equipped and hygienic house, by the use of household conveniences, and by the proper understanding and systematizing of home work means that the home maker is spared unnecessary labor to the benefit of her health and strength and that she and her family may have an opportunity for something besides the daily tasks which too often leave neither time nor inclination for other things.

With the knowledge which has been gained and made available regarding food and nutrition, and the information which it is expected will be accumulated regarding the energy questions which have to do with home life, the Department of Agriculture hopes that it may help to provide data of use in teaching mothers how they may so regulate their household duties that they are not overworked, while at the same time they provide their families with a wholesome and adequate diet.

III. BY THE STUDY OF BIOLOGIC SCIENCE

The Chairman: As some one said yesterday, to have decent homes we must eliminate poverty. All of the speakers this afternoon have mentioned an understanding of biology as fundamental in problems of sanitation and health. In one other essential for preventing infant mortality, popular understanding of biologic laws of sex and parenthood, admirable pioneer work is being done in a western normal college that should be developed in all normal institutions. We may consider ourselves fortunate that Professor Phelps has come to give us the details of her work.

BIOLOGIC TEACHING OF SEX

By Prof. JESSIE PHELPS, Michigan State Normal College

In answer to the question, "How is the Michigan State Normal College fitting its students to establish through the public schools better practices in hygiene and sanitation, and higher ideals of parenthood?" I have to say: "It is doing almost nothing." Our student body, like that of most colleges and normal schools, is not even aware of the existence of the problems of infant mortality and health conservation.

Our institution gives, however, three regular courses that must lead the students who enter them to a consideration of these matters. One is a brief twelve-lesson course in the Domestic Science and Art Department, called *Infant Diet*, based on Dr. Holt's "Care and Feeding of Children." It gives, among other things, directions for the care of the nursing mother, and actual practice in the preparation of children's dishes and the various modifications of milk. A movement is on foot to have a regularly trained visiting nurse who would, in addition to the oversight of our sick students, give a course to the domestic science women on the care of the pregnant mother and the newly born infant. The course in *General Hygiene* given in the Physiology Department deals with school and public hygiene, as well as personal hygiene, and much stress is put upon school sanitation. Hough and Sedgwick's "Hygiene of the Human Mechanism and Sanitation of Its Surroundings," supplemented by United

States Government and Michigan State Board of Health Bulletins, is used as text. The third course, *Special Physiology for Women*, or the physiology of sex and development, given in the Biological Department, is the one which I have been asked to describe you in some detail. In addition to these regular courses, mention should be made of the fact that the Kindergarten Department of our Training School is much alive to the needs of the child in the home, and through its mothers' meetings and house to house visitations, it is doing some most important educational work in instructing the mothers in the general care of their children.

This course, "Special Physiology for Women," offered by the Michigan State Normal College, is concerned, first, with the study of physiology and hygiene of sex; second, with the development of the human being from the ovarian egg to advanced adolescence; third, with the needs and methods of instructing children in some of the more fundamental biologic laws of life, and, fourth—since the whole matter of sex is by its very nature a social one—with such sociological questions as courtship, marriage, eugenics, heredity and prostitution. It will be seen that the course develops into the science of sociology. It is grounded in the science of biology. Such instruction, indeed, can hardly be given safely or sanely unless it has a broad scientific basis and a practical sociological application; its most worthy characteristic should be its reasonableness, its naturalness, and this can be true only when the facts of sex are left in their own biologic setting and given a real human significance. Nearly any detached fact is hideous—and the public has already viewed the facts of sex for too long a time in their separate and unrelated conditions. This course is an attempt to show relationships and to keep proportions.

We, therefore, begin with the primary principles of biology, and this introductory work has to occupy a considerable part of the entire course, since our students come to us with almost no high school work in zoology and rarely any in human physiology. It is a lamentable condition in our State, but in living up to, or down to, the university admission requirements most of the high schools offer no courses in physiology or hygiene. Only about 12 per cent. of the students in the Special Physiology classes have had any work in advanced physiology or zoology, most of which is taken after entering college. We must then treat of the nature of protoplasm, the cell theory, the maturation and fertilization of germ cells, and other similar topics in an elementary and careful manner.

Since the evolutionary way of presentation is the most natural, and, in fact, the only one which will enforce the idea of unity, we take up our series of animals and plants according to this order. Hereby we are able to insist, by our very method of procedure, upon both the laws of heredity and the potent influence of environment. Through all this introductory work the emphasis is kept upon the reproductive functions of the forms presented; and the problems of the origin of reproduction and of sex are, of course, raised.

By the time we reach the climax of the subject—human reproduction—three things have been accomplished. First, a biological setting or background has been made; second, a vocabulary has been established; and, third, the student's mind has been prepared to deal with this particular topic in a scientific, that is, a common-sense manner. The establishment of a working vocabulary is of no small account. I am more and more assured that it saves much embarrassment, as well as confusion of ideas, and strips the subject of the vulgarity which ordinarily clothes it.

Among the higher forms, introductory to the human subject, we study the anatomy and embryology of the rabbit and bird, teaching with considerable detail the arrangement, origin, and function of the fetal membranes and blood vessels, thus getting excellent material for comparative work later. Demonstrations are given throughout the course to illustrate every topic for which we can get material, and these are always supplemented by lantern slides, charts, and much reference reading. In connection with the mammalian work, small pregnant mammals, such as the rat and rabbit, and pregnant pig uteri are used; and one-to-four-day incubator chick embryos are shown in connection with the work on birds. No text is used.

In dealing with the human subject we pursue the same order of procedure, presenting first, by means of the manikin and charts, the anatomical features of both sexes, and then the physiological phases of the subject, including under this last, menstruation, fertilization, embryological development and birth. Dr. Jeanne Solis, of Ann Arbor, our near-by university town, has come each year to give a special lecture to the class on the subject of the hygiene of menstruation. The presence of a physician, I feel, gives added weight and sanction to the hygienic laws which have been presented.

Following the work on human physiology and hygiene there comes the necessary consideration of some of the pathological aspects of the subject. Such topics as masturbation, prostitution, and venereal diseases are handled frankly, but briefly since we wish to emphasize only the normal and the physiological. These

topics are of use mainly to lead the way to a consideration of the social relations of the sexes, and to show the need of applied hygiene. Courtship, marriage, home-keeping, dress, women's work, and the rights of children are touched upon. This last, the rights and education of the child, is, obviously, the one topic which makes the course of interest to a "Society for the Prevention of Infant Mortality." For, although we do not say much in regard to the dressing and feeding of babies, we do teach certain things of primary importance to their well-being, namely, the choice of fit fathers, the making of good and glad mothers, and the training of civic-minded teachers. In this connection methods of instructing children in the fundamentals of sex life are suggested. We advocate, first of all, telling a few of the facts of reproduction at a very early age—the earlier the better; certainly as soon as the child asks concerning the mystery of mysteries. And those children who never ask, we advise to be so environed—(and here the school can play an important part)—that they will be stimulated to ask, or seeing for themselves, will not need to ask. In any event, we hold that modern parents have as one of the chief duties the giving of such instruction; and that if up-to-date, functioning parents be lacking, the child has a right to demand teachers who will "make good."

Nature study in the schools offers a wonderful opportunity for instruction in sex, and vacation outings and recreation studies may be utilized easily and naturally. Parents and teachers need only be frank and willing to learn with the child. There is no reason why 5 and 6 year old children should not have charge, either at home or in the school, of pets, or some domestic animals which breed readily, such as rabbits, chickens, guinea pigs and canaries. Observational hives of bees are a source of great interest and information to the children in the fifth or sixth grades. The egg laying and the care of the young can be directly seen, and the marriage flight of the queen and the method of internal fertilization can be discussed in a perfectly impersonal way. Much other work of a similar nature is suggested to the students in special physiology, not forgetting, of course, the work with plants. Plant raising and breeding are urged, and lessons on heredity therewith emphasized. Much of such material can be utilized for composition work through the grades, even though regular nature study is not installed; in fact there is scarcely any material that the composition teacher can use which calls out so much original work, is so stimulating to interest and so easily checked as this. Our own Normal students have good preparation for conducting such work, if they have had the courses offered in nature study and the biological sciences. It goes without saying that all this work should be presented without excuse

or apology or hesitation, and with no more or less sentiment attached than to any other subject. The naturalness of the reproductive processes will be best emphasized by naturalness of method. There is little need of preaching or of making application. "Facts talk," because facts are the most potent things in the world. If a child is early and correctly taught he is much less likely, as we all know, to use vulgar language or indulge in wrong practices than he would otherwise be. The old method of letting a child alone in his life explorations has resulted usually in his finding, and that right early, only the distorted and untrue concerning matters of sex. The time has come to try a new method. We can scarcely make things worse.

In addition to this nature study in the lower grades, we advocate to the class that formal science lessons both in botany and zoology be given in the upper grades, and somewhere early in the adolescent period a little work in civics in order to awaken the dormant social conscience of the child. When we are all as much aware as we should be of our place in the social group and our responsibility to the race, we shall be more concerned about being good parents and raising fine children. I hold that if boys and girls, while the age of chivalry and romance is dawning, be made to have civic pride and take some active part in civic affairs, they will not only be kept out of mischief and prepared for adult citizenship, but they will find later an application for all their biologic knowledge. The biology and the history teachers need to work together.

For the sake of the home as well as the school, I urge upon the class the co-operation of teachers and parents. The young women are asked to find out what the parents are attempting, and then to devise ways and means to help them. The formation of parents' clubs is urged, in which the matter of instruction of children in sex and control of sex evils shall be discussed along with many other matters. The students are warned of the evils of isolated play, of masturbation, and of vulgar pictures and communications, and are told to deal with these matters at once and privately. They are likewise given specific instruction for the treatment of cases of masturbation among young school children.

In regard to the suggested high school work in biology—if botany and zoology have not been given in the seventh and eighth grades, I advise their being given in the first year of the high school course, and made compulsory for all students. The course in physiology and hygiene can best be given in the senior year of the high school after the work in chemistry and physics, and should include the dissection of a small mammal by each pupil, and the study of the general embryology of birds and mammals.

Toward the close of the course in special physiology, a few round table discussions are held, in which the young women earnestly take part, relating what they have seen in the school room among young children, and how they themselves were instructed in sex, and what they consider the proper attitude of lovers, married people, parents, and children. As much time as possible throughout the course is given to private personal conferences and weekly reports of readings are carefully inspected.

Following the lessons on human development, one hour—an informal, social one—is spent studying the copies of some of the more famous masterpieces which express the mother idea in art. We call this “Madonna Day.” I mention it only to show that all the weight of good science, good sense, and good art as well as personal influence, is thrown on the side of the rightness and duty of marriage and parenthood. The fear lest such a course turn our young women away from marriage is probably wholly unfounded. Its direct teaching would, I believe, do exactly the opposite.

It is almost too early to speak of the specific results of the course since it has been given only three years, and only 250 women have had its teaching. Perhaps the increase in the size of the class from year to year indicates the need that is felt for such work, and the way in which the course has been received. The first year 52 reported for credit and 23 as regular visitors; the second year 72 asked for credit; and last year three sections were formed for the 127 who enrolled regularly. The average age of the class members is 23½ years. Most of the young women have gone out to teach. A few have married. Many write me of what they are doing to instruct mothers and children. Some have established parents’ meetings, and all from whom I have recently heard—some 100—say that they are still glad of their training in sex physiology, and are finding constant use for it in the school and society, and have profited by it in the practice of better personal hygiene and saner social relations. They claim they are better guardians of children than they would otherwise be. It seems incontrovertable that a widespread understanding of biologic laws must be instrumental in the removal of many of the causes which produce infant mortality, and that it is bound to create a more healthful attitude toward marriage and parenthood, which means a deeper civic sense, a wider world consciousness, and a truer race pride—in a word, healthier, happier children.

BIOLOGIC SCIENCE AND HEALTH

WILLARD S. SMALL, Ph. D., Lecturer on Hygiene at George Washington University

I will take a minute of my time to comment upon certain important utterances of preceding speakers. As a practical school man, I wish to commend unreservedly the resolution reported by the chairman of this meeting. If this resolution could become operative in practice, it would work a revolution in the attitude of the teachers toward hygiene. I wish to endorse also the ideal that President Davis is making a reality in his normal school. It heartens me greatly to hear Dr. Whipple, whose first love is psychology, give to the school hygiene the precedence that belongs to it in the training of teachers. Finally, I would say, with respect to Dr. C. O. Probst's demand for a health officer, co-equal with other supervisory officers, in every public school system, that there is not an intelligent school administrator in the country who would not welcome joyfully such a dispensation.

And yet through all these papers there has been an undertone suggesting inadequacy, if not futility, of most of the attempts at instruction in school hygiene. I am minded to ask, as was asked by William Allen White in the case of Kansas, "What's the matter with school hygiene?" Briefly, the matter with school hygiene is this: as a subject of instruction in normal schools and colleges and teachers' institutes, sanitary engineering has been palmed off in the name of school hygiene. A subject matter over which in practice teachers can have little or no control and a point of view remote from the practical professional interests of teachers have rendered the courses in school hygiene relatively ineffective. School hygiene is a larger thing than sanitation. It is in fact an educational philosophy and touches every phase of school life. A systematic course in school hygiene must do three things: (1) Impress upon the prospective teacher the conviction that health is an important end in the educative process; (2) make clear to them the relation between normal human development and the various conditions, procedures, and practices that constitute the school environment; and (3) give them as adequate knowledge as possible of the means of properly controlling these factors.

Obviously such a course of instruction cannot be erected upon a foundation of quadratic equations, Latin declensions, or Burke's

orations. It can be erected only upon a foundation of biology, physiology, and genetic psychology. With respect to the normal school, at least, the practical question is: How and where may this foundation be laid? Professor Phelps in her admirable paper has shown that a large majority of those who take her course in sexology lack the essential foundations for the work and that a full half of the time of the course is devoted to laying these foundations. It is fairly obvious that in a two-year normal school course, it will be practically impossible to do all the foundation work necessary either for such a course as Prof. Phelps has outlined or for a treatment of school hygiene such as I am defending. By common practice, a reasonable amount of time is given to psychology in the normal schools. To make this effective as preparation for school hygiene, it requires only that the instruction in psychology be concrete and genetic. But for preparation in biology and physiology, we are forced back to the high school. This is no injustice to the high school.

There are two ways in which the high school may give effective preparation of the kind needed: (1) By the systematic study of biology; (2) through the instrumentality of the instruction in physical education. (Commonly known as physical culture or physical training.)

If I could issue an edict and enforce the same, every high school pupil would study biology at least one year, except those pupils who might be prevented by college entrance requirements. This exception would be merely concession to the God-of-things-as-they-are, not an admission that the exception should be made. If every state and city normal school would make this requirement, the high schools could and would respond.

I offer the following outline of the course in general biology given in the school of which I am principal, not as ideally perfect, but as a sample of what can easily be done in any reasonably well equipped city or town high school. Such a course cannot fail to give the student a conception of the solidarity of life and a foundation, both of knowledge and of method, for the subsequent study of physiology and hygiene, in both its personal and general applications.

The course covers thirty-six (36) weeks, six (6) periods a week; time is distributed as needed to recitation and laboratory exercises.

1. The course begins with type studies of insects and crayfish—animals tolerably familiar. Habitat, habits, life history and external structure of each animal are studied. The structure and functions of all systems of the crayfish are studied. Time 8 weeks.

2. This is followed by a brief study, two (2) weeks, of the simplest organisms. All the life processes before studies are seen to be performed by the one-cell animals.

3. Then follows a study of the biologic series through the fishes. This includes the sponge, hydroid, starfish, earthworm, clam, and perch. Each of these types is studied relative to adaptation of structure to life processes under increasingly complex conditions. Six (6) weeks. Laboratory method.

4. A brief comparative study of human physiology occupies four (4) weeks. The digestive, excretory, circulatory, respiratory and nervous systems are studied by use of charts, models, texts and specimens of organs when practicable.

5. The course concludes with twelve (12) weeks plant biology.

Likewise I would issue an edict, had I the power, requiring systematic work in physical education of all pupils in all high schools. The teacher of physical training and gymnastics, if competent, is the most effective because the most intimate teacher of personal hygiene. The physical examination and the conduct of physical exercises give occasion and opportunity for instruction in every important aspect of hygiene both personal and general. The harvest from this field is rich for the high-minded and adequately prepared teacher. The need is equally great for boys and girls.

Summary. 1. Improvement of health conditions through the agency of the schools depends upon the adequate training of teachers both in personal and school hygiene. (In addition to proper sanitary engineering in schoolhouse construction.)

2. For this instruction, the normal school must build upon the foundations laid in the high schools.

3. These foundations should be twofold: (1) Systematic instruction in general biology; (2) training for health in the department of physical education.

THE USE OF BIOLOGIC STUDIES IN THE TRAINING OF TEACHERS FOR THE PREVENTION OF INFANT MORTALITY

By **LEWELLYS F. BARKER, M. D.**, Baltimore, Professor of Medicine, the Johns Hopkins University, and Physician-in-Chief to the Johns Hopkins Hospital

The advantages of a training in biology for the teacher who desires to do something toward educating children in matters of hygiene are manifold. A large proportion of our teachers are unmarried women, who, owing to the abnormal reticence which is maintained on biological subjects, especially regarding matters of sex, are largely ignorant of much which they should know if they are to instruct young people in the laws of life and to instill into them ideals which will raise the standards of marriage and parenthood.

To many a woman teacher a course in microscopic botany has come as a revelation. The healthiest mode of approach to biological questions and to the phenomena of sex is through the study of plant and animal life. The two great factors of life, heredity and environment, can here be brought before the student in a wholly unobjectionable way and the analogy of human life is so obvious that the principles learned will almost surely be transferred in due time by the learner to the human domain.

The courses in biology should not consist wholly of lectures, but should include practical and experimental work. Observation and experiment even if limited to a few fundamental points will be far more fruitful than a long course of didactic lectures. Let the teacher-to-be observe for herself the influence of external conditions in causing changes in the structures of plants and animals, let her note the response of the living substances to heat, light, oxygen, food-substances, poisons, and infectious agents and she will quickly realize the importance of a well regulated environment for the welfare of human life. Again, let her study pollen and ovule microscopically, observe the process of plant fertilization, and the development of the plant embryo, or permit her to watch frogs' eggs, fish eggs, and hens' eggs, and to follow the embryos through their various stages, and you have chosen the easiest way to initiate her normally and without shock into a knowledge of the mysteries of

sex, of impregnation and conception, of birth and development. If the course can be extended so as to include illustrations of experimental hybridizing so much the better; observation of the effects of hybridizing in sweet peas or in some colonies of mice will quickly open the mind to the significance of heredity and, surely, nothing is more likely to awaken the conscience to the duty and privilege of the human race of improving the quality of children born than some acquaintance with the laws of heredity and especially with the rules of the Abbot Gregor Mendel regarding the inheritance of particular qualities.

A teacher thus trained in biology will be able intelligently to instruct her pupils as to the importance of personal and public hygiene for the good of society, and she will do much, though often in an indirect way, to make it clear to children that the future of the race depends upon the quality of the children born and the quality of the children born depends upon the inherent qualities of their parents. If the teachers in our schools knew that drunkards, lunatics, idiots, prostitutes, and habitual criminals are such because in the majority of instances they have been born with defective nervous systems and if they knew that such drunkards, lunatics, idiots, prostitutes, and habitual criminals are more likely to breed their kind than to have healthy off-spring we should have taken a large step forward in that education of public opinion which will be necessary before we can pass laws which will prohibit parenthood to the notoriously unfit. If these same teachers knew that a family record of "good stock" on the husband's side and a family record of "good stock" on the wife's side is the best guarantee for the birth of physically, mentally and morally healthy children, they could do much toward the development of that sane opinion about marriage which those of us who have the good of the people at heart hope may soon displace the abnormal ideas now prevalent in the matter not only among young people but among the parents who should know and teach their children better.

The Chairman: Dr. Barker mentions only the need of instructing women teachers in biologic laws. All these educational efforts we are considering for health and for homes reach girls and women more than boys, or than men who alone are the lawmakers and the law enforcers in all but five States. Wholesome scientific instruction is not needed **less** by voters than by non-voters. One of the greatest hindrances to the efforts for putting hygiene and home-making, with their auxiliary sciences, biology, physics, and chemistry, on an effective basis in popular education is the lack of intelligent comprehension on the part of those in control whose training has been narrowly

academic or classic, excluding the biologic sciences. The unsanitariness of schools is due to the same inefficiency in making practical use of elementary sciences. We should advocate special effort to have men who do school work taught social and personal biologic laws, and, in public schools, to have boys receive in home-making ideals something comparable to what girls have, that men on their side may be good home makers.

The chairman requested Professor Wright, representative of the Mechanics Institute at Rochester, to tell of his work.

Prof. J. H. Wright, Rochester: I have been much interested in hearing these papers, but feel that I have nothing to add at this time. I came down to find out what is being done in this work, what is needed in our work in which we are trying to train home-makers and teachers of domestic science. We are attempting to do some of these things in a very crude way, I will admit, but we hope to turn out a body of young women who will go on with the work.

The Chairman put to vote the resolution presented in her address. It was unanimously endorsed as follows:

Healthy parents, right customs and wholesome environment being essential factors in preventing infant mortality, be it

RESOLVED, That the American Association for Study and Prevention of Infant Mortality urge that boards licensing teachers for public schools give as detailed tests in elementary hygiene, sanitation and biology as in mathematics and languages.¹

¹ Later it was unanimously adopted in the general business session of the Association.

AMERICAN ASSOCIATION FOR STUDY AND PREVENTION
OF INFANT MORTALITY
AFFILIATED SOCIETIES
REPORTS

BABIES' DISPENSARY AND HOSPITAL,

The work of the past year has been characterized by an extension of the branch dispensary system; a campaign of education for the reduction of infant mortality, especially emphasized during the summer months; a serious attempt at the solution of our milk problem, and a gradual growth of the dispensary in all of its departments. Our problems have had to do largely with the details of everyday dispensary life, rather than with fundamental policies. The brunt of the details has fallen upon the physicians in the dispensary and upon the Superintendent of Nurses, with her corps of hardworking, painstaking nurses.

The growth in the Central Dispensary has been paralleled by growth and interest in the Branches. Last summer, following the general plan of the summer before, two additional Branch Dispensaries were opened, making a total of six branches. Here, of course, the work was largely prophylactic. Consultations between physicians, nurses, mothers and older children became a prominent part of the plan. While the attendance at some of the branches was not as large as desired, it was nevertheless felt that the general scheme was admirable to meet the needs of many mothers in districts too far from the Central Dispensary and to attract those with well babies, who simply needed intelligent direction and encouragement. It has therefore been deemed best to continue the six branch dispensaries throughout the year.

During the summer months a municipal campaign for the reduction of infantile mortality was planned on broad lines, attempting to draw into co-operation all organizations interested in the welfare of babies. The organization was effected with a Medical Director and a corps of attending physicians and nurses for the Central and Branch Dispensaries. An advisory committee constituted as follows gave valuable counsel: (1) The Director of Public Health and Sanitation. (2) Member of the Committee on Public Health and Sanitation of the Cleveland Chamber of Commerce. (3) The Director of Schools. (4) the Secretary of the Milk Commission. (5) A member from the Medical Board of the Babies' Dispensary and Hospital. (6) A member of the Women's Board. The Board of Education allowed the use of a room in the Broadway and Kinsman Schools during the summer. The Board of Health assisted in many ways to make the summer work successful. Through its influence the services of four Visiting Nurses were made possible. Perhaps the greatest problem last summer, as all through the year, has been the milk. The Babies' Dispensary has endeavored to control and distribute a clean, pure, tuberculosis-free milk to as many needy babies as possible. This has been effected through the co-operation of Messrs. Bellamy and Ganderton at Bedford, who have received every suggestion for bettering conditions at the farm with favor, and have carried out many improvements during the year. Milk has been distributed from the Central Dispensary and

from six Branch Dispensaries, to fifty-three milk stations on two routes, to all the day nurseries and kindergartens, a few of the boarding homes for babies, to settlement houses and three general hospitals.

The educational propaganda of the Dispensary has been carried out by consultations in the dispensaries by physicians and nurses with mothers and older children, by follow-up work, and practical demonstrations in the homes by Dispensary Visiting Nurses; by a course of illustrated lectures, given in the public schools, to mothers clubs, and by newspaper publicity.

From October 1, 1909, to October 1, 1910, there were 13,437 births in the City of Cleveland. During this period, exclusive of stillbirths, 2,016 babies under one year of age were recorded on the death reports. This gives a mortality rate of 150.0 per 1,000, or 15 per cent, a rate about 1.6 per cent higher than for the corresponding period of last year.

Total number of new patients at the Babies' Dispensary and Hospital from October 1, 1909, to October 1, 1910, was 1,338. Total deaths 140, 27 under direct care, and 113 under outside care. Total death rate for the Dispensary, 7.6 per cent. Lowering of the death rate from last year of 1.2 per cent. In the city as a whole, there was an increase of 1.6 per cent in the infant mortality. While the decrease of 1.2 per cent at the Babies' Dispensary and Hospital can be attributed to many factors, it is believed that the character of the milk supply was one of the most important.

The principal features of the Babies' Dispensary and Hospital are:
A Central Dispensary, six Branch Dispensaries, and an Out Door Ward.

A medical director, four physicians, and one out physician, on duty at the Central Dispensary.

Eight physicians on duty at the Branch Dispensaries.

One superintendent and six graduate nurses on duty at the Dispensaries.

Four graduate nurses, one nursery maid and a wet nurse on duty during the summer months at the Out Door Ward.

One milk laboratory with fifty-three distributing stations.

Total number of gallons of milk delivered.....	32,610
Number of bottles of milk.....	37,451
Number of baskets modified milk.....	4,966
Total number of new cases.....	1,837
Total attendance	10,285
Number of visits to homes by nurses.....	18,392

The Dispensary co-operates with all charitable institutions in the city.

THE BABIES' HOSPITAL, Newark, N. J.

The Babies' Hospital Milk Dispensary is conducted by the Hospital as a part of its medical service. The Babies' Hospital is a charitable institution designed for the sick infants of the poor, is under nonsectarian management and attempts to fulfill the following objects:

First—To provide a place for the care and treatment of sick infants who are otherwise without medical attendance.

Second—To establish a school for the training of intelligent caretakers for the children of the better classes.

Third—To furnish to the poor suitable food for their infants at cost and free to those who are destitute.

Fourth—To confer a public benefit through opportunities offered to physicians to add to their knowledge of the diseases of infancy. The hospital maintains thirty beds with an active service to children under three years of age. A medical clinic is conducted in the hospital for out-patients and this service is extended to include consultations for the instruction of mothers with nurslings or sick infants.

A part of the medical work consists in the maintenance of a milk dispensary in the hospital building where modified milk, suitable for infants and young children, is distributed to the poor, with printed instructions on infant hygiene. The milk, adjusted to the needs and digestion of the various classes of infants, is put up in separate nursing bottles each containing one feeding and is sealed and prepared so that it will keep without ice. One day's supply is furnished to the mother or messenger sent to the dispensary for it.

In addition the hospital maintains four distributing stations beside the one at the hospital where members of the Medical Staff conduct weekly consultations for mothers with nursing and sick infants. A daily distribution of the infant's milk is made at these substations by means of a wagon which conveys the milk to the stations where a nurse distributes it.

Through the assistance of a committee of women, trained nurses are employed to assist the physicians at the consultations, to make records of the individual patients and to visit the mothers of the dispensary patients in their homes to help them understand the instructions of the physicians and to teach infant hygiene.

The worthiness of each milk case is determined through the order signed by a physician or some responsible person who knows the applicant. Only those who are poor are allowed to use the dispensary or obtain advice at the consultations.

The objects of the milk dispensary and consultations are:

First—To continue to furnish good milk to infants leaving the hospital.

Second—To provide suitable milk for sick infants brought by mothers to the hospital clinics or consultations.

Third—To conduct consultations for the instruction of mothers with nurslings and supplement their failure with good milk when necessary.

Fourth—To maintain visiting nurses to gather statistics, give instructions in the proper use of milk and teach infant hygiene in the home.

This work is being accomplished as follows:

(a). **Educational.** The nurses attempt to visit each patient at its home once every month. Instruction is given to the mother or messenger from time to time as they come to the station for the milk. A printed pamphlet on "The Care of the Baby," including all the features of hygiene, is distributed gratuitously to the beneficiaries of the charity. The physicians carry on an active educational program in their conferences with the mothers who bring their infants to the stations every one or two weeks for examination.

(b). **Preventive and remedial.** This work is limited to the activities of the milk dispensary and consultations. No milk is distributed to the mothers for their personal use, but verbal instruction is given to them by the physicians on maternal feeding.

(c). **Medical and nursing supervision.** This is fulfilled by the consultations, by the visits of the nurses to the home and by the weekly meetings at the clinic which is a starting point for the educational work of the charity.

(d). **Statistical.** The number of infants reached by the Babies' Hospital last year (1909) was two thousand five hundred and seventy-three (2,573). This included all patients treated in the hospital and at the consultations including the nursing infants. Accurate mortality statistics have been determined concerning the infants who were fed on dispensary milk and represent the class known as the tenement house infant. The city mortality among the infants under three years years of age is 26 per cent. of the total deaths, or 10 per cent. of the total births. The mortality among the five hundred and sixty-eight (568) infants (under three years of age) fed through the dispensary during the past year was 2.7 per cent.

(e). **Social.** There has been a distinct improvement in the home conditions of the dispensary patients through the periodical visitation of the nurses who encourage the mother and, by suggestions and practical assistance, frequently revolutionize the management and care of the infant in its home.

The medical service is about to inaugurate a system which will determine the influence of this philanthropic work upon the hygiene, the management and care and the reduction of morbidity and mortality among this class of infants.

THE BABIES' MILK FUND ASSOCIATION OF LOUISVILLE, KY.

The Babies' Milk Fund Association of Louisville, Ky., began operations for the current year on May 3, 1910, by the establishment of seven distributing station. These depots were operated continuously throughout the season until October 1, when all but one were discontinued, partly because of insufficient funds and partly because of our success in the teaching and inauguration of home modification with a large percentage of our patrons.

The work for the year has been eminently successful and the result most gratifying. We have increased our clientage 100 per cent., materially decreased the death-rate as compared with that of the city at large, and have made decided improvement along educational lines in regard to infant hygiene, preparation of food and feeding, and personal and home cleanliness.

The policy of the Association in accomplishing these results has been as follows:

First—Educational. Weekly clinics were conducted by competent physicians at each station, all of which the mothers and neighbors were encouraged to attend. Here infants were examined and weighed, histories taken, and food prescribed or changed as indicated.

Practical talks on infant hygiene and feeding were given at these meetings, and mothers' meetings were held at each station monthly where lectures were given on specific subjects relating to care and feeding and home surroundings.

In addition to this, the supervising nurse gave frequent lessons and demonstrations in regard to home modifications, which were continued in the individual homes.

Pamphlets on the care and feeding of infants were also generally distributed.

Second—Preparation and distribution. All milk, whole as well as modified, was prepared in the Association laboratory according to physicians' prescriptions and sent at a regular hour daily to the trained nurse in charge of each station for individual distribution. This laboratory is in charge of a laboratory nurse and two assistants. Both the nurses and the management of the laboratory were under the control of the supervising nurse and the chairman of the Medical Committee. Whole milk was supplied to mothers in half pints or multiples thereof, where indications justified it.

Weekly bacterial counts were made of the whole milk and various modifications taken from the stock prepared for daily consumption. These counts were especially gratifying, the maximum being under 22,000, and the great majority running under 8,000.

The milk sugar was also frequently examined in order to prevent contamination from this source. Constant vigilance was observed as to the icing, both to and from the distributing centers and where necessary, Hess refrigerators were supplied in the homes. And lastly, constant effort was made to minimize the handling of our products.

Third—Medical and nurse supervision. Competent physicians were in weekly attendance at each station and made more frequent house visits where the severity of the case demanded. The station nurses were subject to the order of these physicians, and carried out such directions as were given, daily or oftener, and for as long a period as was necessary.

These nurses were under the immediate control of the supervising nurse and kept a daily hour at their respective stations for purposes of distribution and enrollment. They also had a weekly hour of class instruction in regard to matters pertaining to their work which was conducted by the supervisor. The rest of their time was spent in house to house visiting, home instruction, and relief nursing at the direction of the staff or neighborhood physicians.

Also a volunteer board of women visitors was maintained who did follow-up and relief work.

Fourth—Social. A systematic effort was made by the nurses and workers to teach and maintain proper methods of caring for and preparing food, cleanliness of house and person, destruction of flies, ventilation, and simple rules of general prophylaxis.

Fifth—Statistical.

Total number of children registered May to October.....	558
The number under one year of age.....	236
The number over one year, up to five years.....	322
The number of physicians represented.....	120
Visits by Association nurses.....	4,952
Number of bottles of modified milk.....	117,257
Number of bottles of whole milk.....	23,343

The total number of deaths for the season was seventeen, two of which were surgical and three occurred in less than thirty-six hours after being first seen. This makes the death rate 3.04 per cent. for the whole 558 children registered. The death rate for children under one year of age is less than half that averaged by the city at large during the last five years.

**CERTIFIED MILK FUND AND BABY HYGIENE COMMITTEE,
CALIFORNIA BRANCH ASSOCIATION OF
COLLEGIATE ALUMNAE,
San Francisco**

The Committee was formed in 1908, for the purpose of securing certified milk for the boarded out babies under the care of the Associated Charities. Educational work among the foster mothers was begun immediately. Medical care, with weekly clinics, was organized by Dr. Adelaide Brown, and the services of a corps of physicians and of a visiting nurse were secured. Each baby is under the special care of one of the physicians and is brought to the clinic at least twice a month for examination. The medical advice given to the foster mother at the clinics is followed up by the work of the visiting nurse, by whom the modification and care of milk are taught in the homes.

One of the most interesting developments of the Baby Clinic Day has been the establishment of neighborhood Baby Hygiene Centers, for the benefit of young untrained mothers, who have come without invitation to the clinics, to seek advice for their own babies.

Number of babies on Certified Milk, Oct. 1909-Oct. 20, 1910.....151

Average attendance at Clinic, Mch. 3, 1910-Oct. 13, 1910..... 17

Average gain in weight per month, 1 lb. 4½ oz.

Average gain in weight per week, 4 oz.

CITY MORTALITY FOR YEAR ENDING JUNE 20, 1910.

Under one year.....	723
Total number of deaths for year.....	6,518
Infant mortality, per cent.....	11.09
Mortality among babies under care of Committee, per cent.....	.8

**CHILDREN'S AID ASSOCIATION,
Indianapolis**

Brief Statement Concerning Milk Work of Season 1910

Milk. Purchased in bulk from Springdale Farms at Fisher's Station, Ind., at \$3.25 per hundred weight on contract that milk should never have bacterial count of more than 10,000 C. C. This cost of \$3.25 per hundred weight, plus ice, service and freight made the cost per gallon approximately 42 cents. Total cost for the season \$2,002.58.

Laboratory. Laboratory maintained at the farm under supervision of chemist, graduate of Purdue. Modifications were made on prescription of the physician and distributed to specially sick babies. Two thousand six hundred and sixty-six modifications were made during the summer at a total cost of \$460.05, making the average cost of each modification .172.

Stations. Five stations were maintained under the supervision of five physicians. Three of the larger stations had a nurse each, the other two stations were under the supervision of a nurse with an assistant. Sickly babies were brought to the stations by their mothers and examined by the physicians who made prescriptions according to the needs of the babies. The examination of the physician was repeated each week and such changes in the feedings as were necessary were made. Some member of the family came each morning to the station and got the milk for the babe. The nurse was at the stations in the mornings to consult with and advise the

mothers and the remainder of the day she spent in visiting the sick children at their homes. 324 babies were registered during the season and 15,993 feedings were distributed and 2,305 professional visits were made. The total cost of maintaining the five stations was \$1,027.07.

Miscellaneous. Added to the cost of milk, \$2,022.68; laboratory, \$460.05; stations, \$1,027.07, was a miscellaneous cost for printing, stationery, postage, telegrams and telephone messages of \$210.45, making a total cost for the season of \$3,700.15. This total cost does not include the value of services and materials given without charge, such as transportation of milk from railroad depot to the stations by the Overland Automobile Company (the value of services about \$500.00) of ice contributed to the various stations by various ice companies at a value of \$210.00 and a few similar items to the value of \$35.00. Services of the physicians at the stations were also given without charge.

**THE CHILDREN'S AID SOCIETY OF PENNSYLVANIA,
Philadelphia**

(a). Educational. Through our department for destitute mothers with infants an effort is made to provide for the instruction of such mothers in infant hygiene and infant feeding. Some literature is distributed, but we do not have any classes for mothers. The Society joins with other agencies from time to time in general movements in the community having for one of their objects the education of mothers in the care of infants.

(b). Preventive and remedial. We do not conduct milk dispensaries nor undertake the distribution of milk for mothers and babies, but to some extent, our educational work is conducted along lines which are both preventive and remedial in their ultimate effect.

(c). Medical and nursing supervision. In the case of mothers with infants applying to our Society consultation by physicians and nurses is practically always secured. We do not undertake follow-up work in the homes by nurses, but our own visitors do some work along this line.

(d). Statistical. During the year 1909 our department for mothers with children placed 437, each with one child. In addition to this we received fifty children in our boarding-out department who were cared for apart from their mothers, being placed at board in private families.

Of the fifty babies (received during 1909 under two years of age) we lost by death during the same year a total of seven.

(e). Social. The Society seeks in various ways to improve the home conditions under which the children live, but this is usually in co-operation with other agencies.

(f). Child caring. The Children's Aid Society of Pennsylvania does everything possible to prevent separation of young infants from their mothers and has developed a special department to care for widows, deserted wives, and unfortunate mothers with infants. For children of mothers physically or morally unfit to properly care for them and for foundlings, and babies whose mothers have died, the Society maintains a boarding out department, making use of private families, usually in the country. These homes are selected with

special reference to the fitness of the foster mother for the care of an infant. However, the selection of the home and the visitation of the child after placement is done by the regular visitors of the Society and not by trained nurses.

**CHRISTIAN SERVICE LEAGUE OF AMERICA,
Wichita, Kansas**

One hundred and eighteen babies under one year of age have been cared for, in private or in temporary homes by the League, during the past three years. The League has started to build a model nursery for babies. The organization employs five secretaries and field workers.

**COMMITTEE ON INFANT SOCIAL SERVICE,
Boston**

The Committee on Infant Social Service of the Women's Municipal League has for a year and a half employed a nurse whose whole time is devoted to the care of pregnant women. This work was begun as an experiment to see if the efficiency of the next generation could be improved by care from its very beginning. The work is not intended to be charitable, but entirely educational in its aim, and the women have been simply visited and advised as any patient is advised by her private physician.

The average length of time that the women have been under the care of the League is less than three months. In some cases it has been six, seven or even eight months; under the latter circumstances of course much more can be accomplished.

In the year and a half the nurse has cared for over six hundred women. Each case has been visited once a week, or at the latest once in ten days, with the exception of a few women living rather far away who were in good health, in such cases sometimes a fortnight has elapsed between the visits. If anything was wrong with any patient the visits have been made as frequently as was necessary even if that proved to be every day.

The system is a very simple one. The nurse calls in the morning at the hospitals and is given the names of the patients who have registered since her last visit; especially those to be taken in as house patients. She then goes to see them in their homes, explains her work and makes friends with them, and arranges to visit them during the coming week.

No responsibility is taken by the nurse beyond the simplest prescriptions; plenty of water both inside and out, fresh air, rest when possible, not too hard work, and if necessary cascara, nothing more. If the difficulties of the patient do not yield to these measures, she is sent to a hospital or dispensary for treatment. More than half of the women have needed advice and have markedly improved under the nurse's care, and about 8 1-3 per cent. of the cases have shown symptoms of serious illness, mostly eclampsia. Forty-seven have been threatened with this disease, some few cases which were sufficiently dangerous to require a stay of some days at the hospital, the majority, however, were treated at home, and in no case has the disease developed, with the exception of one woman, who, though referred to us, refused to be visited.

Three miscarriages only have occurred, and we have had no deaths to record during the whole period. Six women have already come back to us for the second time, one of whom notified our nurse months before she registered at the hospital.

The expenses of the work are limited to the nurse's salary and car-fares and are covered by \$1,150 a year, making an expense per patient of a trifle under \$3.00. The women are encouraged to pay this sum, as the committee believe that it is much better for them and for the future of the work that they should do so whenever possible.

In conclusion attention may be called to three things:

First—That whereas about eight per cent. of the pregnant women were threatened with eclampsia, in no case did the disease develop; indicating that care during pregnancy greatly lessens its dangers.

Second—That the average birth weight of the babies whose mothers were cared for was seven pounds ten ounces, which is ten ounces above the general average birth weight as given by Williams.

Third—That the cost of accomplishing these results is a trifle under \$3.00 per patient.

COMMITTEE ON PREVENTION OF BLINDNESS OF THE NEW YORK ASSOCIATION FOR THE BLIND

The work of the Committee on Prevention of Blindness during the year ending November 1, 1910, has, like that of the preceding year, been almost entirely educational, co-operative and legislative.

The educational work has been carried on by means of the publication and distribution of literature, public speaking, photographic exhibits, lantern slides, and through magazine articles and the press. Thirty-one thousand two hundred and forty-seven of the committee's publications have been distributed during the year. These have been sent into every State of the Union, and to many European countries.

Through the courtesy of the New York School of Philanthropy, the committee was enabled, during the winter of 1909-10, to carry on investigations and gather information regarding the relation of social conditions to the occurrence of ophthalmia neonatorum, this being one phase of the field work done by students in the school. Assistance in this connection was very kindly given by the New York Eye and Ear Infirmary, the New York Ophthalmic and Aural Hospital, the Manhattan Eye, Ear and Throat Hospital, and Bellevue and Allied Hospitals.

The committee made investigations during the year relating to the existing provisions in hospitals in and about New York city for the reception and care of patients suffering from ophthalmia neonatorum. It was found that there were eight hospitals to which patients with ophthalmia neonatorum may be admitted. There are several dispensaries at which patients may be seen and treated daily, and where directions are given for treatment at home, which are always imperfectly carried out, and a certain number of eyes lost as a result.

The executive secretary, on behalf of the committee, while abroad last summer, went to London for the purpose of investigating the English method of educating, licensing and controlling midwives.

Women engaged in this profession in England are required: 1. To take a course in midwifery in a training school sanctioned by the Central Midwives Board, which was appointed by an Act of Parliament in 1902. 2. To pass the examination given by the Central Midwives Board, and to present certificates of their good moral character.

3. To be registered and licensed by the Board after examination.
4. To conform to the rules and regulations formulated by the Board, pertaining to the details of their work and equipment so long as they practice.

These regulations are enforced by Local Supervising Authorities, and in London there are midwife inspectors who devote their entire time to the inspection of these women, their homes, work and equipment.

The purpose of midwifery control in England is to prevent unnecessary infant blindness, mortality, and physical degeneration, and unnecessary death and invalidism among the mothers.

DEPARTMENT OF HEALTH, BALTIMORE

A special effort has been made by the Commissioner of Health to secure better enforcement of the birth registration laws. As a means of insuring prompter and more complete returns, the department has issued a physician's memorandum book, of convenient size, containing blanks for all necessary data for birth or death certificates.

DEPARTMENT OF HEALTH, ROCHESTER

The city maintains its own milk stations. The milk dispensed is produced on a farm leased and operated during the summer months under the direction of the Health Bureau. Clean milk, properly modified, is supplied in nursing bottles for babies who are sick or cannot nurse, at a cost of from one to two cents a bottle.

Five stations were in operation during July and August, each under the charge of a trained nurse. In addition the Bureau employed five visiting nurses, who instructed the mothers in their homes, or if necessary gave nursing care for sick children. Useful advice and suggestions relating to the care and feeding of infants were given to the mothers by the nurses in charge of the milk stations. Literature on the care of babies in hot weather was distributed. Of the 538 children under the care of the nurses, only 12 died.

HULL HOUSE, Chicago, Ill.

Hull House co-operates with the United Charities and Board of Health of Chicago in their infant welfare work.

THE INSTRUCTIVE DISTRICT NURSING ASSOCIATION, Columbus, Ohio

The Babies Dispensary and Milk Station of Columbus was established in February, 1908. This was the first organized effort along the line for the Study and Prevention of Infant Mortality in this city. In June of 1908 it was merged with The Instructive District Nursing Association and is now entirely under the management of this organization.

The work being done is along the following lines:

Educational: Mothers are visited and instructed by the Visiting Nurses as to the care and feeding of infants.

During the present year several thousand circulars have been distributed, these circulars giving instructions in hygiene and the care and feeding of infants.

Prevention and Remedial: Milk dispensaries are maintained, where certified milk—modified or whole may be obtained at a moderate cost and whenever necessary, free of charge. The milk is modified at a central station and delivered at eight substations. Milk is supplied thus for infants only, the Associated Charities or Diet Kitchen furnishing milk for the mothers when desired.

Medical and Nursing Supervision: Three dispensaries are in charge of physicians during certain hours of the week. Two are located in settlement houses and the nurse-in-charge is always ready to respond to any and all appeals for aid. There are no nurses employed especially for "follow up" work—this work being done as thoroughly as possible by the regular visiting nurses, in connection with her other duties. Six hundred and twenty-five babies were reached last year, (1909).

Summer Work: In 1908, during the month of August, a camp was maintained for the care of babies. It was established on the spur of the moment, the nurses finding several babies dying from lack of fresh air and proper care. This impromptu camp was so successful in saving the lives of the babies and in teaching the mothers the necessity of fresh air, sunshine, cleanliness and pure milk for their little ones, that in 1909, two tents were built on the plan and with the same dimensions as those used in Chicago; one of these was placed on the lawn of the Godman Guild House and was open from July 8th to September 10th, 1909. The number of babies treated, 15—of these, 4 died. There were 313 days' treatments given.

The other tent was placed on the lawn of the Mercy Hospital; this was open from July 25th to September 10th, 1909. The number of babies treated were 15—of these 3 died. Number of day's treatments given, 334.

In the summer of 1910, five lots in the beautiful grove, west of the city and easily accessible by street car, were purchased and a permanent camp for babies is now established. Three tents and a shack were used for the care of the babies and the accommodation of the four nurses. The babies were kept at the camp both day and night.

The camp was opened July 7 and closed September 20, 1910.

Number of babies treated.....	60
Number discharged well.....	18
Number improved.....	24
Number unimproved.....	3
Sent to Children's Hospital.....	10
Died	5
Number of day's treatment given.....	1506
Average number day's treatment given each baby.....	25

We look forward to next summer to a large increase in the usefulness of the baby camp—we expect to be able to care for double the number of babies. We now have a permanent location beautifully situated, covered with magnificent shade trees, and the baby camp is sure to develop into one of the most helpful and useful charities in the City of Columbus.

**MARYLAND ASSOCIATION FOR STUDY AND PREVENTION OF
INFANT MORTALITY.**

The Maryland Association was formed in February, 1910, by the federation of the Mother's Relief Society and the Babies' Milk Fund. The work has been carried on under the direction of a joint committee of the two organizations. It has included advisory care of the expectant mothers; obstetrical and nursing care; consultations for mothers and babies, extending the advisory care throughout the period of infancy; and the distribution of modified milk for the babies for whom artificial feeding is necessary. The work is continued throughout the year. Eight milk stations are operated, each of which is under the charge of a trained nurse. The number of babies on the list during the year was 1,200; the number receiving milk daily is 250. The death rate among the dispensary babies has been less than half that of the general mortality rate among babies in Baltimore City. The Association employs a physician; a superintendent and staff of six trained nurses; and a social worker. During the summer months the sick babies are sent to the Thomas Wilson Sanitarium for children at Mt. Wilson, a short distance outside the city.

History of the Milk Stations in Baltimore: In 1904 the Trustees of the Thomas Wilson Sanitarium in order to increase the scope of the year for babies of Baltimore who could not go to Mt. Wilson, established four milk stations in widely separated districts of the city. The work of the first year was made possible largely through the liberality of Mr. Jacob Epstein. During the second year the stations were maintained by the Sanitarium. Afterwards in order to meet the increasing demands at the stations, the Babies' Milk Fund Association was duly incorporated and an appeal was made to the public of Baltimore for support. The Sanitarium has continued to be the largest contributor.

From the beginning the milk used at the stations has been produced at the Burnside Farm of Mr. S. M. Shoemaker, and modified and distributed to the several stations from the Walker-Gordon Laboratory. A number of simple milk mixtures suitable for babies of various ages are used, but it is clearly understood that other formulæ can be ordered by physicians at their discretion. A uniform charge of ten cents a day for all mixtures has been charged, but no child is refused the milk because of the inability of its parents to pay. All the babies are sent to the stations by their physicians or from the medical dispensaries of the city. From the outset the milk has been dispensed by trained nurses who spend the greater part of the day in visiting the homes of the babies and in giving instruction to their mothers. This has been done under the direction of the Superintendent, Miss A. M. French.

History of the Mother's Relief Society: The Mother's Relief Society was organized in the early nineties as the Mother's Branch of the Young Women's Christian Association. The objects of the association are:

To secure for needy, deserving women in confinement skilled care as a substitute for the attention of the ignorant midwife.

To provide a caretaker for the confinement period.

To furnish clothing for the baby, gowns for the mother, and bed clothing in cases needing these supplies.

The aim of the society has been to aid without pauperizing. In addition to the work of investigation of special cases Miss Alice H.

Small, the social worker of the Society, has made an investigation of the practice of midwives in Baltimore, as well as a study of birth registration.

Consultations and Classes for Mothers: Consultations and Mothers' meetings have been held by Dr. Henrietta M. Thomas, the Association's physician, at the various stations. At these meetings topics pertaining to the feeding, clothing and general hygiene of the baby are systematically considered. The great value of maternal nursing is always emphasized.

Study Classes: During the winter of 1909-1910, a study class was conducted by Dr. Mary Sherwood. The class was composed of members of the board of managers, physicians, nurses and social workers. The meetings were held in the office of the American Association for Study and Prevention of Infant Mortality. The topics included:

- I. General statement of the facts of preventable infant mortality and its contributing causes.
- II. Maternal Nursing and Substitute Feeding.
- III. Milk Production.
- IV. Birth Registration.
- V. Flies as Disease Carriers.

MARYLAND SOCIETY FOR THE PREVENTION OF BLINDNESS

This Society has given talks on the prevention of blindness before two of the Mothers' Meetings, the Social Service Club, the Parents and Teachers Club, the Settlement Association, the Hebrew Friendly Inn, two meetings of the Eastern Branch of the Young Women's Christian Association, at the Social Worker's Hall before the Federated Blind Men's and Woman's Clubs of Baltimore, and at its own public meeting at the Medical and Chirurgical Faculty in March, 1910.

About four thousand leaflets on the Prevention of Blindness, especially in infants have been distributed.

Two thousand and thirty-seven letters have been sent to the physicians throughout the State to enlist their co-operation. About nine hundred answers were received and pledges given to use a prophylaxis in infants eyes at birth.

Sixty-one letters were sent to the hospitals throughout the state inquiring how far they could co-operate in the care of mothers and infants at birth, and the later care of eye cases.

This Society sent a delegation to Annapolis and assisted in obtaining the Governor's signature to the Mid-wifery Bill passed in the Legislature in the session of 1910.

This Society's efforts at present are to organize the teaching of midwives in Baltimore, and to bring the prevention of blindness in industries before the Labor Unions.

METROPOLITAN LIFE INSURANCE CO., INDUSTRIAL DEPARTMENT, New York City

In 1909 the Company established a visiting nurse service for sick policy holders. The service is carried on in over sixty-four cities. One of its features is the right of the policy holder to call for the nurse in maternity cases. This enables the expectant mother to receive advisory care before confinement, and if advisable, the nurse continues her instruction of the mother afterwards.

MILK AND BABY HYGIENE ASSOCIATION, Boston

The objects of the Milk and Baby Hygiene Association, of Boston, are to improve the general milk supply, to encourage breast feeding, to provide milk properly modified for babies who cannot be nursed, to furnish advice and training in hygiene and care of babies.

Education of mothers in infant hygiene is undertaken in three ways: First of all, by the visits of graduate and specially trained nurses to homes. These visits are made not only to those who are referred to us by physicians and others, but we are now making one visit to the home of every child born in the wards in the congested part of the city. If the mother welcomes the nurse and seems to need further visits, they are made. The second method adopted is by organization of the mothers into twelve conference classes of 20 to 60 members each. These classes are met by the volunteer physicians and by the nurses. At the large classes we have an assistant who keeps the mothers interested and in order and who does the actual weighing of the child, thus freeing the nurse to talk with the doctor and mother about the progress of each baby during the week. The third method is by distribution of literature. A year ago we prepared large illustrated poster sheets of instructions to mothers on the care of babies. These were widely circulated through public schools, settlements, and on bulletin boards, as well as through the hundreds of patrons of our ten stations. These posters were issued in English, Italian, and Yiddish. This year they have been re-issued by the Boston Board of Health, by the Worcester Board of Health, and supplies of them have been purchased from us by other organizations. We also issue other small leaflets to mothers.

The education of the public is brought about principally through stories issued to the newspapers. We have an average of ten feet of columns per week in the local press. The appeals which we issue are also designed to convey very definite educational information. High school girls have been reached during the past year through a special lecture course established by us jointly with the School Board. The class consisted of 39 members who attended with absolute regularity lectures arranged by our medical director. We have made a beginning in the teaching of fathers by a class conducted for us by Dr. William P. Lucas, of the Infant's Hospital and the Rotch Milk Fund for Sick Babies.

All of our work is designed to be preventive and remedial. We do not care for sick babies, referring them promptly to private physicians, hospitals or dispensaries. Of course, nearly all of the children who are referred to us are somewhat upset, but they are accepted if they have no temperature or other positive indication of illness. The nurse and the conference physician investigate the cause of the trouble, assist the mother to improve her breast milk and as a final resort prescribe our stock formulae of modified milk or teach the mother preparation of a special formula at home. We distribute whole milk to the mothers for their own use for home modification and for the use of older children. This is the inspected grade of milk, the highest practicable standard, and we are able to sell it at 9 cents a quart. Our modified milk is sold in all formulae at 2 cents for four ounces, 2½ cents for six ounces, and 3 cents for eight ounces. These prices represent wholesale cost.

We have cared for 2,005 children during the past fifteen months. At no time have there been less than 700 under our care, the highest number being about 900. Among these children there were up to September 1, 1910, 46 deaths, both while the children were under our care and after they had passed from our supervision. While under our care, the children have shown a death rate of $2\frac{1}{2}$ per cent. This is to be compared with the rate of $12\frac{1}{2}$ per cent for Boston as a whole, counting all babies under one year of age, rich or poor. It seems to us fair to compare the above, because we have had something more than 10 per cent of the babies of the city under our care during this time.

Our nurses are instructed to act as voluntary sanitary inspectors. The Board of Health furnishes blanks to report any violations of the sanitary regulations. They also report to the director observations of the conditions under which milk is sold in the stores in their district. They have been responsible for sending valuable information which when placed at the disposal of the city milk inspector resulted in suspension of licenses.

Our Association has been successful in having a regulation adopted by the local Board of Health prohibiting the sale of loose milk. This regulation was postponed from time to time on the impurity of certain milk dealers until the middle of June, when after a great public contest the regulation was confirmed by the Mayor. Through the summer about 100 licenses have been revoked by the milk inspector for violation of this regulation. Appeals have been taken by the licensees to the State Board of Health, which after lengthy deliberation has upheld the regulation.

The Association has also to report that it has founded a special milk research to attempt the solution of great milk problems which have long been matters of acrimonious discussion but which can only be settled in the laboratory. This research will be conducted under the direction of Dr. Milton J. Rosenau, Professor of Preventive Medicine and Hygiene at Harvard Medical School, through whom the laboratories of the medical school have been placed at our disposal. Dr. Edwin H. Schorer, formerly of Johns Hopkins University and the Rockefeller Institute, has been engaged for a term of three years to prosecute this research. The Association and Dr. Rosenau are keeping in close touch with the United States Department of Agriculture and with other organizations which are conducting or planning milk researches, and respectfully request information in regard to all such matters in order that there may be no duplication of effort.

THE NEW YORK DIET KITCHEN ASSOCIATION

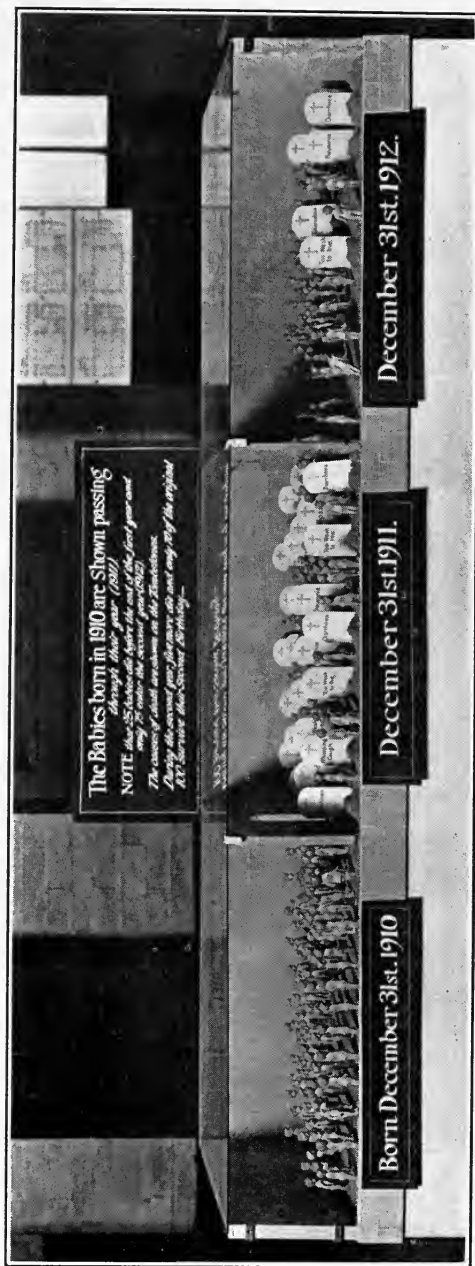
The Association supports nine milk stations or "kitchens" where certified milk is dispensed to both mothers and babies, also to tuberculosis and general cases, on the presentation of requisitions signed by recognized medical or charitable authorities or is sold at six cents (\$.06) a quart to such as can pay for it.

Instruction in infant hygiene, the modification of milk and the proper feeding of their babies is given the mothers by the matrons in the kitchens and by the doctors and nurses in the conferences. The literature distributed is that published by the Department of Health on the subject.

Baby conferences are held regularly in the stations by physicians who volunteer their services or by doctors and nurses detailed from

the Department of Health for that purpose. In addition a large amount of instructive and preventive work is accomplished by the matrons both in the kitchens and by their visits in the homes. As the Association co-operates with the numerous dispensaries and hospitals, many of the babies receiving milk are under the supervision of the doctors and nurses of these institutions.

During June, July, August and September of this year, 1335 babies received milk from the kitchens while the total attendance at the conferences has been 1197 babies with only 4 deaths from diarrhoeal diseases. As in no section of the city is the baby work covered exclusively by this Association, comparisons between the general and local infant mortality rates cannot be made.



(Plate I.)

MODEL ILLUSTRATING INFANTILE DEATH RATE.

(See page 322.)

Catalogue of the Exhibition held in connection with the First Annual Meeting of the American Association for Study and Prevention of Infant Mortality, McCoy Hall, Johns Hopkins University, Baltimore, November 9-16, 1910.

EXHIBITION

MEMBERS OF COMMITTEE

Dr. Marshall L. Price, Baltimore, <i>Chairman</i> .	
Dr. J. W. Schereschewsky, Baltimore, <i>Medical Officer in charge of Exhibition</i> .	
Mr. Wm. F. Cochran, Jr., Baltimore, <i>Chairman of Committee on Finance</i>	
Miss Ellen C. Babbitt.....	New York
Dr. Walter BenseL.....	New York
Dr. James Bosley.....	Baltimore
Dr. Henry L. Coit.....	Newark
Miss M. F. Etchberger.....	Baltimore
Dr. W. A. Evans.....	Chicago
Miss A. M. French.....	Baltimore
Dr. H. J. Gerstenberger.....	Cleveland
Dr. George W. Goler.....	Rochester
Dr. L. P. Hamburger.....	Baltimore
Dr. Henry Barton Jacobs.....	Baltimore
Dr. C. Hampson Jones.....	Baltimore
Mr. George L. Jones.....	Baltimore
Mrs. J. H. Mason Knox, Jr.....	Baltimore
Mr. Walter Kruesl.....	Boston
Dr. Joseph S. Neff.....	Philadelphia
Mr. Wilbur C. Phillips.....	New York
Mrs. Marshall L. Price.....	Baltimore
Dr. Mary Sherwood.....	Baltimore
Miss Alice H. Small.....	Baltimore
Surgeon-General Walter Wyman.....	Washington

The sections under which the exhibition was arranged, and the chairman of each were as follows:

- A Feeding and Dietetics; Dr. C. W. G. Rohrer, Baltimore
- B Intestinal Disorders of Infancy; Dr. Harry L. Whittle, Baltimore
- C Other Diseases of Infancy and Childhood; Dr. John Ruhräh, Baltimore
- D Educational Prophylaxis; Clothing, Bathing, Exercise and Ventilation; Dr. Henrietta M. Thomas, Baltimore
- E Preventable Diseases and Congenital Disorders of the First Seven Days of Life; Dr. Chas. W. Mitchell, Baltimore
- F Economics and Eugenics; Prof. Wm. E. Kellicott, Baltimore
- G Institutional Care of Infants and the "Placing Out System;" Dr. Charles O'Donovan, Baltimore
- H Antenatal Causes of Infant Mortality; Dr. Chas. W. Mitchell
- I Birth Registration; Dr. C. Hampson Jones, Baltimore
- J Moving Pictures

(From the program of the meeting)

"It will be seen from the program that the exhibition is wide in its scope, and deals with all the essential topics in the study of infant mortality, and its prevention. One of its objects will be to impress upon the general public the importance of maternal nursing in the reduction of infant deaths, and that any form of artificial feeding can only be regarded as a substitute for breast feeding. As, however, a certain proportion of children must be artificially fed, a considerable part of the exhibition will be devoted to the milk work of departments of health, city, state and national; medical milk commissions; influence of feeding on infant mortality; and the contagious diseases conveyed by milk. The specific causes of infant mortality, particularly cholera infantum, will be shown in as effective and convincing a manner as possible.

"With respect to the need and care of the infant, itself, exhibits will be shown of suitable clothing; feeding methods will be demonstrated; seasonal care of infants will be explained, as well as the early recognition of conditions which may lead to serious after results.

"It is hoped to conduct mothers classes in connection with the exhibit. Arrangements have been made for the exhibition of moving pictures, both with respect to flies and milk. The films which have been prepared in this connection are very interesting and should prove efficient instruments in impressing the public as to the dangers lurking in the presence of flies and in impure milk as an article of food.

"Especial care will be taken by the committee to have the material in that simple and direct form which experience has shown to be most efficient in influencing popular education, and to possess scientific value as well. It is believed that the occurrence of this exhibition will ultimately be regarded as an event of national, if not international significance, as it is hoped by the association that it will be the inception of a movement destined eventually, to extend throughout the entire country. It will therefore be seen that the results which the exhibition expects to accomplish are in reality of a fundamental character, as it is possible to give, thereby, a true concept to the public mind of the real importance of children to the State, and thus bring home the actualities of this, the greatest social problem of the times."

LIST OF EXHIBITS

FEDERAL

U. S. DEPARTMENT OF COMMERCE AND LABOR

BUREAU OF THE CENSUS

Diagrams:

Set of 27 relating to deaths of infants. Accompanied by explanatory pamphlet prepared for distribution at the meeting and exhibition

U. S. DEPARTMENT OF AGRICULTURE

BUREAU OF CHEMISTRY

Charts:

Fifteen relating to foods

Nutrition Bulletins:

Publications issued by the Department on milk, eggs, cereals and other articles of value in children' dietaries

Charts:

- a Summary of bacteriological examination of 263 samples of ice cream collected in the city of Washington from October 13th, 1906, to July 29th, 1907
- b Summary of bacteriological examination of 381 samples of milk collected in the city of Washington from January 12th, to July 2nd, 1907
- c Showing composition of foods for infants
- d Showing results of bacteriological examination of 29 samples of ice cream from Washington in co-operation with the Health Department collected May, 1909

BUREAU OF ANIMAL INDUSTRY: DAIRY DIVISION

Photographs:

Set of 26 showing good and bad dairy conditions
Milk container for households

DEPARTMENT OF THE INTERIOR

BUREAU OF ETHNOLOGY

Figures of Indian mother and child
Papoose

STATE DEPARTMENTS OF HEALTH**MARYLAND**

Models:

Stand and colored blocks showing "When, How and Why babies die in Maryland"

Babies cemetery showing what becomes of 100 babies born in Baltimore at the present time (See illustration, Plate I.)

Pyramids:

Representing 1,000 infant deaths under one year of age; showing the number that die from each of six causes of death divided into two portions, one of which corresponds to the life saving which would have been effected if all the mothers of the 1,000 children had nursed them (See illustration, Plate II.)

Diagrams:

Three, showing relation of deaths of infants in Maryland to general death rate

Chart:

Showing the probability of dying within a year for each year of life

OHIO

Wall Card:

Birth registration

PENNSYLVANIA

Chart:

Illustrating the study and prevention of infant mortality through vital statistics

MUNICIPAL DEPARTMENTS OF HEALTH**BALTIMORE**

Milk testing station. (See illustration, Plate III.)

In charge of representative of City Health Department

Table and specimens:

Bacteriological exhibit (See illustration, Plate IV.)

Charts:

Set of twenty-four showing deaths from diarrhoea for eight years in one ward

Two showing death rate from diarrhoeal diseases. Average of eight years

Three showing death rate of children under five years of age from diarrhoeal diseases for eight years.

Frames:

Birth registers

Nine reasons showing importance of birth records

Birth and death rate each ward nine months—1910

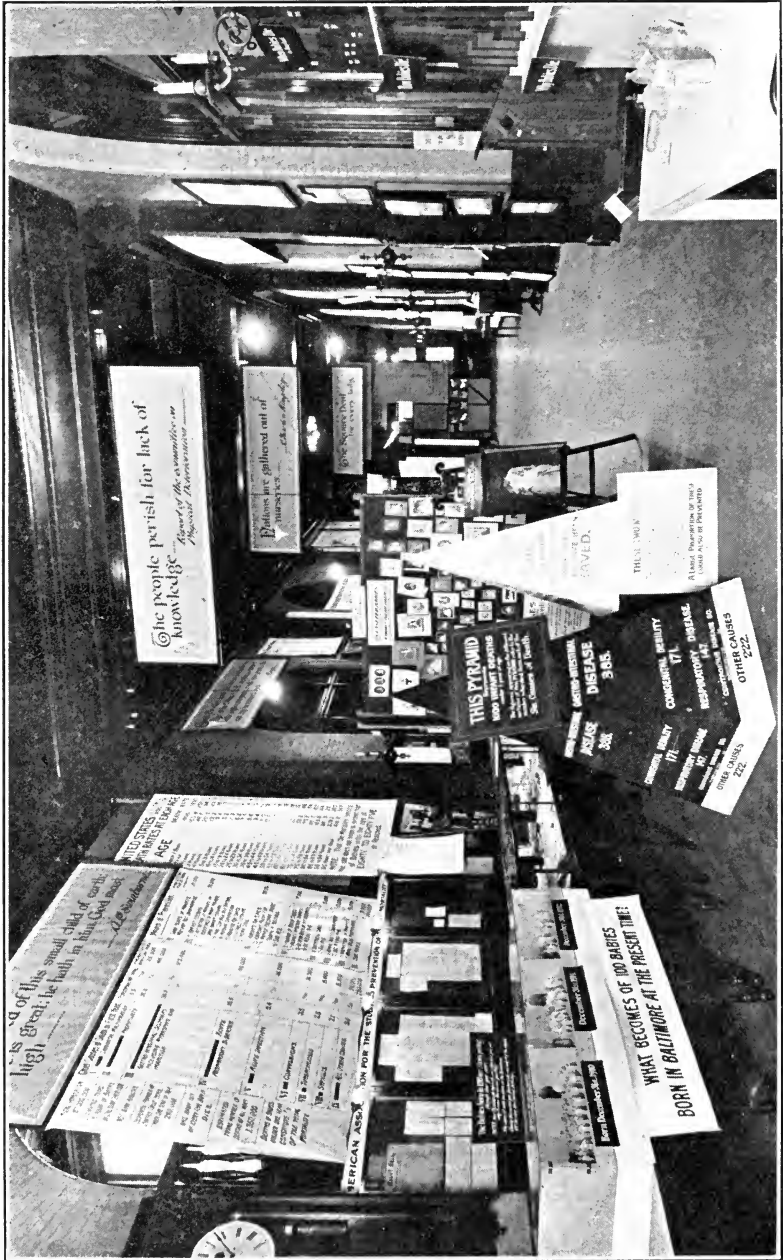
Placards:

Showing the Death roll from contagious diseases in Baltimore for 1909

Showing deaths in Baltimore for 1909

Maps:

Set of five showing location of deaths from diarrhoeal diseases



(Plate II.)

MAIN CORRIDOR OF EXHIBITION. MODELS IN FOREGROUND.

Table:

Showing deaths from diarrhoeal diseases for ten years by months

CHICAGO

Charts:

Showing the relation between summer mortality among children and density of population and nativity

Showing diarrhoeal diseases deaths per 10,000 of population

Showing infant deaths from diarrhoeal diseases during the hot weather

"What kills the babies?"

Showing where the babies died from diarrhoeal diseases

Showing what sanitation and preventive medicine have done for Chicago

"The double cross," showing Chicagoans the impure air and impure food diseases

Showing the increase in the average age of death

Maps:

Chicago's breathing spots

Prosecutions and violations of the milk ordinance

Places where ice is harvested for Chicago

Location of diphtheria cases in December, 1908

Location of diseases from diarrhoeal diseases in summer, 1909

Diagram:

Infant welfare campaign

Posters:

Summer care of babies. Posters in three languages

Flies. Speaking of flies

Showing the use of pacifiers. String of retired long tube rubber nipples

"Which way are you going?" Rules of health and consequence of neglect

"Don't kill your baby." Directions for feeding infants. Same poster in Italian, Polish and Yiddish

Showing agencies employed during the summer campaigns of 1909 to save the babies

"Save the babies." Giving directions for food and other measures.

Showing Chicago's breathing spots

Photographs:

Set of seven showing Municipal Playgrounds

Outdoor schools

Set of sixteen showing insanitary housing conditions

"Catching the public eye"

Set of sixteen showing good and bad dairy conditions

Set of twenty showing insanitary dairy conditions

Set of eight showing work of Fresh Air Fund, Chicago Daily News

Set of six showing small parks

Set of five showing sanitary conditions

Public baths

Frame:

Showing blanks used in Infant Welfare Campaign

Wall Cards:

- Showing diphtheria culture outfit
- Showing circulars in various languages distributed by the Health Department
- Showing placards carried in advertising space of Chicago street cars
- Set of four with newspaper clippings
- "How Cubans solve the problem of shortening the time between the cow and the baby"
- Hess refrigerator

DISTRICT OF COLUMBIA

Charts:

- Showing comparative study between the mortality in 630 cases breast-fed infants and 206 cases bottle-fed infants during the first year
- Showing comparative study between the white and colored total mortality from diarrhoeal diseases in infants under two years of age—1900-1909
- Mortality among infants under two years from diarrhoeal diseases—1880-1909—with certain notations
- Showing comparative study between the white, colored and total mortality of infants under one year from all causes—1900-1909

Wall Cards:

- Showing comparative study between the mortality of infants under one year from all causes and the number of registered births—1907-08-09
- Laws and regulations concerning reporting and registration of births in the District of Columbia
- Blank forms for reporting births and still births
- Supplemental blanks, birth registration
- Showing co-operative work between the Health Department and the Instructive Visiting Nurse Society of the District of Columbia
- Showing pamphlet distributed by the Health Department for the prevention of infant mortality

NEW YORK CITY DEPARTMENT OF HEALTH**Bureau of Records**

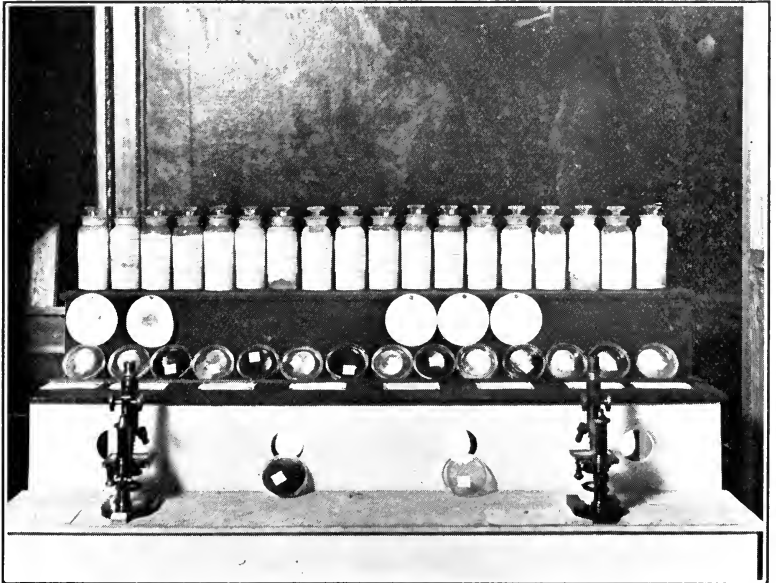
Charts:

- Birth report in the City of New York—1900-1910, inclusive
- Certified copies of birth records issued
- Certificates of birth records for school and employment purposes—1905-1909
- Births reported during the year of 1909
- Percentage of births reported by physicians and midwives, 1905-1909
- Births according to nativity of father in New York City, 1905-1909
- Births according to nativity of mother in New York City, 1905-1909



MILK TESTING STATION.

(Plate III.)



BACTERIOLOGICAL EXHIBIT.

(Plate IV.)

(See page 322.)

NEW YORK CITY DEPARTMENT OF HEALTH**Division of Child Hygiene**

Charts:

- Deaths, 1909. Total number under 1 year
- Death rate under 1 and 2 years, 1909
- Death rate, diarrhoeal diseases, under 1 year and 2 years, 1909
- Deaths from diarrhoeal diseases under 1 year, August, 1910, Feeding
- Death rate from diarrhoeal diseases under 1 year, June-September, 1900-1909
- Deaths and death rates under 2 years, July-August-September, 1898-1910
- Birth rate and infant mortality in certain blocks in Manhattan, 1907, 1908, 1909
- Diseases causing deaths under 1 year, New York City, 1909
- Death rate, children under 1 year, Old City of New York, 1891-1909

Placards:

- Little Mothers' League. Badges
- Prevention of Infant Mortality
- "The need of individual instruction of mothers"
- "Mothers must be taught how to care for milk"

Poster:

- How to keep the baby well

Circular:

- Summer care of Sick Babies. Formulae for milk modification

Photographs:

- Saving the babies. Nurse's home visit
- Nurse's first visit and her second visit
- Advising proper clothing
- Bathing the baby
- What instruction and proper feeding will do
- The result of improper care
- Recreation Pier Clinic for Sick Babies: The waiting line. Receiving advice from the doctor and nurse
- Recreation Pier Clinic for Sick Babies: Weighing the baby
- Saving the Babies: Mothers' meeting on Recreation Pier
- Department of Health Clinic at the New York Diet Kitchen

Association:

- Weighing the baby
- Advising proper feeding

Little Mothers' League:

- The Weekly Meeting
- Learning to prepare the baby's milk
- Learning how to bathe the baby
- Preparing milk for babies
- Instructing mother at Pier
- (Placard)

DEPARTMENT OF PUBLIC HEALTH AND CHARITIES OF PHILADELPHIA

Charts:

- Deaths of children under 1 year, from 1 to 2 years and from 2 to 5 years, and percentage of deaths of children under 5 years to total mortality for 30 years
- Births, and deaths from diarrhoea and enteritis, under 2 years of age in relation to density of population, 1909
- Births, and deaths from diarrhoea and enteritis under 2 years of age in relation to density of population, 1908
- Total deaths under 5 years of age in relation to maximum, minimum and mean temperature and humidity by weeks for the year 1909
- Total deaths under 1 year in relation to maximum, minimum and mean temperature and humidity by weeks for the year 1909
- Total deaths under 2 years in relation to maximum, minimum and mean temperature and humidity by weeks for the year 1909
- Deaths under 1 year from all causes in relation to feeding, maximum, minimum and mean temperature and humidity by weeks during the summer of 1910
- Deaths under 1 year and between 1 and 2 years in relation to feeding, maximum, minimum and mean temperature and humidity by weeks during the summer of 1910
- Total deaths per 1,000 of population compared with deaths under 1 year, deaths under 2 years, and deaths under 5 years, by years since 1880
- Total deaths per 1,000 of population compared with deaths under 1 year, deaths under 2 years, and deaths under 5 years, by months during 1909
- Births and deaths per 1,000 of population for 30 years
- Number of births during the year and number of those living at the end of the year
- Number of babies who died during the year
- Instructions in nursing (2)
- Elucidating deaths of 1909
- Bottles with labels of the more common soothing syrups, cartoons, etc., printed matter entitled, "Dangerous drugs"
- "Weight of Baby"
- Weights with different kinds of feeding, Philadelphia General Hospital
- Bacteriological examinations of milk
- "Publicity that counts," giving head-lines of newspaper articles

Maps:

- Location of playgrounds and milk stations in Philadelphia
- Ward lines in relation thereto
- Deaths by wards from diarrhoea and enteritis in children under 2 years of age and all deaths from all causes in children under 5 years of age per 1,000 population

Photographs:

- "Redbank Sanitarium"
- Detail work, Red Bank Association
- "Cheap home-made ice box" on chart

Showing necessity of vaccination
 Dirty milk and dirty milk bottles
 "Preparing baby's food"
 Composite—"Care of baby"
 Modified Milk Stations
 Illustrating open air hospitals, educational centers, play apparatus, playgrounds
 Practical demonstration of care of babies and children at two large river piers
 Some Philadelphia parks
 Additional—"Philadelphia parks"
 Three of wards and general care of baby, Philadelphia General Hospital
 Instructions to school children
 Medical clinics and milk stations
 Used for outside of slum exhibits
 Set of three showing Visiting Nurses' Work and general housing conditions

Wall Cards:

Instructions on care of the baby
 Instructions for mothers
 "Dont's" for baby feeding
 Report blank of nurses

Displays:

Proper and improper nipples
 Circular—"Care of the Baby"
 Circular—"Fly"
 Home-made fly killer on frame
 Dressed dolls, showing proper and improper methods of dressing baby
 Model bed on chart with instructions concerning same

Colored Illustrations:

"Bathe the baby"
 Danger of baby on unclean floor
 "Keep baby's mouth clean"
 Foods that are dangerous

ROCHESTER HEALTH BUREAU

Charts:

Showing diminution in death rate due to municipal control of milk
 Comparing the average number of bacteria in milk and deaths under 5 years of age
 The result of bacterial examination of milk
 Average deaths under 5 years of age prior to and after the establishment of municipal stations
 Results obtained by the tuberculin testing of the retail milk supply

Show case:

Containing ancient lead pap boat exhibited by Dr. Goler
 Bottle of pasteurized milk showing fly blows in milk
 Glass receptacle showing dirt from milk can, strained out on cheese cloth

SAN FRANCISCO BOARD OF HEALTH

- Score Cards:
 Control of dairies
 Delivery stations
- Cards:
 Four years reports on contagious diseases
 Instructions as to contagious diseases
- Reports:
 Licensing dairies of out-lying counties
- Bulletin:
 Department of Health, Vital Statistics, September, 1910
- Pamphlet:
 Health Laws

MUNICIPAL PHILANTHROPIES**MILK AND BABY HYGIENE ASSOCIATION OF BOSTON**

- Frames:
 Set of five showing blanks used in birth registration in Boston
- Charts:
 Showing the infant mortality in Boston in relation to the temperature
 Showing deaths per 1,000 of infant population of infants under 1 year in wards where milk stations are operated
 Showing standard feeding, by ages, by weights
 Showing stomach development by ages of infant
- Posters:
 "Save the Baby from Summer Heat"
 Mothers' Education—English, Yiddish, Italian
- Photographs:
 Set of forty showing course of milk from pasture to baby
- Printed Matter:
 Publications of Milk and Baby Hygiene Association
- Maps:
 Pin map showing infant deaths in Boston—September, 1909—September, 1910. By nationalities, by institution, by congestion
 Pin map showing wards 6 and 8, Boston. Infant mortality September 1, 1909, to September 1, 1910, by causes. Ward 6, Italian. Ward 8, Jewish
- Wall cards:
 Poisons for babies. List of opiates sold as "soothers"
 Boston City Milk Regulations
 Record forms—Milk and Baby Hygiene Association
 What is Certified Milk?
 Co-operation for clean milk and profit from milk
 Bird's Eye View of Infants' Health Protection
 Showing annual cost and methods of establishing milk stations
- Public opinion cards:
 "Let babies live." "Infant mortality problem is milk and care."
 Contrast between mortality in well-to-do and poor families.
 Objects of Milk and Baby Hygiene Association



MILK DISPENSARY.
 (See page 331.)

(Plate VI.)

**COMMITTEE ON INFANT SOCIAL SERVICE OF THE WOMEN'S
MUNICIPAL LEAGUE OF BOSTON**

Prenatal care. Birth-weight of babies. Cost of work
Leaflet prepared for the meeting of the American Association
for Study and Prevention of Infant Mortality

MASSACHUSETTS INFANT ASYLUM

Photographs:

Set of nine showing babies boarded out by the Institution

Basket:

Containing model doll dressed for sleeping out of doors

UNITED CHARITIES OF CHICAGO

Diagram:

Infant Welfare Campaign. Co-operation of different agencies,
public and private

Photographs:

Nine illustrating infant welfare work
Twenty-two Mary Crane Day Nursery, roof tents, etc.

Maps:

Showing location of baby tents
Infant mortality curve

Frame:

Showing blank forms used in infant welfare work

Baby register filing case

Mrs. Henrotin's Exhibit (Inexpensive nursery outfit):

Baby hammock of coffee sacking
Bed for baby: clothes basket with blankets, sheets, etc.

Model bed

Home-made ice box

Demonstration: Milk kept cold by process of evaporation (milk
bottles in pans of water. Cloth covering bottles projects into
pan. Pan placed in current of air. Evaporation of water keeps
milk cool)

"Baby killers"—long tube nipples and pacifiers

Scales

Bottle-brush

Mattress in box

Nipples in covered glass jar

Pan and pitcher for bath

THE BABIES' DISPENSARY AND HOSPITAL OF CLEVELAND

Charts:

A. B. C. D. Comparative mortality statistics of babies under 1
year of age in the city-at-large, and those coming under the
care of the Babies' Dispensary and Hospital

Comparative mortality among breast-fed, bottle-fed, mixed feed-
ing and weaned babies under care of Babies' Dispensary and
Hospital

Mortality of infants fed on "certified milk"
 Mortality of infants under 1 year of age from gastro-intestinal diseases compared with other causes of death

Photographs:

Frames (3)

Our solution of the "Milk Problem"
 The Out-Door Ward of the Babies' Dispensary and Hospital
 Lantern slides used in Educational Campaign

Unframed (7). Bromide enlargements

Latimer, as the nurse found him

Latimer, as he looks now

Mary, before Dispensary care

Mary, after Dispensary care

Out-Door Wards

Babies' Dispensary and Hospital

Wall cards:

A. B. C. D. E. Complete set of literature used by the Babies' Dispensary and Hospital

LOUISVILLE BABIES' MILK FUND ASSOCIATION

Charts:

Statistical, showing growth of work, registration; and milk output

Statistical, comparison between general death rate in Louisville of children under 1 year, and that of children looked after by the Milk Fund Association

Statistical, decrease in death rate, 1909-1910, of children on Milk Fund lists

Formulae in use at milk stations

Bacterial counts of Milk Fund modified milk, compared with certified and market milk

Photographs:

Set of nine illustrating work of Association

Wall cards:

Information blanks and appeals for funds

Record and report forms

Educational literature

Programs for mothers' meeting

Instructions for nurses, rules for management of stations

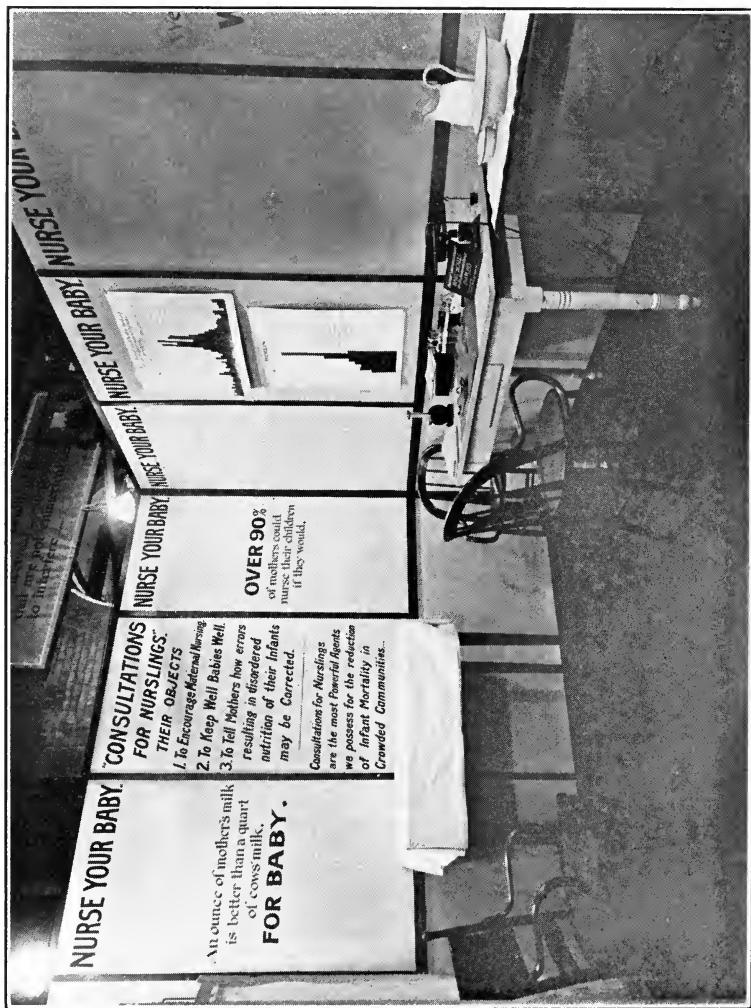
Outline of course for Visitors Committee, in clean milk and infant feeding

Models:

Bottle bank for stores and clubs

Carrier for milk bottles

Hess—(home-made) refrigerator



CONSULTATION.

(Plate V.)

**MARYLAND ASSOCIATION FOR STUDY AND PREVENTION OF
INFANT MORTALITY**

**(Comprising the Mothers' Relief Society and the Babies' Milk
Fund Association of Baltimore)**

Model consultation for nurslings: Mottoes on every panel, "Nurse your baby." Central panel, "Consultations for Nurslings."
(1) "To encourage maternal nursing. (2) "To keep well babies well." (3) "To tell mothers how errors resulting in disordered nutrition of their infants may be corrected." (4) "Consultations for nurslings are the most powerful agents we possess for the reduction of infant mortality in crowded communities." "Over 90 per cent. of mothers could nurse their babies if they would." "Before weaning the baby consult a doctor who knows."—(See illustration, Plate V.)

Equipment:

One set of record cards
One set of baby scales, Dr. Erlanger's device
One examination table
Centrifuge set of Liffert & Beam's tubes for the determination of butter fat in human milk
Three clinical thermometers
One stethoscope
One breast pump
One tuberculin container with scarifier
One infant's stomach tube
One lactometer
One Esbach's albuminator
Porcelain hand basin
Basin and pitcher

Charts:

Comparative mortality, breast and bottle-fed children in Paris
" " " " " " " " Berlin
" " " " " " " " for five
years in Berlin

Milk station fully equipped:

(The station was in operation during the week of the exhibition)
Table showing home apparatus for modification of milk
Dietition counter
Set of electric stoves—(See illustration, Plate VI.)

Photographs:

Set of twelve. Milk depots conducted by Babies' Milk Fund Association; weighing the baby; distributing the milk; advising mothers
Set of fifteen illustrating errors in feeding
Set of twelve. Thomas Wilson Sanitarium for Sick Babies
Set of five of Burnside Farm
Large photograph of mother nursing child: "This baby is getting a square deal. Is yours?"
Provisions made in Philadelphia, Boston, Baltimore, for care of contagious diseases among children

Wall card: Objects of the Mothers' Relief Society
Two show cases containing articles of clothing

ROBERT GARRETT HOSPITAL, BALTIMORE

Photographs:

Set of six

Charts:

Two, showing work done in the department for infants and cause of death of 461 dispensary infants

Placard:

Descriptive of the work of the Hospital

ST. VINCENT'S ORPHAN ASYLUM, BALTIMORE

Photographs:

Set of fourteen

Photographs:

Two of school girls. Illustrating after-effects of maternal nursing and good hygiene, and artificial feeding and poor hygiene
Exhibited by Dr. Harry L. Whittle, Baltimore**NEW YORK ASSOCIATION FOR IMPROVING THE CONDITION OF THE POOR**

Photographs:

Caroline Rest Home and Junior Sea Breeze
Home instruction
Handicapped
Talk at Junior Sea Breeze
Keep your baby well
Junior Sea Breeze
Teaching before confinement (Caroline Rest Home)
Day dreams
School for mothers
Why babies die
Directions for feeding
Lesson in bathing

Descriptive placards

COMMITTEE ON PREVENTION OF BLINDNESS OF THE NEW YORK ASSOCIATION FOR THE BLIND

Photographs:

Set of sixty illustrating ophthalmia neonatorum

NEW YORK MILK COMMITTEE

Photographs:

Set of twelve showing work of milk stations
Set of twelve showing clean and dirty methods of milk production and their results

Model:

Metropolitan tower and milk bottles
Showing total bulk of milk sold in New York City, also bottles showing total bulk of the following varieties of milk sold in New York City: (a) certified milk, (b) guaranteed milk, (c) raw inspected milk, (d) raw selected milk (e) pasteurized milk (f) raw milk—(See illustration, Plate VII.)



ANOTHER SECTION OF THE EXHIBITION.

(Plate VII.)

Samples in bottles of certified milk, pasteurized milk, and store milk
Set of five petri dishes showing bacterial count and two petri dishes
showing dirt from one can of milk strained out on absorbent
cotton

Exhibit of milk cans and milk bottles put to illegal uses, such as
containers for paint, ashes, cement, etc., by various persons in
New York

**NATHAN STRAUS PASTEURIZED MILK LABORATORIES,
NEW YORK CITY**

Photographs: (30)

Straus Laboratory, New York
Straus Laboratory, Interior
Straus Depot, Tompkins Park
Care of bottles
Straus Park Depots, New York
Home pasteurization
Straus Laboratory, Washington (2)
Straus babies

Printed matter:

Four cards mounted with literature, one card mounted with news-
paper clippings
Directions for Mothers
New York infant death rate
Milk and tuberculosis

**SAN FRANCISCO CERTIFIED MILK AND BABY HYGIENE COM-
MITTEE, CALIFORNIA BRANCH ASSOCIATED COLLEGIATE
ALUMNAE**

Photographs:

Set of five of "Boarded out Babies"
Consultation
"Little mothers" in the Chinese quarter

Reports:

Medical report on work, Dr. E. C. Fleischner

Card:

Golden Rules for Foster-Mothers

Chart:

Showing death rates of children under 1 year of age, in San
Francisco, compared with that of children boarded out by the
Associated Charities

ASSOCIATIONS

AMERICAN CIVIC ASSOCIATION

Motion-picture film, "The Fly Pest"

**AMERICAN ASSOCIATION FOR STUDY AND PREVENTION OF
INFANT MORTALITY**

Contrast rooms: Before and after visits of nurse and social worker

Model nursery: (See illustration, Plate VIII.)

Model bed room: (See illustration, Plate IX.)

Electric device: Banner and flashlight. Extent of infant mortality
Infantile death rate throughout the civilized world—(See illustration, Plate X.)

Charts:

- Chief causes of death in first year in the United States and the saving that could be effected by preventive measures
- Death rates at each age in the United States
- Death rates from contagious diseases in the United States
- Death roll from contagious diseases in Baltimore, 1909
- Principal causes of death of infants in England and Wales, 1903

Wall cards:

- Prevention of contagious diseases
- "Whooping cough is deadly to young children"
- "Don't let your children have measles," etc.
- "80 per cent. of babies dying under 1 year of age are bottle-fed babies"

Frame:

- Containing samples of soothing syrups sold in Baltimore

Placard:

- "Don't make a dope fiend of your baby"

Exhibit on Eugenics (Prepared by Professor Wm. Kellicott of Goucher College, Baltimore).

Wall cards:

- Defining eugenics
- Eleven mottoes descriptive thereof

Charts:

- Two illustrating Mendel's law of heredity

Photographs: (Diagrams)

- Three family histories of polydactylism
- Six generations of vagabondism
- Heredity of angio-neurotic-oedema in two families
- History of split foot and lobster claw in two families
- Inheritance of deaf mutism with inter-marriage between affected families
- Inheritance of night-blindness in a single family

Photographs:

- Submitted in contest for best one of Baltimore breast-fed babies
—(See illustration, Plate XI.)

Frame:

- One hundred breast-fed babies. Exhibited by Dr. Pohl, Baltimore

Dolls: Illustrating methods of dressing babies in different parts of the world

- India
- Japan
- Siam

Swaddled:

- American Indian
- Italian

Out of 1000 Births, the following number
of Children will die in their FIRST YEAR
in the various countries forming the
CIVILIZED WORLD.

Compiled from the averages for 10 Years

COUNTRY	DEATHS UNDER 1 YEAR TO 1000 BIRTHS	DEATHS UNDER 1 YEAR ACTUAL NUMBER
CHILI	326	30,303
RUSSIA (EUROPEAN)	263	1,298,245
AUSTRIA	222	200,553
ROUMANIA	218	49,589
HUNGARY	212	154,100
GERMAN EMPIRE	197	374,153
JAMAICA	181	6,414
CEYLON	179	23,255
SPAIN	170.0	106,649
UNITED STATES	165	280,000
<small>1000 APPROXIMATED</small>		<small>APPROX</small>
ITALY	161	83,970
BELGIUM	154	28,499
JAPAN	153	220,013
SERVIA	153	16,268
FRANCE	148	115,378
BULGARIA	144	23,757
CANADA	140	8,200
GREAT BRITAIN & IRELAND	139	147,660
SWITZERLAND	138	11,441
HOLLAND	138	19,209
FINLAND	133	10,877
WESTERN AUSTRALIA	127	756
DENMARK	124	8,089
NEW SOUTH WALES	99	3,745
VICTORIA	98	2,299
SWEDEN	96	11,917
QUEENSLAND	94	1,120
TASMANIA	93	433
SOUTH AUSTRALIA	93	608
NORWAY	86	4,231
NEW ZEALAND	76	2,233

GRAND TOTAL 3243,958

This Means A Baby Dies
In The Civilized World
Every 10 Seconds.

WATCH THE LIGHT FLASH!

Watch the light flash!

AT EVERY FLASH

A BABY DIES

Somewhere in the Civilized World.

One every 10 Seconds.
360 every Hour.
8640 every Day.
3053600 every Year.

ONE HALF OF THIS LOSS
is Preventable.

Persian
Swedish
Syrian
Russian

Combination swaddling and pillow carrying:

Austrian
Bohemian
German
Hungarian
Lithuanian
Polish

Other models:

Instant outfit. Designed by Mrs. Chas. Leister. From Child Nursery, Montreal

Typical English doll

Arnold outfit for American baby

Baby and nurse-maid, lent by St. Margaret's Home, Albany

Chinese doll and outfit, by Miss Mary Carlton, Goucher College, Baltimore

Japanese doll (life size) with complete outfit illustrating costumes worn by babies of the rich, the poor, and the middle classes. Lent by Dr. Bertha Lewis, Bryn Mawr

Labrador mother and child. Lent by the Moravian Seminary, Winston-Salem, N. C.

Moving pictures:

The Fly Pest. From American Civic Association

The Man Who Learned. From the Edison Co., Orange, N. J.

POSTERS (Framed)

Take heed of the small child of earth; he is great; he hath in him God most high —A. C. Swinburne

The people perish for lack of knowledge

—Report of the Committee on Physical Deterioration

The first requisite to success is to be a good animal

—Herbert Spencer

Good Christian people, here lies an unestimable loan; take all heed, therefore. In all carefulness employ it; with high recompense or with heavy penalty will it one day be required back

—Carlyle

Children are the capital of the State. Do YOU consent to waste 25 per cent. of our capital annually?

The magnitude of the loss by Death is also an index of the amount of havoc inflicted on the living —J. Niven

Every parent knows NOT how to bring up a child

—Italian Proverb

Her children arise up and call her blessed; her husband also; and he praiseth her —Proverbs 31, 28

Nations are gathered out of nurseries —Charles Kingsley

Infant mortality is the most sensitive index we possess of social welfare —Newsholme

Let conservation begin at home! the child is the greatest national asset

Give us good motherhood and good prenatal conditions and I have no despair for the future of this or any other country

—John Burns

A mother cannot and ought not to sub-let her maternity

—John Burns

Neglect of the child is not only criminal; it is suicidal

—David Watson

We must look to the mothers of a country for that country's welfare

—Froebel

The business of being a baby must be classified "an extra hazardous occupation"

But Jesus then unto him and said, Suffer little children to come unto me and forbid them not, for such is the kingdom of God

—St. Luke 19, 16

The very foundation of the whole commonwealth is the proper bringing up of the young people

—Cicero

Can a woman forget her sucking child, that she should not have compassion on the son of her womb? Yea, that they may forget, yet will I not forget thee

—Isaiah 49, 15

The square deal for every baby

The errors of the parents, the gods turn to the undoing of their children

—Euripedes

A voice was heard in Ramah, lamentation and bitter weeping, Rachael weeping for her children, refused to be comforted for her children, because they were not

—Jeremiah 31, 15

Whenever the health of the country is concerned— governments that are not chimerical make haste to interfere

—Carlyle

ASSOCIATION OF AMERICAN MEDICAL MILK COMMISSIONS

Charts:

Showing results of investigation of bacterial count of market milk

Showing results of keeping ordinary milk in cold storage

Showing results of keeping certified milk in cold storage

Showing growth of Milk Commission idea

Showing purposes of the organization of Association of American Medical Milk Commissions

Placards:

Results of inquiry, 1907, as to bacterial count of milk supplied Cincinnati hospitals

Results of scoring certified milk by Department of Agriculture at Cincinnati Milk Show contest

The part milk plays in infant mortality

Proportion of deaths of breast-fed to bottle-fed infants

Photographs:

Set of eight of the Cincinnati Milk Show

Set of thirteen of model dairy (Lebanon, Ohio)



MODEL NURSERY.

(Plate VIII.)



MODEL BEDROOM.

(Plate IX.)

(See page 334.)

Printed Matter:

- Four sheets "Reference to the literature of milk"
- One card with literature of the Medical Milk Commissions

Map:

- Showing location of Medical Milk Commissions in United States

ST. LOUIS PURE MILK COMMISSION

Annual reports for years ending February 15th, 1906-1907-1908-1909-1910

- Blank forms for infant feeding clinics—new form and old form
- Monthly report blanks for feeding clinics
- Physicians' order blanks for pure milk
- Weight-curve cards for mothers attending feeding clinics
- Leaflets of instruction in various languages
- Miscellaneous forms, etc.

MILK COMMISSION OF SAN FRANCISCO COUNTY, CALIFORNIA, MEDICAL SOCIETY**Cards:**

- Experts' reports
- Distributors of Certified Milk
- Notices to Consumers

Report:

- California Association of Medical Milk Commissions

Chart:

- Showing growth of sale of Certified Milk since April, 1908

Map:

- Showing region in State of California supplied with Certified Milk by six Medical Milk Commissions

RUSSELL SAGE FOUNDATION, DEPARTMENT OF CHILD-HELPING NEW YORK**Charts:**

- Showing some requisites for babies' institutions
- Showing how one society reduced the death rate from 100 per cent. to 10 per cent. by "placing out" the babies in family homes
- Showing sample record form; individual record, personal and family history

Exhibits:

- The Speedwell Society: photographs and printed matter
- Sanitary toys

Printed Matter:

- Sample record card showing housing, care, and supervision of boarded-out infants

EDUCATIONAL INSTITUTIONS**COLLEGE OF AGRICULTURE, CORNELL UNIVERSITY**

- Bulletins on card
- Economic House Plan
- Placards

DEPARTMENT OF HOME ECONOMICS, UNIVERSITY OF WISCONSIN

Placard: Outline of four years' course. "Improving the individual so that future generations may reach a higher level of attainment than those preceding them"

ASSOCIATIONS AND INDIVIDUALS**WARELANDS DAIRY TRAINING SCHOOL, NORFOLK, MASS.**

Photographs.

Eight frames illustrating courses given at Training School

COMMERCIAL**DR. H. M. ALEXANDER, MARIETTA, PENNA.**

Small, glass show case, Diphtheria Antitoxin and Small-pox Vaccine

Small, glass show case, Diagnostic and Curative Tuberculins

JAMES J. DOUGHERTY, NEW YORK CITY

Models:

Dr. Freeman's pasteurizer

Slone maternity milk set

Dr. Chapin's cream dipper

Dr. Chapin's automatic bottle warmer



Some of our Baltimore
BREAST-FED BABIES
 Mothers are especially qualified to make the success
 of their babies, in their own homes.
A TWENTY DOLLAR GOLD PIECE
 will be awarded to the Best Baby selected by a
 Committee in the case of these exhibitors.

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PHOTOGRAPHS SUBMITTED IN THE CONTEST.

(See page 331.)

AMERICAN ASSOCIATION FOR STUDY AND PREVENTION OF INFANT MORTALITY

CONSTITUTION

ARTICLE I—*Name*

The name of this society shall be THE AMERICAN ASSOCIATION FOR STUDY AND PREVENTION OF INFANT MORTALITY.

ARTICLE II—*Objects*

The objects of the Association shall be: (a) The study of infant mortality in all its relations; (b) the dissemination of knowledge concerning the causes and prevention of infant mortality; (c) the encouragement of methods for the prevention of infant mortality.

ARTICLE III—*Meetings*

The meetings shall be held at such times and in such places as may be directed under the By-Laws.

BY-LAWS

ARTICLE I—*Membership*

This Association shall consist of five classes of members: (a) Active Members; (b) Life Members; (c) Sustaining Members; (d) Honorary Members; (e) Affiliated Organizations.

(a) Those persons subscribing to the invitations for members at the Conference called by the American Academy of Medicine at New Haven, November 11-12, 1909, and such persons as shall from time to time be elected by the Board of Directors, shall be members so long as they comply with the provisions of the By-Laws. The dues of Active Members shall be Three Dollars (\$3) a year.

(b) Members may become Life Members upon the payment of Two Hundred Dollars (\$200).

(c) Members may become Sustaining Members on the payment of Twenty-five Dollars (\$25) a year.

(d) Persons distinguished for eminent services in the study or prevention of infant mortality may be elected Honorary Members.

(e) Organizations pursuing objects in harmony with the objects of this Association may become Affiliated Members according to the terms set forth in Article X.

ARTICLE II—*Board of Directors*

SECTION 1. The Association shall, at its first meeting, elect a board of thirty directors, divided into five groups of six each, to serve one, two, three, four and five years, the duration of office to be determined by lot; thereafter, retiring directors, who have served a full term of five years, shall not be eligible for re-election the year of retirement; provided, however, that this restriction shall not apply to the secretary or treasurer.

The Board of Directors may hereafter, at the annual meeting or at a special meeting of the Association, be increased in multiples of five to at most sixty, the additional members to be assigned to groups in accordance with the provisions of the preceding paragraph of this section and subject to the same restrictions. At least one-third of the total membership of the Board shall consist of non-medical persons.

SEC. 2. The Board of Directors shall make its own rules; the government of the Association, the planning of work, the disbursing of moneys, the arrangements for meetings and congresses, and all other matters pertaining to legislation and direction shall be in its hands; committees shall have the power to execute only what is directed by the Board.

ARTICLE III—*Election of Officers*

The Board of Directors shall annually elect from its own number a President, two Vice-Presidents, a Secretary and a Treasurer, who shall be officers of the Association, as well as of the Board. The President-elect shall be installed at the annual meeting following that at which he was elected.

The Board of Directors shall, at its first meeting, elect also a President to serve for the immediate year.

ARTICLE IV—*Committees*

SECTION 1. The Board of Directors shall appoint an Executive Committee of seven directors, of which the President and the Secretary shall be members *ex officio*, to which shall be entrusted all the executive work of the Association.

SEC. 2. The Board of Directors is empowered to appoint such committees and representatives as may be necessary for scientific educational work, and for the holding of meetings and congresses.

ARTICLE V—*Quorum*

Seven directors shall constitute a quorum of the Board.

ARTICLE VI—*Meetings*

There shall be at least one stated annual meeting of the Association at a time and place to be fixed by the Board of Directors. Other meetings of the Association may be called by the Board at such times as it shall deem proper. The Executive Committee shall hold stated and other meetings provided by the rules of the Board of Directors.

ARTICLE VII—*Moneys*

The moneys received from membership dues and from all other sources shall be used for defraying the expenses of the Association, and for furthering the objects under the direction of the Board of Directors.

ARTICLE VIII—*Amendment of Constitution*

Propositions to amend the Constitution may be presented in writing

at any meeting of the Board of Directors or of the Association; they shall be then referred to the Board of Directors for consideration and report. The Board of Directors shall report all propositions for amendment, whether submitted to it originally or by reference, at the meeting of the Association next following, when action may be taken; *provided, however,* that no proposition for amendment shall be voted upon within thirty days after its presentation, or without at least twenty days' notice of the meeting at which it is to come up for consideration, which notice shall set forth the proposed amendment in full. An affirmative vote of two-thirds the members present shall be required for adoption.

ARTICLE IX—*Amendment of By-Laws*

By-Laws may be amended in the same manner as the Constitution, or by a two-thirds vote of the members present at a meeting of the Board of Directors, provided that twenty days' notice in writing has been given of the proposed amendment in the call for the meeting.

ARTICLE X—*Affiliated Organizations*

Affiliated Organizations shall pay annual dues of Five Dollars (\$5) each, entitling one official representative of each to the status of an individual member, except eligibility to elective offices.

The duty of an Official Representative of an Affiliated Organization shall be to promote co-operation in the study and prevention of infant mortality between his own and this Association, presenting to each a brief written report for this purpose.

AMERICAN ASSOCIATION FOR STUDY AND PREVENTION OF INFANT MORTALITY

MEMBERSHIP LIST 1910

Life Members

Knox, Miss Katherine Bowdoin, Baltimore
Knox, Mrs. J. H. Mason, Jr., Baltimore
White, Richard J., Baltimore

Affiliated Societies

American Society of Superintendents of Training Schools for Nurses
Associated Charities, Hamilton, Ohio
Babies' Dispensary and Hospital, Cleveland
Babies' Milk Dispensary, Buffalo
Babies' Hospital Milk Dispensary, Newark, N. J.
Babies' Milk Fund Association, Louisville, Ky.
Berlin Mills Company's Instructive District Nursing Fund, Berlin, New Hampshire
Bureau of Municipal Research, Philadelphia
California Branch of the Association of Collegiate Alumnae
Cheraw Association for Study and Prevention of Infant Mortality, Cheraw, S. C.
Children's Aid Association, Indianapolis, Ind.
Children's Aid Society of Pennsylvania, Philadelphia
Children's Mission, Boston
Christian Service League of America, Wichita, Kansas
Committee on Infant Social Service of the Women's Municipal League of Boston
Committee on Prevention of Blindness of the New York Association for the Blind, New York City
Connecticut Children's Aid Society, Hartford
Department of Health, Baltimore
Graduate Nurses Association, Cleveland
Health Bureau, Rochester, N. Y.
Hull House, Chicago
Instructive District Nursing Association, Columbus, Ohio
Maryland Association for Study and Prevention of Infant Mortality, Baltimore
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