TRANSACTIONS OF

THE FIRST ANNUAL CONFERENCE

OF

GOVERNMENTAL INDUSTRIAL HYGIENISTS

HELD AT WASHINGTON, D. C.

JUNE 27 - 29, 1938.

B-2724

TRANSACTIONS OF
THE FIRST ANNUAL CONFERENCE OF
GOVERNMENTAL INDUSTRIAL HYGIENISTS

Held at Washington, D. C.

June 27-29, 1938.

TABLE OF CONTENTS

Illustration

CONSTITUTION OF THE NATIONAL CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS

Article I

Name

Section 1. The name of this organization shall be the National Conference of Governmental Industrial Hygienists hereinafter referred to as the conference. The qualifications for eligibility to membership shall be established by the Executive Committee.

Article II

Objects

Section 2. The objects of the conference shall be to promote industrial hygiene and sanitation in all its aspects and phases; To coordinate industrial hygiene and sanitation activities of official Federal, State, local and territorial organizations; to encourage the interchange of experience among industrial hygiene workers in such official organizations; to collect and make accessible to all industrial hygiene workers such information and data as may be of assistance to them in the proper fulfillment of their duties.

Article III

Membership

Section 3. The membership of the conference shall be of three grades, namely, members, associate members, and affiliated members. Eligibility to any of these three grades shall be determined by a majority vote of the Executive Committee.

Section 4. Members shall be limited to two persons regularly employed by Federal, State, local and territorial governments who are engaged in industrial hygiene activities.

Section 5. Associate members shall be limited to persons regularly employed by Federal, State, local and territorial governments who are engaged in industrial hygiene activities, and personnel of educational institutions who are engaged in teaching industrial hygiene. They shall be eligible to serve on committees but not to hold office or to act as chairmen of committees.

Section 6. Affiliated members shall be limited to representatives from other countries who are engaged in industrial

hygiene work under the direction of officially organized departments of the political subdivisions of such countries. They shall be eligible to serve on committees but not to hold office or act as chairmen of committees.

Section 7. The vote of the conference shall lie with the two members present from each State and the majority of those at any meeting shall determine all questions except those pertaining to constitutional amendments, as hereinafter explained.

Article IV

Officers

Section 8. The officers of the conference shall be a chairman, a vice-chairman and a secretary-treasurer.

Section 9. The chairman shall be the executive officer of the conference and shall preside at all meetings during his term of office. In addition, he shall be chairman of the executive committee.

Section 10. The vice-chairman, in the absence of the chairman at any meeting, shall act as the presiding officer, or, in the event of a vacancy in the office of chairman, he shall assume these duties until a chairman has been duly elected at the next annual meeting.

Section 11. In the absence of both the chairman and the vice-chairman the presiding officer at the annual meeting shall be the senior member of the executive committee in attendance.

Section 12. The secretary-treasurer shall be selected by the executive committee from the officers representing the United States Public Health Service and must be an officer serving a detail in Washington. He shall be responsible for the minutes and transactions of annual meetings and shall be custodian of all funds collected by the conference. He shall have authority to disburse those funds, making an accounting of receipts and disbursements at each annual meeting or on the date of his resignation as secretary-treasurer. In addition, the secretary-treasurer shall be secretary of the Executive Committee and shall perform such other duties as the Executive Committee may delegate to him.

Article V

Annual Elections

Section 13. At each annual meeting there shall be elected

a chairman, vice-chairman, and three members of the executive committee. Nominations and elections shall be as explained herewith.

The nominating committee shall consist of five members, namely, the chairman, the vice-chairman and the three conference members who have most recently held the office of chairman. In the event any or all of these members are unavailable for any ensuing year, the conference shall elect by majority vote at any annual meeting conference members to serve on this committee.

The nominating committee shall, not later than two months preceding the next annual meeting, decide on the nominees for each of the offices to be filled, having one candidate for each of the offices. Suggestions for any of the offices submitted in writing by any member or members of the conference at any time prior to the final selection of the nominees two months preceding the annual meeting shall receive consideration by the nominating committee. Nominating petitions bearing the names of ten or more members shall automatically constitute nomination to office, if presented to the nominating committee prior to the final selection of nominees two months preceding the annual meeting.

Not later than four weeks prior to the annual meeting the secretary-treasurer shall send to each member a letter ballot, giving the list of offices to be filled and the list of candidates for each office. The ballot shall be placed in a plain envelope, marked "Ballot for offices", and then sealed. The ballot envelope shall be inclosed in a larger envelope and then forwarded to the secretary-treasurer at least one week prior to the date of the annual meeting, or else presented to him on the morning of the first meeting day. The signature of the member voting shall appear only on the outer envelope. In case a member does not wish to vote for the choice made by the nominating committee he has the privilege of writing in his own selection for any office.

On the afternoon of the first conference day the ballots shall be opened and counted by a committee of three tellers appointed by the chairman and the result of the count announced to the conference. Such tellers must be members in good standing and shall not include any members of the nominating committee, any officer or any person whose name appears on the ballot. Those elected shall not assume the prerogatives of office until the expiration of the conference at which they are chosen except in so far as explained in Section 15.

Article VI

Executive Committee

Section 14. The chairman, vice-chairman, secretary-treasurer, outgoing chairman, the three other members of the conference who shall be elected as above explained, shall constitute the executive committee to carry on the work of the conference between annual meetings.

Section 15. Annual committees shall be appointed by the new executive committee before the close of the annual meeting. Should the annual meeting extend beyond two days, these appointments shall be made on the afternoon of the second day. The secretary-treasurer shall notify all committee chairmen and committee members of their appointment before the expiration of one month from the date of their appointment.

Section 16. Committees needed temporarily to carry on the business of each annual meeting may be appointed by the chairman before or during said annual meetings.

Section 17. Between annual meetings the conference chairman shall make appointments to fill vacancies on any committee.

Article VII

Finances

Section 18. Every member, associate and affiliated member shall pay annual dues of $1.00, these dues to be payable on or before the first day of each annual meeting for each ensuing year. Members whose dues have lapsed beyond the current year shall be ineligible to hold office, vote or serve on any committee.

Article VIII

Annual Meeting

Section 19. The time and place of the next annual meeting may be fixed at the meeting of the conference then assembled or may be made subject to call of the executive committee provided members from at least ten States signify their intention of attending such meeting.

Article IX

Special Meetings

Section 20. Meetings, other than the annual meeting, may be called by the executive committee or on petition of ten or more members from any ten States. The purpose of such meetings shall be to meet emergency situations, disseminate information which should not be held over until the next annual meeting and to discuss conditions which affect or may affect the conference or its members. Such meetings shall not assume any of the prerogatives of the annual meeting or carry on any of the annual business.

Article X

Section 21. The conference may adopt by-laws in accordance with this constitution.

Article XI

Amendments

Section 22. The conference may adopt amendments to this constitution by two-thirds vote of all voting members. Any member may propose an amendment at any annual meeting of the conference, and if such amendment receive approval of the majority of voting members present the secretary-treasurer shall submit the amendment to the entire membership by letter ballot.

MEMBERS OF CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS*

State or Other Jurisdiction	Name	Title	City
California	Dr. J. P. Russell	Director, Industrial Hygiene Service	Berkeley
California	F. R. Ingram	Industrial Hygiene Engineer	Berkeley
Connecticut	Dr. A. S. Gray	Director, Bureau of Occupational Diseases	Hartford
Connecticut	A. L. Coleman	Chief Industrial Hygienist	Hartford
Illinois	Dr. M. H. Kronenberg	Director, Division of Industrial Hygiene	Chicago
Illinois	A. N. Setterlind	Chief Chemist	Chicago
Chicago, Illinois	Joel I. Connolly	Assistant to President, Board of Health; Chief, Bureau of Public Health Engineering	Chicago
Indiana	Dr. L. W. Spolyar	Director, Bureau of Industrial Hygiene	Indianapolis
Indiana	J. S. Wiley	Ass't Engineer	Indianapolis
Iowa	A. H. Wieters	Director, Division of Public Health Engineering	Des Moines
Iowa	P. J. Houser	Industrial Hygiene Engineer	Des Moines
Kansas	Earnest Boyce	Chief Engineer; Director, Division of Sanitation	Lawrence
Kansas	C. C. Dills	Industrial Hygiene Engineer	Lawrence
Baltimore, Maryland	Dr. W. H. Schulze	Director, Bureau of Environmental Hygiene	Baltimore

*Unless otherwise specified, members are affiliated with departments of health.

MEMBERS OF CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS
(Continued)

State or Other Jurisdiction	Name	Title	City
Baltimore, Maryland	Dr. J. M. McDonald	Director, Bureau of Occupational Diseases	Baltimore
Massachusetts	Manfred Bowditch	Director, Division of Occupational Hygiene, State Department of Labor & Industries	Boston
Massachusetts	Dr. H. B. Elkins	Chemist, Division of Occupational Hygiene, State Department of Labor & Industries	Boston
Michigan	J. M. Hepler	Director, Bureau of Industrial Hygiene	Lansing
Michigan	P. F. Rezin	Chemical Engineer	Lansing
Detroit, Michigan	W. N. Witheridge	Sanitary Engineer	Detroit
Detroit, Michigan	W. G. Fredrick	Ass't Chemical Engineer	Detroit
Mississippi	Dr. J. W. Dugger	Director, Industrial Hygiene & Factory Inspection	Jackson
Missouri	W. Scott Johnson	Chief Public Health Engineer	Jefferson City
Missouri	H. I. Miller, Jr.	Industrial Hygiene Engineer	Jefferson City
St. Louis, Missouri	H. G. Dyktor	Chief Industrial Hygiene Engineer	St. Louis
St. Louis, Missouri	John Buxell	Industrial Hygiene Engineer	St. Louis
New Hampshire	F. J. Vintinner	Ass't Sanitary Engineer	Concord
New York	Dr. L. Greenburg	Executive Director, Division of Industrial Hygiene, State Department of Labor	New York
New York	Theodore Hatch	Associate Dust Control Engineer, Division of Industrial Hygiene, State Department of Labor	New York

MEMBERS OF CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS
(Continued)

State or Other Jurisdiction	Name	Title	City
North Carolina	Dr. H. F. Easom	Director, Division of Industrial Hygiene	Raleigh
North Carolina	M. F. Trice	Engineer	Raleigh
Ohio	Dr. K. D. Smith	Medical Supervisor, Bureau of Occupational Diseases	Columbus
Ohio	C. B. Young	Chemical Engineer	Columbus
Pennsylvania	Dr. W. B. Fulton	Chief, Division of Industrial Hygiene	Harrisburg
Rhode Island	Dr. J. P. Deery	Chief, Division of Industrial Hygiene	Providence
Rhode Island	C. L. Pool	Chief Engineer, Division of Industrial Hygiene	Providence
South Carolina	Dr. H. F. Wilson	Director, Industrial Hygiene	Columbia
South Carolina	R. M. Brown	Chemical Engineer	Columbia
Tennessee	Dr. Crit Pharris	Director, Industrial Hygiene	Nashville
Tennessee	H. N. Parrish	Industrial Hygiene Engineer	Nashville
Texas	Dr. C. A. Nau	Director, Division of Industrial Hygiene	Austin
Texas	W. B. Wardlow	Ventilation Engineer	Austin
Vermont	Dr. L. E. Judd	Director, Industrial Hygiene Division	Barre
Vermont	E. C. J. Urban	Industrial Hygiene Engineer	Barre
Virginia	Dr. W. D. Tillson	Director, Bureau of Industrial Hygiene	Richmond
Virginia	R. T. Homewood	Industrial Hygiene Engineer	Richmond
Washington	R. M. Harris	Chief, Division of Public Health Engineering	Seattle
Washington	Arne Eriksen	Industrial Hygiene Engineer	Seattle

MEMBERS OF CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS
(Continued)

State or Other Jurisdiction	Name	Title	City
West Virginia	Dr. J. F. Cadden	Director, Bureau of Industrial Hygiene	Charleston
West Virginia	E. T. Roetman	Industrial Hygiene Engineer	Charleston
West Virginia	S. C. Rothmann	Industrial Hygiene Engineer, State Compensation Commission	Charleston
Wisconsin	Dr. P. A. Brehm	Supervisor, Industrial Hygiene Unit	Madison
Wisconsin	H. W. Ruf	Industrial Sanitary Engineer	Madison
U. S. Public Health Service	Dr. R. R. Sayers	Chief, Division of Industrial Hygiene	Washington, D. C.
U. S. Public Health Service	J. J. Bloomfield	Sanitary Engineer	Washington, D. C.
U. S. Bureau of Mines	Daniel Harrington	Chief, Health & Safety Branch	Washington, D. C.
U. S. Bureau of Mines	Dr. H. H. Schrenk	Chief Chemist, Health Division	Pittsburgh, Pa.
Tennessee Valley Authority	Dr. W. T. Davis	Medical Officer, Occupational Hygiene Division	Wilson Dam, Ala.
Tennessee Valley Authority	R. B. Fleming	Associate Chemist, Industrial Hygiene	Wilson Dam, Ala.

AFFILIATED MEMBER

Canada	Dr. F. S. Parney	Chief, Division of Industrial Hygiene, Department of Pensions and National Health	Ottawa

ASSOCIATE MEMBERS OF NATIONAL CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS

State or Other Jurisdiction	Name	Title	City
University of Illinois	Dr. L. Arnold	Professor of Bacteriology & Public Health, College of Medicine	Chicago
Johns Hopkins University	Dr. A. M. Baetjer	Associate in Physiological Hygiene, School of Hygiene & Public Health	Baltimore
Baltimore, Maryland	C. E. Couchman	Industrial Hygiene Inspector, City Health Department	Baltimore
California	E. W. Dakan	Ass't Engineer, Industrial Hygiene Service, State Health Department	Berkeley
Connecticut	Joseph Massaro	Ass't Industrial Hygienist, Bureau of Occupational Diseases, State Health Department	Hartford
Connecticut	Louis Press	Ass't Industrial Hygienist	Hartford
Illinois	K. M. Morse	Industrial Hygiene Engineer, State Department of Health	Chicago
Kansas	A. L. Nichols	Industrial Hygienist, State Board of Health	Lawrence
Massachusetts	W.C.L. Hemeon	Engineer, Division of Occupational Hygiene, State Department of Labor & Industries	Boston
North Carolina	C. D. King	Ass't Industrial Hygienist, State Dept. of Health	Raleigh
Rhode Island	C. V. Hickey	Ass't Engineer, Division of Industrial Hygiene, State Health Department	Providence
Rhode Island	Joseph Wuraftic	Ass't Engineer	Providence

State or Other Jurisdiction	Name	Title	City
Texas	T. R. Thomas	Engineer, Division of Industrial Hygiene, State Department of Health	Austin
Virginia	H. J. Worsham	Chemist, Bureau of Industrial Hygiene, State Department of Health	Richmond
Tennessee Valley Authority	Dr. S. F. Strain	Chief, Occupational Hygiene Division, Health & Safety Department	Chattanooga
U. S. Bureau of Mines	S. J. Davenport	Principal Translator, Health Division	Washington, D. C.

OFFICERS OF THE CONFERENCE

1937-1938

Dr. Albert S. Gray - Chairman

Mr. W. Scott Johnson - Vice Chairman

Mr. John J. Bloomfield - Secretary-Treasurer

1938-1939

Mr. W. Scott Johnson - Chairman

Dr. John P. Russell - Vice Chairman

Mr. John J. Bloomfield - Secretary-Treasurer

STANDING COMMITTEES

EXECUTIVE COMMITTEE

W. Scott Johnson, Chairman

Dr. John P. Russell	Charles L. Pool
Dr. Albert S. Gray	Dr. Crit Pharris
Dr. Carl A. Nau	J. J. Bloomfield

COMMITTEE TO STUDY METHODS OF APPRAISAL OF INDUSTRIAL HYGIENE PROBLEMS IN A LOCALITY

Dr. Crit Pharris, Chairman

C. C. Dills	H. I. Miller

COMMITTEE ON RELATIONSHIP OF INDUSTRIAL HYGIENE ACTIVITIES TO INDUSTRY, LABOR, MEDICAL PROFESSION, AND OTHER AGENCIES

Dr. R. R. Sayers, Chairman

Dr. R. R. Jones	Dr. M. H. Kronenberg

COMMITTEE ON TECHNICAL STANDARDS

Theodore Hatch, Chairman

A. N. Setterlind	Dr. L. T. Fairhall
Dr. H. F. Easom	Dr. L. E. Judd

COMMITTEE ON INDUSTRIAL HYGIENE EDUCATION

Dr. Carl A. Nau, Chairman

H. G. Dyktor	Dr. F. S. Parney
Harry Miller	

COMMITTEE TO STUDY METHODS FOR SECURING EFFECTIVE AND UNIFORM REPORTING OF OCCUPATIONAL DISEASES AND OTHER ILLNESSES AMONG WORKERS

Dr. John M. McDonald, Chairman

Dr. K. D. Smith	Dr. W. M. Gafafer
Manfred Bowditch	

COMMITTEE ON ADMINISTRATIVE DEVELOPMENT OF INDUSTRIAL HYGIENE ACTIVITIES IN THE STATE THROUGH LOCAL DEPARTMENTS OF HEALTH

Dr. Albert S. Gray, Chairman
Dr. R. R. Sayers
W. Scott Johnson

COMMITTEE ON INDUSTRIAL HEALTH CODE

Charles L. Pool, Chairman
K. M. Morse
Dr. J. M. DallaValle
Dr. John P. Russell
Dr. John F. Cadden

COMMITTEE TO STUDY INDUSTRIAL HYGIENE LEGISLATION

Major Joel I. Connolly, Chairman
Dr. W. D. Tillson
John M. Hepler

COMMITTEE ON INDUSTRIAL HYGIENE PERSONNEL

J. J. Bloomfield, Chairman
Dr. Leonard Greenburg
Earnest Boyce

PROGRAM OF FIRST ANNUAL CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS

Monday, June 27

9:15 a.m. Address of Welcome
By Acting Surgeon General W. F. Draper,
U. S. Public Health Service.

9:30 a.m. Executive Session
Dr. Albert S. Gray, Chairman - Presiding

1. Roll Call
2. Appointment of Special Committees (Tellers, banquet, etc.)
3. Report of Executive Committee
4. Report of Secretary-Treasurer
5. Consideration of committees to be appointed at this conference for the purpose of studying and presenting reports at the next annual meeting on various subjects

12:30 p.m. Announcement by Chairman of the Committee of Tellers of the election of new officers

Monday Afternoon

2:00 p.m. Dr. Albert S. Gray, Chairman - Presiding

1. Public Health Aspects of Industrial Hygiene
By R. R. Sayers, Senior Surgeon, and
J. J. Bloomfield, Sanitary Engineer,
U. S. Public Health Service

   Discussion by Dr. Albert S. Gray, Director,
Bureau of Occupational Diseases,
Connecticut State Department of Health

2. The Administrative Problems of a Municipal Program in Industrial Hygiene
By Dr. John M. McDonald, Director,
Bureau of Occupational Diseases,
Baltimore Department of Health

   Discussion by Dr. Crit Pharris, Director,
Division of Industrial Hygiene,
Tennessee Department of Health

3. The Role of the Engineer in Industrial Hygiene
By Charles L. Pool, Chief Industrial Hygiene Engineer, Rhode Island Department of Health

Discussion by Theodore Hatch, Associate Dust Control Engineer, Division of Industrial Hygiene, New York State Department of Labor

4. Modes of Investigation of Occupational Dermatoses
By Medical Director Louis Schwartz, Division of Industrial Hygiene, U. S. Public Health Service

Discussion by Dr. Kenneth D. Smith, Director, Bureau of Occupational Diseases, Ohio State Department of Health

Tuesday, June 28

9:00 a.m. General Session
Dr. Albert S. Gray, Chairman - Presiding

There are 28 industrial hygiene units in the United States at this time. The director of each of these units will present a five-minute discussion on the following topics:

a. Personnel and budget of each unit
b. Summary of the activities for the past year
c. The most perplexing administrative and technical problem in need of solution

A discussion of the problems presented by each unit will follow immediately after presentation. In view of the number of units, the entire day will be devoted to a presentation and discussion of the various problems.

4:00 p.m. Executive Session
Dr. Albert S. Gray, Chairman - Presiding

Appointment of annual committees by the new Executive Committee. According to the constitution, this must be done not later than the afternoon of the second day.

Wednesday, June 29

9:00 a.m. Demonstrations, Industrial Hygiene Laboratory

FIELD STUDIES. Drs. Flinn, Neal, and R. R. Jones

ASBESTOS STUDY. Dr. Edwards, 2nd floor, hall. Textile industry.
POTTERY STUDY. Dr. Flinn, Room 206, 2nd floor.
MERCURY STUDY. Drs. Neal and R. R. Jones, Room 106, 1st floor. Hatters' fur cutting industry.
RETICULOCYTE AND STIPPLED CELL DETERMINATIONS. Dr. R. R. Jones, Room 106, 1st floor.

ENGINEERING STUDIES. Mr. Page, Room 202, 2nd floor.

Some recent developments in apparatus for measuring atmospheric dusts, fumes, and physical conditions.

PATHOLOGY. Dr. Miller

PNEUMOCONIOSES. Dr. Miller, Room 12, 1st floor. Human pathology.
EXPERIMENTAL DUST STUDIES. Dr. Miller, 1st floor, hall. Biological testing of dusts.

CHEMISTRY. Dr. Fairhall.

LEAD ARSENATE STUDIES. Dr. Fairhall, Room 102, 1st floor.
ABSORPTION AND EXCRETION OF LEAD ARSENATE. Dr. Fairhall, Room 102, 1st floor.
METHODS OF LEAD ANALYSIS. Dr. Webster, Room 120, 1st floor.
METHODS OF ARSENIC ANALYSIS. Dr. Fairhall, Room 102, 1st floor.
PETROGRAPHIC METHODS FOR DUSTS. Dr. Goldman, Room 120, 1st floor.
CHEMICAL ANALYSIS OF SILICA. Dr. Goldman, Room 120, 1st floor.
MERCURY DETERMINATIONS. Dr. Goldman, Room 120, 1st floor.
METHYL BROMIDE STUDIES. Mr. Dudley, Room 204, 1st floor.

BIOPHYSICAL STUDIES. Dr. Brackett.

ULTRAVIOLET EFFECTIVENESS STUDIES. Dr. Hollaender, Room 204, 2nd floor.
SPECTROGRAPHIC ANALYSIS. Mr. Armstrong, Basement.
PHOTOSPECTROMETRIC MEASUREMENTS. Mr. Andresen, Room 204, 2nd floor.
HYDROGEN ION DETERMINATIONS IN RELATION TO SPECTRAL ABSORPTION. Mr. Gilbert and Mr. Allen, Room 204, 2nd floor.
EPIDEMIOLOGICAL RADIATION MEASUREMENTS. Mr. Eicher, Room 206, 2nd floor.

PHYSIOLOGY. Dr. B. F. Jones

EFFECT OF ARSENIC COMPOUNDS ON THE INTESTINES. Dr. Donahue, Room 208, 2nd floor.

ACUTE EFFECTS OF ACETONE VAPORS ON GUINEA PIGS. Dr. Specht and Mr. Valaer, Room 204, 2nd floor.

CARBON MONOXIDE DETECTION IN AIR AND BLOOD. Dr. Baernstein, Room 204, 2nd floor.

LABORATORY GAS ANALYSIS METHODS. Mr. Grand, Room 208, 2nd floor.

Wednesday Afternoon

2:00 p.m. Dr. Albert S. Gray, Chairman - Presiding

1. Viewing of film "Stop Silicosis!".

2. Unfinished business.

B-1724

FIRST ANNUAL CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS

TRANSACTIONS

Morning Session, Monday, June 27, 1938.

The First Annual Conference of Governmental Industrial Hygienists was called to order by the Chairman, Dr. Albert S. Gray, in the auditorium of the United States Public Health Service, Washington, D. C., at 9:30 a.m. on June 27, 1938.

DR. GRAY: Gentlemen, the meeting will now come to order. I am going to ask a member of this conference, who knows everyone here better than anyone else, who has been the father confessor to most of us some time in our career in industrial hygiene, to introduce the guest speakers. Dr. Sayers.

DR. SAYERS: Thank you, Mr. Chairman. Thank you, Mr. Secretary. I am not going to make a speech at this time. I do want to tell you that we are very appreciative of your being here. Dr. Draper, who has been Acting Surgeon General longer than I have been in the Service and longer than the Surgeon General has been in the Service, will greet you, inasmuch as the Surgeon General is out of town. At the present time Dr. Draper is also representative of the United States Public Health Service on the Council of Industrial Health of the American Medical Association. Dr. Draper is very much interested in the work that we are doing. Dr. Draper.

DR. DRAPER: I just want to welcome you here in behalf of Dr. Parran, who would be here if he were in town, and I want to tell you of the very genuine and intense interest that we all have in industrial hygiene work. It seems only a short time ago that I became acquainted with the beginnings of the industrial hygiene work, which took place at Joplin, Missouri, about 1915, if my memory serves me right. Since then there has been a gradual development, of course, until now the field has been pretty well outlined. We know what a great many of the problems are, and through the impetus that has been given us by the Social Security appropriation, we are able to do something toward meeting some of the demands in this field of work. So many of the State organizations are just beginning to get started and under way that you men are really in at the beginning. And the start that is made--the early impressions--will determine very considerably the success or failure of the work in the various States as time goes on. So your work is important and we are extremely interested in and concerned with it. Of course, the development of uniform methods, and procedures, and standards between the States is very important. It is my understanding that one of the reasons you are here these three days is to take account of the experience of the past year and use that experience as the basis for developing plans for the future. As Dr. Sayers says, I have suddenly found myself in one of the industrial hygiene activities. For some reason--it has never been entirely

clear to me why--I am a member on the Council on Industrial Health of the American Medical Association. With my appointment I began to develop an avid desire for information and knowledge in the field. So with every opportunity I hope and expect to sit in with you, and I hope you won't consider me entirely foreign. Thank you.

DR. SAYERS: Dr. Draper has other engagements which force him to leave us immediately. I assure you, however, that Dr. Draper is very much interested and is anxious to be with you; he will have a representative to sit in his place.

The next speaker that you will hear represents a very important part of our work. He has much to do with the development of the work within the States. Knowing his interest, I think it would be worth while for him to express his opinions freely at these meetings, and I hope he will become acquainted with each and every one of you. I would be very glad if he can and will sit in at all our meetings. He has much to do with the Social Security budgets, and also with the development of programs, not only on industrial health but other health problems and the relationship of industrial health to other health procedures. We have plans which we believe will make public health more important and more efficiently carried out in industrial hygiene units by industrial hygiene methods. Dr. Miller is in the Division of Domestic Quarantine and is representing Dr. Waller. Dr. Miller.

DR. MILLER: As Doctor Sayers stated, I am in the Division of Domestic Quarantine, States' relations. Now I find myself very much in the position of someone who has been given by his fond parents a title to carry with him the rest of his life. Naturally, when one speaks of the Division of Domestic Quarantine, you raise the question what is domestic quarantine, and why is it so called? The explanation might be of interest to you. We have, as you know, a number of divisions in the Public Health Service, one of which is the Foreign Quarantine Division, the purpose of which is to exclude diseases from foreign countries. In like manner, it is the duty of the Domestic Quarantine Division to prevent the transmission of diseases from State to State. In our earlier conception of the control of disease, all we knew about it was the application of quarantine measures to control the disease. That is the origin of the term "domestic quarantine". But in our newer conception of public health, we don't think much in terms of quarantine any more. We feel that to prevent the spread of diseases from State to State, the procedure should be not to place guards all along the borders and ports of entry around the States, but to attack diseases at their source, and it is for this reason that we now participate in the actual control of disease within the State. It is on this basis that the Social Security Act, Title VI, is founded. The appropriation of funds was granted to the States simply to give the States money with which to do the work for which we

ourselves are responsible. With that conception in mind, you will understand more clearly what the function of the Domestic Quarantine Division is. As Dr. Sayers stated, we now choose to speak of this function more frequently as the Division that has to do with States' relations.

I don't need to tell you, except as a reminder, that there has been a great social change going on in this country within the last few years--a tremendous readjustment of our whole social structure, and at the bottom of the whole thing is the industrialization of the country. We are changing from a rural community to a municipality, and that means the industrial community. The Social Security Act was passed for the benefit of all the people, not simply some peculiarly needy section of the population, and, since this tremendous industrial development has taken place and is taking place, certainly industrial hygiene problems cannot be overlooked. When I became Regional Consultant to District 3--the region including Detroit and Chicago--at the beginning of the Social Security program, I began to cast about to see what the great problems were in that District of ten States--what things should be emphasized most, and I convinced myself very readily that for certain States in that territory industrial hygiene was one of the outstanding problems. I mention particularly Michigan, Ohio, Indiana, and Illinois and, of course, to some extent, Wisconsin and Minnesota. At the time the Social Security Act came into effect, there were

3 States that were doing something along the line of industrial hygiene. At the present time, according to my last information, 23 States and 3 cities have industrial hygiene units in State or city government. Now the question is, should all States set up industrial hygiene units? Personally, I don't think so. I think we have to look on industrial hygiene in its relative importance to other problems in any given State. There are some States, as you well know, which are not industrial States and their interests are not in industrialization. When funds are limited, there are much more important problems along other lines. The point I want to make is that we have to fit industrial hygiene into the general health program. We can't allow industrial hygiene to usurp an undue amount of funds which should be used for other public health work. When you do that you are defeating your own purpose.

An industrial hygiene program should be integrated into the State and the local health program. Instead of being a separate thing, it should be woven into the whole picture. The first essential, I should say, is an effective central administration. You have to tie up central administration activities with your local health work, and I think we will not at any time realize the total force and power of our industrial hygiene programs until we get strong local health services through which we can work. There is one thing we should consider about this industrial hygiene program, and that is that adequate provisions have not

been made for educating people who are interested in industrial hygiene for this work. Dr. Sayers, through his seminars, has done much to fill that gap, but the fact remains, that for industrial hygiene there has not been adequate provision for the training of personnel; and if there is any field in which technical training is important, it is industrial hygiene--not only from the standpoint of technical laboratory work but also from the standpoint of public health administration. This, I believe, is one of the greatest handicaps that industrial hygiene has to face.

DR. GRAY: The next thing in our procedure is to have our esteemed secretary call the roll. May I ask each of you to stand as your name is called. I shall appreciate this. Mr. Bloomfield.

The roll call showed the following persons present:

Members

Alabama	Dr. W. F. Queen
Connecticut	Dr. A. S. Gray
Illinois	Dr. M. H. Kronenberg
Illinois	Mr. A. N. Setterlind
Indiana	Dr. L. W. Spolyar
Indiana	Mr. J. S. Wiley
Iowa	Mr. P. J. Houser
Kansas	Mr. C. C. Dills
Baltimore, Maryland	Dr. W. H. Schulze
Baltimore, Maryland	Dr. J. M. McDonald
Massachusetts	Dr. H. B. Elkins
Michigan	Mr. J. M. Hepler
Michigan	Mr. P. F. Rezin
Mississippi	Dr. J. W. Dugger
Missouri	Mr. W. S. Johnson
Missouri	Mr. H. I. Miller, Jr.
St. Louis, Missouri	Mr. H. G. Dyktor
St. Louis, Missouri	Mr. John Buxell

New Hampshire	Mr. F. J. Vintinner
New York	Dr. Leonard Greenburg
New York	Mr. Theodore Hatch
North Carolina	Dr. H. F. Easom
North Carolina	Mr. M. F. Trice
Ohio	Dr. K. D. Smith
Rhode Island	Dr. J. P. Deery
Rhode Island	Mr. C. L. Pool
South Carolina	Dr. H. F. Wilson
South Carolina	Mr. R. M. Brown
Tennessee	Dr. Crit Pharris
Tennessee	Mr. H. N. Parrish
Texas	Dr. C. A. Nau
Vermont	Dr. L. E. Judd
Vermont	Mr. E. C. J. Urban
Virginia	Dr. W. D. Tillson
Virginia	Mr. R. T. Homewood
West Virginia	Dr. J. F. Cadden
West Virginia	Mr. E. T. Roetman
West Virginia	Mr. S. C. Rothmann
Wisconsin	Dr. P. A. Brehm
U. S. Public Health Service	Dr. R. R. Sayers
U. S. Public Health Service	Mr. J. J. Bloomfield
U. S. Bureau of Mines	Dr. H. H. Schrenk
Tennessee Valley Authority	Mr. R. B. L. Fleming

Associate Members

Tennessee Valley Authority	Dr. S. F. Strain

Affiliated Members

Canada	Dr. F. S. Parney

Visitors

Arkansas	Mr. R. W. Franks, State Health Department
Rhode Island	Mr. Joseph Wuraftic, State Health Department
Vermont	Mr. H. B. Slocum, State Health Department
Virginia	Mr. Worsham, State Health Department
Michigan	Mr. H. E. Miller, Michigan University
Tennessee	Mr. Roy Morton, Vanderbilt University

REPORT OF EXECUTIVE COMMITTEE

Your Executive Committee has met in Washington, D. C., on June 25 and 26, and after due deliberation, has the honor to present for your approval the following report.

Your Committee recommends that the next annual meeting be held in Washington, D. C., with the United States Public Health Service, during the last week in April, 1939.

Further consideration of the activities of this Conference shows the necessity for another class of membership---namely, that of associate. The establishment of such a membership will make it possible for personnel of the various State and municipal industrial hygiene units to become associated more closely with the work of this Conference and to participate in the technical activities of the Conference. Your Committee, therefore, recommends the following changes in the constitution:

Article III. Membership. Section 3. The membership of the Conference shall be of three grades, namely, members, associate members, and affiliated members. Eligibility to any of these three grades shall be determined by a majority vote of the Executive Committee.

Section 4. Members shall be limited to two persons regularly employed by Federal, State, local and territorial governments who are engaged in industrial hygiene activities.

Section 4a. Associate members shall be limited to persons regularly employed by Federal, State, local and territorial governments who are engaged in industrial hygiene activities, and personnel of educational institutions who are engaged in teaching industrial hygiene. They shall be eligible to serve on committees but not to hold office or to act as chairmen of committees.

Section 5. Affiliated members shall be limited to representatives from other countries who are engaged in industrial hygiene work under the direction of officially organized departments of the political subdivisions of such countries. They shall be eligible to serve on committees but not to hold office or act as chairmen of committees.

Article VII. Section 17. Finances. Every member, associate and affiliated member shall pay annual dues of $1.00, these dues to be payable on or before the first day of each annual meeting for each ensuing year. Members whose dues have lapsed beyond the current year shall be ineligible to hold office, vote or serve on any committee.

Your Executive Committee has arranged a showing of the film entitled "Stop Silicosis!" on Wednesday afternoon, June 29, at 2 p.m. in the Public Health Service Auditorium.

The Chairman appointed the following Committee as tellers to count the ballots for the election of officers:

Dr. W. F. Queen, Chairman
Mr. F. J. Vintinner
Dr. K. D. Smith

The following Committee on Resolutions was appointed by the Chairman:

Dr. J. P. Deery, Chairman
Mr. J. M. Hepler
Dr. H. F. Easom

The Chairman next read the report of the Executive Committee.

DR. GRAY: What is your pleasure with regard to the Executive Committee's report?

MR. DYKTOR: I do not know how many of you will remember, but at the first seminar we had quite a fight about this distinction of members. We decided to have only one class of membership, and that class to vote. Now you are completely ignoring the original intention, and I would like to see every member vote on the question. I think it is a very important question.

DR. GRAY: As I read from the Executive Committee report, there are three classes--members, associate and affiliate members. Members are the only ones who have the right to vote. I hope you understand this point. Is there any further discussion?

MR. BLOOMFIELD: May I clear up that point for Mr. Dyktor? You understand that according to the constitution the conference can adopt amendments by a majority vote, but before this amendment, or any other amendment, can become a part of the constitution, we have to circularize the conference by letter ballot and obtain a two-thirds vote of approval; so that there is an opportunity for the members to exercise that privilege at that time.

DR. GRAY: As a matter of fact, the vote of this conference, if we vote to agree to this at this time, would not make it a constitutional amendment. It must be voted upon by letter ballot and we must have at least a two-thirds majority.

DR. PHARRIS: With the understanding that a vote at this time

will not make it a constitutional amendment, I make a motion that the report of the Executive Committee be adopted.

DR. McDONALD: I would like to second that motion. I am particularly in favor of the idea of moving the next meeting to the month of April.

MR. JOHNSON: I think we of Missouri are usually in agreement, but this is one time that I think Mr. Dyktor has made a mistake, when he says that this change in the constitution is changing the voting power in any way. Each unit has only two votes anyway, so it is really not changing the voting power by putting in associate members. We still have two votes and we are not taking the voting power away from anyone.

DR. GRAY: The change is simply to broaden somewhat the possibilities of the conference, by permitting those who are doing industrial hygiene work in official agencies to actually be associate members of the conference and feel they are really part of it. It has been moved the seconded that the report of the Executive Committee be accepted. All in favor say "Aye". Motion carried. The next thing on the agenda is the report of our Secretary-Treasurer. Mr. Bloomfield.

B-2724

TRANSACTIONS OF
THE FIRST ANNUAL CONFERENCE OF
GOVERNMENTAL INDUSTRIAL HYGIENISTS

Held at Washington, D. C.

June 27-29, 1938.

REPORT OF SECRETARY-TREASURER

The portion of the Secretary's report which we will present to you is merely of a financial nature. We will not attempt to discuss or present to the meeting the multitudinous duties with which your Secretary has been burdened, but merely suggest that in the future when the Secretary corresponds with you, you answer promptly in order to conserve the Secretary's time and the not too great amount of money that we have on hand for postage. This latter fact will be made more obvious by the following statement:

Dues received		$ 55.00
(The dues were received from those members listed in the program of the Conference)		
Expenditures:		
Stationery	$13.54	
Postage	16.46	
Total Expenditures		~~30.00~~
Balance on hand		25.00

DR. GRAY: From what I can see of the deliberations of the Executive Committee, some of that $25.00 is going to be used. I can see some of it going out already. That will be the report of the next secretary. What is your pleasure in regard to the Secretary's report? Do you think he has expended too much on postage? I know he likes to write from all the papers he has written. It might be desirable to have some restraint placed on the correspondence he carries on. Do I hear a motion to accept the Secretary's report?

MR. ROTHMANN: I make a motion that the Secretary's report be accepted as read.

MR. DYKTOR: I second the motion.

DR. GRAY: Motion carried. The Executive Committee wishes to announce the appointment of committees. Some of the personnel of these committees will depend upon the vote on the amendment to the constitution. This, however, stands subject to the result of that vote. We have suggested, therefore, the following committees.(Committees appointed have been listed earlier in these transactions. See page xiv.) We want you (the committees) to feel free to call upon any outside informative agencies to secure information and personnel that may aid in the work of the committees. I would like to have discussion and suggestions of further committees or any ideas which you may wish to incorporate.

MR. HATCH: It is a fact that there are several organizations in the country now that are national in scope, which have as one of their primary interests the development of industrial hygiene. I am wondering if this conference should recognize this and set up some sort of a committee to determine and maintain the proper relationship between this Conference and the American Public Health Association. The Industrial Hygiene Section of the American Public Health Association has become very active, and they have a Committee on Technical Standards and a Committee on Appraisal of Industrial Hygiene Problems; the American Society of Civil Engineers also maintains considerable interest in this matter, having a similar committee; there are other similar organizations. I suggest the establishment of a committee to coordinate this work in national organizations.

DR. GRAY: I believe Mr. Hatch's suggestion is very much to the point. I think we should have a correlating committee. Is there any further discussion on this subject?

MR. DIKTOR: I thoroughly agree with Mr. Hatch, because there is always the possibility of duplicating the efforts of other organizations.

DR. GRAY: I think that we should definitely have a correlating committee to see that duplication of effort is not made.

MR. MORTON: From observations I have had of other organizations, I believe that actual joint membership on subcommittees or on

the committee itself will probably be more effective than trying to have a coordinating committee to look around, and see that we do not duplicate. In the Conference of State Sanitary Engineers, joint committees on several subjects have been established with the American Public Health Association, and in some instances with one or two other organizations. There is little trouble once they have been established and work as a single committee, and the reports are adopted by the organizations concerned. Our efforts to use coordinating committees have not been nearly so successful as the use of joint committees or joint sub-committees whenever possible.

DR. GRAY: It is just the question, apparently, of which is the better method. I do not think that there are any of us who do not realize that we should establish a correlating committee or joint committees, and work with other organizations to see that we don't duplicate work. We are pretty sure that the various committees know the field in which we are working. Is there any further discussion?

DR. PHARRIS: There is still one very important point in connection with the conference. That is, the relationship of this organization to other State organizations. The majority of the members of this organization are also in State organizations. What are you going to do with the reports--are they going to that organization for ratification? It might be a good plan to have an official committee in the Public Health Service, and

let them present it to the organization or to the State and Territorial Health Officers, for whatever action they care to take on that. I don't think we will get into nearly so much trouble.

DR. GRAY: I am going to ask Mr. Johnson what the State Sanitary Engineers do under such conditions.

MR. JOHNSON: I do not believe that the committee reports or the executive action or any of the activities of the Conference have ever been cleared through the State and Territorial Health Officers. I have no recollection of that ever being done. Have you, Mr. Morton?

MR. MORTON: Only once, regarding administrative matters. On technical matters, no.

MR. JOHNSON: Dr. Gray can tell you more about the State and Territorial Health Officers. In Dr. Osborn's report this spring mention was made of this Conference, and the State and Territorial Health Officers were very enthusiastic over the development of the Conference. Personally, I have never heard of any direct criticisms, or any insinuation that the State and Territorial Health Officers have any objections to the organization of this Conference or its procedure. When it comes to administrative matters--and some of these committees are dealing with administrative matters--possibly reports should be cleared through the State and Territorial Health Officers before they

are adopted by this Conference.

DR. GRAY: Mr. Johnson is quite correct; the idea of this Conference was presented by the Industrial Hygiene Committee of the State and Territorial Health Officers, and that report was adopted. I think the fact that we have 50 out of a possible 55 members present here is sufficient proof that the State health officers felt this was a desirable thing to do, because certainly none of us could have come unless our State health officers permitted us to do so. If you like we can read the portion of the report which mentions the desirability of an association of this kind. Would you like to hear that portion of the report?

DR. PHARRIS: The matter might not be important, but I raised the question because I think it would be a very good thing to clear matters through that organization. They could be handled in some other way.

DR. GRAY: Mr. Pool, have you any ideas to present on the method by which the State Sanitary Engineers clear reports before they publish such reports? Are reports submitted to the State and Territorial Health Officers before they are published?

MR. POOL: I believe certain reports are referred to the State and Territorial Health Officers. That is one reason why the committee meets jointly with the American Public Health Association. I would like to move that Mr. Hatch's suggestion of a correlating committee be adopted, at least temporarily.

DR. GRAY: Is there any further discussion on this matter? I can see the possibility of trouble, particularly with administrative matters that might occur. I think, then, that the best way to handle this is for the Executive Committee to consider it and come to some conclusion as to the proper method of taking care of the situation.

MR. BLOOMFIELD: Members of the Conference, I just noticed that Dr. Olesen, Assistant Surgeon General in charge of the Division of Scientific Reports and Statistics, is with us. Dr. Olesen would probably be interested in knowing that the Executive Committee has just appointed a committee to deal with industrial hygiene education. Probably some of you know that the Health Education Office is a part of Dr. Olesen's Division, and I think that it would be an excellent plan for this committee to work with the Health Education Office or integrate their work with that office, so that there will be no duplication of effort. I am wondering if Dr. Olesen would not mind coming up and saying hello to this Conference.

DR. OLESEN: This is one of the penalties for butting in on a conference of which you know nothing. I just came in to see what was going on. I like to mention in the weekly dispatch what things of importance are going on around the Service building. That was my sole purpose for coming in. I am very much interested in what Mr. Bloomfield has to say regarding the possibility of establishing a committee on industrial health education. I

think it is a good idea, but if anything is done in industrial health education, someone with a keen knowledge of the subject will have to take it on. We are beginning an office of health education without knowing in which direction we are going--without very much experience or guidance in the field in which we are engaged. So that we naturally will have to have some very expert advice before we can meet the demands for health education. It is a peculiar field and one with which we are not very conversant, one in which we would like to do something without knowing how to do it. At the present time we have a considerable staff to build up. We are putting on a lot of people who know pretty well how to write, and in a general way how to tell people what they should know, but without any funds at the moment for printing the many ideas which are being ground out. I think the two should go together. I am very much interested in this conference and hope we may be able to learn what you are doing so that we may publicize some of the things you are doing. I am very pleased to be able to greet you, and hope you will have a very profitable meeting. As I think you indicated, you have a very excellent attendance. That is a very noteworthy thing, because so often when you have meetings many of the people who should attend are not here. I hope that I shall see some of you whom I know personally later on. Thank you.

DR. GRAY: I think that constitutes most of the official business this morning, and the conference will now go into an executive

session. First, we will have a report from Dr. Queen on the result of the balloting. We will meet again at 2:00.

DR. QUEEN: The Committee of Tellers has the following report. For Chairman, Mr. W. Scott Johnson of Missouri; for Vice-Chairman, Dr. John P. Russell, of California; for the Executive Committee, Dr. Crit Pharris of Tennessee, Dr. Carl A. Nau, of Texas, and Mr. Charles L. Pool, of Rhode Island.

DR. GRAY: I shall now consider a motion to adjourn until 2:00 p.m.

MR. DILLS: I move that the conference adjourn until 2:00 p.m.

MR. HATCH: I second the motion.

DR. GRAY: Motion carried.

Afternoon Session, Monday, June 27, 1938.

Dr. Albert S. Gray, Chairman

DR. GRAY: It has been suggested that we have a meeting of the old and new Executive Committees, and that the chairmen of the various committees appointed this morning get together to meet one another so they will know who is on the several committees. It has also been suggested that we put before the members of these committees the possibility of those of them who attend the American Public Health Association convention this fall in Kansas City having an informal meeting at that time to discuss what they have accomplished. We shall now proceed with the scientific program. The first speaker will be Dr. Sayers.

PUBLIC HEALTH ASPECTS OF INDUSTRIAL HYGIENE*

By
R. R. Sayers, Senior Surgeon,
and
J. J. Bloomfield, Sanitary Engineer,
United States Public Health Service.

"In recent years", wrote Sir George Newman, 1/ "we have learned that public health is not only a matter of the postponing of mortality and the prevention of sickness, but of the positive side of health--the increase of vitality, capacity, and efficiency of the human body. Our aim is not only to oppose diseases but to advance and develop physical fitness and well being. To secure this end, we must have regard to the whole life of man--his heredity and upbringing, his work and rest, his food, his habits, his environment. We must pay attention not only to his actual ailments and diseases, but to the conditions making for a maximum degree of personal health. Thus it comes about that a new relation is found to exist between occupation and health. In a word, the health of the industrial worker forms an integral and inseparable part of the health of the community."

---

*This paper has appeared in the Journal of the American Medical Association, Vol. 111, No. 8, August 20, 1938.

This broad concept of industrial hygiene was enunciated nearly two decades ago, and like all fundamental statements is applicable today. Yet, if we take stock of what has been accomplished in this country during the past twenty years, and especially of our present practices in this field of public health, we realize that our emphasis has been placed on the control of industrial accidents and occupational diseases. It is not intended to underestimate the importance of accidents and occupational diseases, but rather to call attention to the opportunity offered, and at the same time provide assistance to the groups served in the solution of other health problems which are equally, if not more, important. Since industrial health is so closely interwoven with community health, each component part of a broader program is certain to support the other. An analysis of the health problems affecting all wage earners and our present-day activities in the field of industrial hygiene will serve to indicate more clearly what may and should be accomplished in the immediate future.

Scope of the Problem

Industrial hygiene is the science of the preservation of the health of workers. It, therefore, involves primarily

a program of health conservation and accident and occupational disease prevention. Such a program necessarily extends beyond prevention of accidents and occupational diseases; it includes also the broad subject of the health of the worker. It is obvious that some of the problems arise from the nature of the industrial environment itself--namely, the control of poisons, dusts, excessive temperatures and humidities, defective lighting, noise, overcrowding, and general plant sanitation. They also obviously involve such factors as hours of work, fatigue, communicable diseases in the factory, mental health and personal hygiene.

In the past, industrial hygienists have concentrated their efforts in the main upon a rather limited portion of the industrial population, namely, the 15,000,000 workers employed in manufacturing, mechanical and mineral industries. Although it is true that the major occupational diseases occur in manufacturing and mining industries, nevertheless, such gainful pursuits as agriculture, with 10 million workers, transportation and communication, with more than 4 million persons, domestic and personal services with approximately 5 million gainful workers--all of these employments have health problems which should be receiving our attention. What makes the problem somewhat more difficult is the fact that a large number of our workers are employed in small

establishments, which at present have no practical means of furnishing adequate industrial health services to their employees. For example, of the more than 8 million persons employed in manufacturing plants alone, approximately half are found in factories with less than 250 workers.

While insufficient data have thus far prevented our recognition of health problems in nonindustrial pursuits, we have ample evidence to indicate that there exists a greater mortality rate in the industrial population than in the whole group of gainfully employed persons. Excess mortality is especially notable among unskilled workers, among whom the death rate from all causes in certain States was found to be 100 percent in excess of the death rate among agricultural workers. Studies of illness in industry made by the United States Public Health Service also show high rates of illness among workers. For example, the incidence of such diseases as tuberculosis, pneumonia and degenerative conditions was found to be higher than average in the industrial population. There is evidence to justify the opinion of authorities in this field that tuberculosis deaths can be reduced 50 percent by health supervision of workers in occupations predisposing to the disease, by detection of minimal cases, and by provision of adequate medical and institutional care in the early stages of the disease. A large amount of information testifies that

a majority of cases are discovered too late in the course of the disease for effective treatment. Again, it is also known that pneumonia mortality and disability is excessive among workers exposed to extremes in temperature, inclement weather, toxic gases, and dusts. Health supervision of the worker and his environment has been found to be an effective measure in reducing illness and death due to this cause.

When we pause to consider the means we can take to improve the health of our workers, we find that we are confronted with a four-fold problem. First, accidents bulk large in the layman's view of industrial disability, and in spite of the fact that great strides have been made during the past 20 years in the prevention of accidents, this form of injury is still an important problem. According to the last report of the National Safety Council,[2] there were 19,000 occupational deaths in 1937. Studies also indicate that we have not approached minimum rates since the records for accidents in certain steel companies with best practices show a far lower rate than for the industry as a whole.[3] Second, it is well known that certain occupations, not necessarily the so-called "dangerous trades", are associated with poisoning, disease and high mortality. Third, many of our workers in early adult life are found to lack the physical capacity to undertake certain types of work. And

fourth, we have come to realize that we have far too much absence from work occurring due to sickness, fatigue, or other incapacitation because of a complex set of factors, some of which are no doubt controllable. This, in brief, gives us an idea of the health problem of the industrial worker. While at first sight accidents, occupational diseases and high occupational death rates appear to be impressive, there is no doubt that the least dramatic side of the problem is in fact the most important--namely, the lost time and incapacity due to illness. It is this last condition that is so widely prevalent as to be almost universal in all localities, at all ages, in all occupations. Here we have a vast amount of wasted energy and life due in the main to preventable illnesses, some of which no doubt may be contributed by the working environment. Although we have made significant progress in the control of certain preventable diseases, as is evidenced by the declining trend of our death rate in the last 40 years, we must not lose sight of the fact that this saving of life has taken place chiefly in childhood and in the years of early adult life. No significant increase occurred during this period in the average years of life remaining to persons of middle and advanced age. The death rates from some important diseases of adult life have been increasing, a phenomenon understandable in the light of the fact that the principal causes of

death operating in the advanced years are primarily chronic. Preliminary data from the National Health Survey[4], based on surveyed persons of all ages, show that chronic diseases, including permanent impairments, alone account for six of the ten days of incapacity from illness and accidents experienced by the average person per year; and with respect to sickness and accidents, data to be published by the Division of Industrial Hygiene show in the instance of a public utility that on the average 7.5 days were lost annually by males and 10.9 by females.[5]

All of these facts have an important bearing on the industrial health problem, since here we are dealing with an adult population. It would appear, therefore, that we must accomplish for our adult diseases what we have achieved in recent years in infant and child hygiene, and industrial groups appear to offer one of the most logical points of contact. In other words, we must bring public health to the factory as well as to the home.

Present Trends in Industrial Hygiene

In recent years, large industrial establishments have contributed much toward the protection of the health of their workers. Most of their activities, however, have been centered on the control of accidents and occupational diseases. We

must bear in mind also that these programs in industry have been confined in the main to large establishments, and if we recall that nearly half of our workers in manufacturing plants are employed in units of less than 250 workers, the difficulty of our task is at once apparent. There may be several ways of bringing industrial hygiene to the small factory, and one of these appears to be some type of service by State and local health departments, cooperating with the medical profession, employers, workers and other State agencies.

Responsibility for safeguarding health rests chiefly with State and local government. This fact is an outgrowth of our political system which gives considerable autonomy to the individual States. The agencies of the Federal government concerned with industrial hygiene are primarily engaged in the collection and dissemination of information, conducting field studies, laboratory research, and protection of the health of Federal employees. Prior to 1936 most States had concerned themselves chiefly with matters of safety, sanitation, employment of women and children, and compensation of employees following disabling accidents. All but two States have workmen's compensation legislation for accidental injuries and today 21 States provide compensation for one or more occupational diseases. Administratively, the

States have placed enforcement of occupational disease legislation in various departments. However, if we accept the definition of industrial health given earlier, we must realize that industrial hygiene embraces a broad health function. The Division of Industrial Hygiene of the United States Public Health Service has been active during the past two years in the development of this field in State and local health departments. This development has been stimulated in part by funds allotted to the various States for public health activities by the provisions of the Social Security Act. Today there are 23 States and 4 municipal departments of health that have taken steps to provide industrial health services. It must be remembered, however, that these units are but in their infancy and will not be in a position to render adequate service to industry and labor unless they have greatly increased financial support and trained personnel.

At present the industrial hygiene divisions in our States and cities are confining their work chiefly to the evaluation and control of occupational diseases in industry. There are several reasons for this fact, one of them having already been mentioned--namely, the embryonic stage of most of the industrial hygiene units. Another reason for this concentration of effort on occupational diseases may be explained by the fact that in most cases it is not difficult to establish a direct relationship between an occupational

disease and its cause which, in many instances, can be traced to the working environment. Furthermore, occupational diseases have for some time been receiving unusual attention, due to the dramatic nature of many of the poisonings which occur in industry. We all recall the recent nation-wide interest in silicosis, and more lately, similar activity in connection with certain types of dermatoses. Another factor in this emphasis on occupational diseases is the rather limited view held by most of our public health workers concerning the subject of industrial health. As already indicated, industrial hygiene is essentially adult health among gainfully employed, and necessarily runs the entire gamut of public health for these individuals.

Nation-wide data to support this view are slowly being collected and analyzed. It is hoped to have some basic statistics on the subject of illness and death by occupation in a large industrial population in this country as soon as the Public Health Service has had an opportunity to analyze the results of its recent inquiry on more than half a million workers. Statistics for the prevalence of occupational diseases are available for only a few States, since it must be borne in mind that the principle of compensating for an occupational disease is of recent origin in this country. In Wisconsin, where a workman's compensation law has been in

operation longer than in any other State, some recent unpublished data furnished by Dr. Gafafer of the United States Public Health Service bear examination. For the 16-year period from 1920 to 1935, occupational diseases accounted for 2 percent of the total compensated cases. During 1935 this percentage increased to 2.8. During the same 16-year period 2.8 percent of the total costs for all injuries was due to occupational diseases, but during 1935 the corresponding percentage increased to 7.1. The compensation cases settled in 1935 represented a loss of over 2 million working days, and of these days lost, 8 percent were accounted for by occupational diseases. In other words, although the incidence of occupational diseases and costs are rising, they still constitute but a small percentage of total compensated cases and costs occurring in the State of Wisconsin. Reports from other States, such as New York, New Jersey, and Ohio, show a similar trend. According to the United States Department of Labor, the total direct and indirect costs of industrial injuries in this country are approximately 5 billion dollars annually, and of this amount, occupational diseases accounted for but a small percentage.

On the other hand, studies made by the American College of Surgeons indicate that illness causes at least 15 times as much absenteeism as do industrial injuries.[6/] Among women,

lost time from sickness in certain companies has been found to be as much as 40 times the number of days lost from work on account of industrial accidents.[7] Hence, it is apparent that the time and monetary losses due to general illness must indeed be staggering. Although we have no comparable statistics to show the costs in this country for the so-called general illnesses in the industrial population, individual studies do show that were such information available it would definitely indicate that these latter costs are far in excess of occupational disease and accident expenditures. Data cited by the Committee on the Costs of Medical Care indicate an expenditure of approximately 10 billion dollars annually due to illness.[8]

It would seem, therefore, that if we are to improve the general health status of the most important and numerous group in our population, it will be necessary to control not only unhealthful conditions in the working environment, but also to give consideration to such factors as proper living conditions, elimination of strain and hurry, and anxiety due to economic insecurity, communicable diseases--in fact, as already stated, a general adult health program for our workers.

A Suggested Program

Health officials occasionally feel that they cannot afford to conduct full-time industrial hygiene activities, since any funds so used would unbalance the entire health program. However, if we are to accept as valid the definition of industrial hygiene so oft repeated in this discussion, it is evident that health officials can afford this phase of public health, because any health program among our industrial workers will redound to the general health of all persons in the State. Before delving further into the method of approach in industrial hygiene, it may be well to set forth the program which has been recommended by the Public Health Service to the various States.

The first topic for consideration is the matter of determining the scope and nature of the problems in the State. This may be accomplished in several ways. If it were possible to obtain industrial morbidity and mortality statistics, as well as the prevalence of occupational diseases and accidents, we would have a basis for defining our future program. However, industrial hygiene being practically in its infancy in this country, such statistics are unavailable, except for some accidents, for occupational diseases in a few States, and illness records in plants having sick benefit organizations. For these reasons, it has been suggested to the various States

that they conduct preliminary surveys of all work places, in an effort to obtain information on the potential occupational diseases and health services. The health services data in particular should prove useful in so far as the survey calls for information concerning the keeping of adequate sickness and accident records.

Once the occupational disease hazards have been established by means of this preliminary survey, the industrial hygiene personnel are in a position to select industries for study, in an attempt to evaluate each exposure and the means of control. Once such studies are completed, it should be possible to make definite recommendations for the control of existing or potential health nazards.

By an intensive educational campaign among industrial officials and local physicians, arrangements can be effected for securing reports of occupational diseases, and of more importance, investigating the cases so that the cause of the disease may be determined and efforts made to prevent its recurrence. From the preliminary survey, data should be available concerning the extent to which absence due to illness is recorded, and arrangements should be made with establishments to secure uniform reporting of such absences to the State department of health, so that excessive sickness rates by occupation and by disease may be determined and means taken for their elimination.

In carrying out these provisions, the work should be done cooperatively, and in addition to furnishing services to physicians, industry, and labor, the industrial hygiene unit should also be a source of information for other State agencies, and the public. The value of an educational program to acquaint physicians, industry, workers and various groups as to the importance of the problem cannot be over-emphasized.

At the present time most State industrial hygiene units employ a very small number of personnel, usually a physician, an engineer, a chemist and a secretary. It should be evident that even if this number of persons were doubled, one could only hope to accomplish a limited improvement in the health of all the gainfully employed persons in any State unless all of the resources of the health department could be drafted. This is a perfectly legitimate view of the problem, if we pause to consider the method of approach which may be employed. For example, no one would dispute the fact that many of the diseases of childhood are not directly associated with the school environment; yet, this fact has not deterred our health departments and physicians from doing their most effective work in the prevention of childhood diseases through the medium of the school. The same procedure may be attempted in combatting our adult diseases by approaching the problem through the medium of the factory. For example, the southern health officer may feel that with the limited number of so-called industrial

workers in his State, industrial hygiene activities are not justified. Yet there is no reason why these same health departments cannot carry on a program of nutrition, venereal disease, tuberculosis or malaria control through the industrial groups. By so doing they will be practicing effectively public health among a vast number of people. At present, such programs employ the home as a means of contact. It would seem that this approach of bringing public health to the factory should commend itself from the viewpoint of efficiency alone. The fact that many illnesses among our gainfully employed may not be directly caused by the working environment should not deter physicians and public health workers from attempting to eliminate the causes of these diseases through the working environment.

Many of our health departments have limited the scope of their activities. Most of them are concerned first and foremost with communicable disease control. This is as it should be, since the primary function of a health department is such control. But there is no reason why the scope of health work in a county, district, or city cannot be widened to include the prevention of chronic diseases, and there is ample justification for such efforts when we realize that the National Health Survey has shown that chronic disease and permanent impairments alone account for 6 of the 10 days of incapacity from illness and accidents experienced by the average person in a year.

One should not obtain the impression that industrial hygiene could be carried out by the health officials now trained in general public health work. It is desired to stress the fact that in order to carry on any kind of public health work in the factory, it is still necessary that the personnel know industry and industrial processes, and for this reason the only persons logically to guide the work should be those particularly trained in the field of industrial hygiene. However, there is no reason why there should not be a closer cooperation between the industrial hygiene personnel in a State health department, the various local public health units, and the medical practitioner, in an attempt to bring public health to our gainfully employed and indirectly to their families.

REFERENCES

1. Newman, George: Introduction to Collis, E. L., and Greenwood, Major: The Health of the Industrial Worker. P. Blakiston's Son & Co., Philadelphia, 1921.

2. Accident Facts. Preliminary 1938 Edition. National Safety Council, Chicago, 1938.

3. Accident Experience in the Iron and Steel Industry to the End of 1932. Monthly Labor Review. Bureau of Labor Statistics, U. S. Department of Labor. Vol. 37, No. 3, September, 1933.

4. Preliminary Reports. The National Health Survey. Sickness and Medical Care Series. Bulletin No. 1. Washington, D. C., 1938.

5. Gafafer, W. M., and Frasier, E. S.: Frequency and Duration of Disabilities Causing Absence from Work Among the Employees of a Public Utility, 1933-1937. Public Health Reports, 52:1273-1288, July 29, 1938. Reprint No. 1963.

6. Newquist, M. N.: Medical Service in Industry and Workmen's Compensation Laws. American College of Surgeons, Chicago, 1938.

7. Brundage, D. K.: An estimate of the monetary value to industry of plant medical and safety services. Public Health Reports, 51, No. 34, August 21, 1936.

8. Falk, Rorem and Ring: The Costs of Medical Care. The Committee on the Costs of Medical Care. Publication No. 27, 1933.

DR. GRAY: I see that I am down to discuss the paper just presented by Doctor Sayers. The principal thing to my mind that has been put before us is the large outlook of industrial hygiene. It does not simply embrace occupational diseases. Occupational disease is but a simple part of the program which should be initiated concerning the health of those industrially employed. We will hear a bit more on this in the future. But it is something to which we should all give careful consideration. Already such work is being done in some of the States which do not have a very great amount of occupational disease, per se, notably by Dr. Dugger in Mississippi, who, in the work he has undertaken, is concerned not only with the prevention of occupational diseases but is integrating through his approach to industry all public health activities, both State and local. And I think that this is the message Dr. Sayers wishes to convey to us. Also, I think it is quite reasonable to understand that there have been almost as many methods of approach to this problem as there are States engaged in the work. Since the main part of this development has been of very recent origin, that can be very easily explained. And I think it should be very definite, that, as Dr. Sayers said, the committee of this conference inquire into and arrange some definite methods of procedure, with the realization that they must be applied within the limitations of any State in which this work is to

be done. Is there any further discussion of this paper at this time---any questions you would like to ask?

MR. TRICE: It was particularly pleasing to me to hear Dr. Sayers say that such subjects as nutrition should be part of the work in the field of industrial hygiene. In North Carolina, for example, when anyone learns we are engaged in work that involves the problem of industrial hygiene, they say "What about cotton mill workers? They have a pasty complexion and look like they are about worn out." Well, it occurred to us that perhaps one of the things is that they don't live right or don't eat right. Dr. Easom and I have discussed this problem of industrial hygiene. It is probably a problem for the Division of Industrial Hygiene. How to attack the problem best we don't know. Should we handle the subject on bulletin boards, explaining from time to time the value of different foods, or is there some better way to handle it? I do not know. But I was particularly glad to hear Dr. Sayers say that it was part of the work of the Division of Industrial Hygiene.

DR. GRAY: Is there any further discussion of the subject at this time? Dr. Dugger has a word to say.

DR. DUGGER: Gentlemen, members of the conference. I enjoyed Dr. Sayers' discussion very much. It makes me feel that I am no longer an orphan in this work. I have been attending conferences on industrial hygiene for some time. Two years ago, at the seminar here, all I could hear was occupational

send a list of all positive Wassermann reactions or positive x-ray examinations that show any pathology to the health officer of the county in which this individual resides. This work is conducted in cooperation with the health officer of each county; also, if the mill happens to have a physician, in cooperation with him. I am very much gratified that our industrial hygiene work is drifting to the work that I have been trying to carry out in Mississippi since 1929. My definition of industrial hygiene is the preservation, promotion, and improvement of health, and the prevention of disease in industry. Thank you, very much.

DR. GRAY: Thank you very much, Dr. Dugger. If there is no more discussion, we will pass on to the next paper. Dr. McDonald, Director, Bureau of Occupational Diseases, Baltimore City Health Department.

diseases--discussions of occupational diseases and their control. And I felt that I could not discuss that question. We probably have occupational diseases in Mississippi. We have as yet not made a survey to determine just what occupational diseases we might have there. We probably will in the near future. Since 1929, I have been directing the Bureau of Industrial Hygiene in Mississippi, the personnel consisting of myself and a secretary, who is in the office most of the time. Many times I have gone into industrial organizations, finding myself conducting physical examinations, immunizations for typhoid and smallpox. The physical examinations consisted of urinalyses and general physical examinations of employees. For the last 2 years we have had a nurse to assist me in this work. We have added tuberculin testing to our work, and x-ray of positive tuberculin reactors, and I am very much interested in this work. I feel that we are getting some place. When these tuberculin tests are made in a group, all of the positives have been x-rayed. We have found that about 30 to 35 percent showed a positive tuberculin reaction. Of these positive tuberculin reactors, we have about $3\frac{1}{2}$ to 5 percent on x-ray examination who show some form of tuberculosis. On this examination, when it is completed, a record of each one is kept. Each person is notified by letter of the findings of the examination, and is requested to see his family physician. We

THE ADMINISTRATIVE PROBLEMS OF A MUNICIPAL PROGRAM IN INDUSTRIAL HYGIENE

By
Dr. John M. McDonald, Director,
Bureau of Occupational Diseases,
Baltimore City Health Department.

In order to appreciate the problems of the municipal industrial hygiene unit under discussion, it is necessary to know something about the development of that unit and its organization.

A study of carbon monoxide hazards from domestic gas appliances in Baltimore during the winter of 1922-1923, the enforcement of a gas appliance ordinance[1] beginning in 1925, and the investigation of occasional unfavorable reports and complaints pertaining to industrial operations were factors which led to the consideration of the industrial hygiene problem in Baltimore by the Baltimore City Health Department. Doctor Joseph W. Mountin in his report[8] recommended "That the City Health Department establish a division or office which will have the promotion of industrial hygiene as its major responsibility" because of the increasing need for studying the working environment and its effect upon the health of workers and because there already existed in the Health Department a foundation for an industrial hygiene service. This recommendation was also endorsed by the Office of Industrial Hygiene and Sanitation, Division of

technical training of the field personnel. At the same time a need for the development of the medical aspects of industrial hygiene was apparent and subsequently filled by the appointment of a director of a Bureau of Occupational Diseases on August 15, 1936.

At present the personnel engaged in developing the industrial hygiene program in Baltimore City Health Department is as follows:

The Director of the Bureau of Occupational Diseases
The Director of the Bureau of Environmental Hygiene
Three Inspectors of Industrial Hygiene
One stenographer - full time
One stenographer - half time

The first problem that confronted the industrial hygiene unit was the evaluation of potential industrial hazards. The problem has been approached in a number of ways; the principal ones are as follows: Following the appointment of the three inspectors of industrial hygiene in 1933, a preliminary survey of a representative number of Baltimore industries was made with the cooperation of the inspection staff of the Commissioner of Labor and Statistics. Information covering the type of industry, toxic materials used, protective measures available, accident hazards, medical services, lighting, ventilation and sanitation was recorded on a specially designed inspection report card and subsequently tabulated. The data available from the survey served as an index for

selecting industries and establishments where health hazards were most likely to exist and were used as a guide for making field investigations.

In the summer of 1936 the Governor's Commission for the Study of Occupational Diseases in Maryland sponsored an industrial survey of the State under the direction of the United States Public Health Service, with the cooperation of the Maryland State Department of Health, the State Commissioner of Labor and Statistics, and the Baltimore City Health Department. The survey covered about one-third of the industrial plants in Baltimore employing five or more workers. The Baltimore City Health Department has been furnished a copy of the report upon each plant in the city which had been surveyed. These reports are of great value in selecting industrial groups or specific plants for detailed study.

Since that time the work in industrial surveys has been carried forward steadily. New industries are being started at frequent intervals and some of the older ones are being enlarged. There were also approximately 1300 establishments of the "one man" type which were not included in the survey by the Commission.

At the present time several surveys are going on. Laundries and dry cleaning establishments are being investigated, particularly for the detection of carbon monoxide and the

various solvents which are used in dry cleaning. Surveys are being made in the granite-cutting industry and dust counts and other technical data have been accumulated for several plants. In addition, seven employees have had physical examinations and roentograms of the chest. X-ray examinations have been made on another group of employees exposed to a silica hazard in connection with which dust exposure studies have been made.

The investigation of silicosis has also been approached from another angle. Case records of adult male patients admitted to hospital for treatment of tuberculosis during the past two years have been examined in order to determine whether or not silicosis has played any part in the causation of the tuberculosis. From the analysis of the case records of 437 of such patients, it would appear that silicosis is present in about 1.5 percent of all the adult males admitted to hospital for treatment of tuberculosis. The study of case histories will be carried further by an investigation into the records of State sanatoria.

Four of the larger paint-manufacturing plants have been visited and in two of them dust studies have been made for the estimation of lead in the air. Where hazards have been found the managements have been informed and have taken steps to control such hazards. Talks have been given to the

employees who are exposed to the lead hazard. The plant physician has been visited and he has agreed to follow a procedure which will enable him to keep a closer watch on the condition of the men exposed to lead. It is hoped that a similar service will eventually be rendered to all the paint manufacturing plants in the city.

Because of the recent United States Public Health Service publication[4] on the subject of mercury poisoning, it was felt that the industrial hygiene unit ought to have more knowledge of the potentialities of this hazard. To that end, an instrument for the detection of mercury in the air has been acquired. There are several local plants for the manufacture of felt hats, besides which there are two scientific laboratories where mercury is used in quantity. The investigation is still in the preliminary stage and contacts are now being made with the executives concerned in order that we may carry out our study of the presence of mercury vapor in air.

The industrial hygiene laboratory plays an important part in all industrial hygiene work, especially in the analysis of dusts and other contaminations of the air. During the past year the laboratory has developed an improved cell for dust counting.[5] In 1937 an effort was begun to develop a field method for the estimation of volatile solvents in

the workroom atmospheres.

All the more recent records are kept on the forms designed by the United States Public Health Service for such purposes. 3/ In addition to that, a card index system has been set up for rapid reference. The card gives the plant address, the materials used, the potential hazards and the number of employees, in addition to information pertaining to accident hazards, medical services, lighting, ventilation and sanitation. It is particularly useful because the other side of the card is used by the inspectors of the State Bureau of Labor and Statistics to enter such data as floor space available, hours of work, and other information relating to employment.

So far as the evaluation of potential hazards is concerned, we have reasonably good records. Also, we are making progress in securing further records. By arrangement with the Bureau of Buildings of the City Department of Public Works, the Baltimore Association of Commerce, and the State Commissioner of Labor and Statistics, we are informed of the coming of new industries to the city, which gives us an opportunity to visit the plants and make preliminary surveys of the industries and, at the same time, offer to them the services of the Industrial Hygiene unit.

Thus far we have dealt with potential hazards and hazards found as a result of planned field investigations. We turn now to the more difficult problem of discovering actual cases of occupational disease, or, to put it in other words, the problem of case finding.

In Maryland there is a law which requires the reporting of "all occupational or industrial diseases". However, there is no law which provides for the compensation of those ailments. As might be expected under such conditions, cases of occupational diseases are rarely reported. Until a law is passed providing compensation one cannot expect to see a great deal of improvement in this respect.

Since few case reports are being obtained from physicians and only occasional ones from hospitals, we are forced to turn to other sources for information. For the last three years the Division of Chemistry in the Health Department has been doing special work in blood lead determination. [6] This analysis of blood for its lead content is freely offered to all practising physicians in the city as an aid in the diagnosis of lead poisoning. When the analysis is completed reports are sent to the physician who has submitted the sample of blood and also to the industrial hygiene unit. The physician is visited, the case is discussed with him and his diagnosis is obtained. As a result of personal contacts with physicians

for whom blood analyses have been done, it can be said that at least twenty cases of lead poisoning in adults were under treatment in Baltimore during 1937. Also, as a direct result of this service several factories in which lead hazards have been causing cases of poisoning have been discovered.

Complaints are sometimes sources of information about industrial hazards or cases of occupational disease. In one case the Health Department received a complaint that zinc fumes were issuing from a metal reclaiming plant. A visit to the plant disclosed the fact that, in addition to reclaiming zinc, the factory was also recovering solder from old automobile radiators in such a way as to give rise to a potential hazard from lead fumes and dust. This discovery led to a conference with the management, and also to a physical examination of the four employees who were engaged in the lead recovering operation. The results of investigating complaints are not always so productive, but investigations usually lead to a fairly complete inspection of the plant against which the complaint has been made, and often afford the opportunity to interest the management in having a study made of any potential hazard in the plant.

An arrangement has been made with the State Industrial Accident Commission whereby any cases of occupational disease which come to their attention are available for our information. Since compensation is not required to be paid for such diseases, they seldom come to the notice of the State Industrial Accident Commission.

On the whole, the reporting of occupational diseases is still in a most unsatisfactory state. Some results have been obtained from the laboratory service offered to physicians, and also from the survey of granite-cutters, but a great deal of work still remains to be done before we shall have efficient case reporting, and that brings me to the next problem, namely, that of education.

The ideal solution of the problem would be to spread information about industrial hygiene to every person in the city because the preservation of the health of the working population has a bearing, direct or indirect, on every inhabitant. In beginning educational work it has been necessary to concentrate on two groups, namely, the physicians and the plant executives.

The Baltimore Health News affords one direct method of communication with medical men and others. This monthly publication is sent to every practising physician in Baltimore.

It is one of the official channels of communication between the Health Department and the physician. It affords opportunities to describe the services made available to physicians by the industrial hygiene unit of the Health Department and also to publish articles on industrial hygiene. Another method is the presentation of industrial hygiene subjects to groups of physicians, such as the local medical society. Opportunities to address groups of physicians are rather rare, but it is sometimes possible to take part in discussions at medical meetings and to bring out the industrial aspects of cases presented at these meetings.

The Directors of the Bureau of Environmental Hygiene and the Bureau of Occupational Diseases are active participants in the teaching of the senior class of the University of Maryland School of Medicine. Each gives one hour's lecture and a field demonstration to the medical students in their senior year. A lecture of one hour's length is much too short to cover the subjects of industrial hygiene and occupational diseases. Emphasis is placed upon the effect of occupation on health and the importance of an occupational history in diagnosis. We give a brief discussion of methods used in the prevention of occupational diseases and furnish the students with an outline for reference use. In addition, several lectures and factory

visits are provided for selected groups from the Johns Hopkins School of Hygiene and Public Health.

Another plan for reaching medical men is at present under consideration, namely, to give a series of lectures on occupational diseases to the internes in the different hospitals. By this method we hope not only to interest internes in occupational diseases, but also to improve the reporting of cases. We feel that the interne will receive more benefit from such instruction than the senior medical student would because the interne has had some experience in the actual handling of cases and is in a position to appreciate the importance of knowing something about industrial medicine. This plan is still in the formative stage and has not yet been submitted to the hospital authorities for their consideration. However, I feel that it has possibilities and I hope that we may be permitted to try it out during the coming year.

In dealing with physicians there are several points to keep in mind: First, it must be made clear to them that our work is actually increasing their practice, rather than diminishing it. We advise industries to make use of the doctor in pre-employment and periodic examinations of employees as a means of preventing the occurrence of sickness. Not only do such examinations benefit the employer and employee, but they

also provide the physician with much more work than he would secure from the treatment of occasional cases of occupational disease. Second, we offer various services to the industrial physician, as, for example, the blood lead analysis. Requests for information which will assist the physician in his diagnosis are answered as fully and promptly as possible. Third, especially with medical students, we try to make an appeal to their pride in making correct diagnoses, as well as in having some all-around knowledge of medicine.

In making contacts with industrial groups excellent results were attained through a booth at the Manufacturers' Products Exhibit of the Baltimore Purchasing Agents' Association. This exhibit drew the purchasing agents of local industries, as well as a great many plant executives and foremen, exactly the type of people with whom an industrial hygiene unit wishes to get in contact. The exhibit lasted for three days, which was long enough to give everyone who was interested an opportunity to see every booth. Further, the rules of the exhibit required that at least one of the exhibitors should always be present in the booth during the time that the exhibit was open. Over 1000 of the circulars listing the industrial hygiene services available in the Health Department were distributed. Invitations were received to talk to several local manufacturing groups and to make surveys in

several local factories. For education on a large scale this exhibit has proven the most useful method of distributing information.

Another method which has considerable value is the talk given at meetings of small industrial groups because the talk is followed by a period for questions and discussions which clear up the doubtful points. As a result one often gets requests for further talks and invitations to make industrial surveys. Whenever possible talks are also given to safety organizations of different types, civic groups, and others.

A third, and most effective method is to arrange a conference with the plant executives, either before or after making a survey of the plant, and explain in detail the available industrial hygiene services and their value to both employers and employees. When we take the report of a survey back to the plant where the work was done we sit down with the management and explain our findings. We then offer to work with them in carrying out corrective measures and in checking up on the effectiveness of the measures installed.

The fourth and last problem has to do with relations to other divisions in the Health Department, to other municipal departments, State departments, and agencies of

the Federal Government. Full cooperation has been rendered by all other bureaus within the Health Department. For example, the Bureau of Tuberculosis has made X-rays on all the granite-cutters and silica workers who have been examined. The Bureau of Laboratories has analyzed some of the samples taken in industrial hygiene surveys.

Also, it has been necessary to establish relations with other bureaus in the municipal government. One example is the arrangement with the Bureau of Buildings whereby all plans for new industrial buildings, and additions to, or remodeling of, existing industrial buildings are sent to the Bureau of Environmental Hygiene for inspection before approval by the Bureau of Buildings. This inspection has disclosed a variety of defects in ventilation and sanitation. Consequently, it was possible to have the plans changed in order to prevent the possibility of hazards arising from the defects. This same bureau has complete charge of plumbing inspections and thus has control over the troublesome question of cross-connections which are so likely to occur, particularly where dual water supplies are in use.

In all our relations with other agencies there is one problem of outstanding importance, namely, what part should an industrial hygiene unit play in the present program for the eradication of syphilis? Many industrial firms are taking an interest in this program and some of them are using a serodiagnostic test for syphilis in their physical examinations. A

certain proportion of positive cases will be found among industrial employees. Some organization must take on the educational work of convincing the employer that workers should not be rejected or discharged simply because of a positive blood test, so long as workers suffering from syphilis undergo a suitable course of treatment. Industrial hygiene units have closer contacts with industry than any other division of a health department, hence they are almost inevitably drawn into the program, even though syphilis is not an occupational disease.

The question of the nature of our participation in the syphilis program is still unsettled. In Baltimore the Commissioner of Health has approached some of the larger industrial firms and has succeeded in persuading the medical directors to sign a contract containing the following terms: (1) All reports of disease are to be kept confidential between patient and medical director; (2) All cases of disease found are to be reported to the Health Department; (3) All positive cases are to be followed up by the medical director of the industrial firm to see that they are being treated, and (4) no discrimination is to be practiced against any employee simply because he shows a positive blood test. It is hoped that the smaller firms will follow the lead of the larger ones.

The Health Department possesses a copy of the film on syphilis entitled "For All Our Sakes". This film is available

for use whenever desired, but so far it has not been shown to industrial groups.

I realize that every health department will finally plan its syphilis program in its own individual way because of the varying conditions found in different localities. What is needed at present is the enunciation of the general policies which are to be followed in establishing a method dealing with syphilis in industry.

Four of the more important problems in the administration of a municipal program of industrial hygiene have been discussed: (1) The evaluation of potential hazards, case reporting, education and relations with other organizations. (2) Particular attention has been paid to the question of syphilis in industry because it is of special interest at this time. (3) Partial solutions have been offered for some of the problems, but the main purpose of the paper has been to present them for discussion to see what progress has been made in their solution and, if possible, to discover what further steps can be taken at this time.

Acknowledgment is made to Dr. Wilmer H. Schulze, Director of the Bureau of Environmental Hygiene, in the Baltimore City Health Department, for the history of the development of industrial hygiene work in the department, as well as for several other valuable suggestions.

REFERENCES

1. Schulze, Wilmer H.: The Baltimore Gas Appliance Ordinance and Its Relation to Public Health. Jour. Indust. Hygiene, Vol. XIV, No. 2, February, 1932, pp. 41-56.

2. Schulze, Wilmer H.: Industrial Hygiene Applied to the Clothing Manufacturing Industry. Amer. Jour. of Public Health, Vol. 28, No. 4, April 1938, pp. 476-478.

3. Bloomfield, J. J., and Peyton, Mary F.: Evaluation of the Industrial Hygiene Problems of a State. Public Health Bulletin No. 236, June, 1937.

4. Neal, Paul A., Jones, R. R., Bloomfield, J.J., DallaValle, J. M., and Edwards, T. I.: A Study of Chronic Mercurialism in the Hatters' Fur-cutting Industry. Public Health Bulletin No. 234, May, 1937.

5. Couchman, Charles E., and Schulze, Wilmer H.: A Modified Cell for Dust Counting. Public Health Reports, Vol. 53, No. 9, March 4, 1938.

6. Kaplan, Emanuel, and McDonald, John M.: The Blood Lead Value as an Aid in the Diagnosis of Lead Poisoning. Read at meeting of Federated Biological Societies of America, at Baltimore, Md., April 1, 1938 (unpublished).

7. Baltimore Health Department: Baltimore Health News.

8. Mountin, Jos. W.: A Study of Health and Hospital Service in Baltimore, Maryland.

DR. GRAY: This paper will now be discussed by Dr. Crit Pharris, Director, Division of Industrial Hygiene, Tennessee Department of Health. Dr. Pharris.

DR. PHARRIS: Industrial hygiene is one of the newest activities being engaged in by public health workers in the United States and there are many important problems which must be solved as the work progresses. Dr. McDonald has presented a very interesting discussion of four administrative problems. They will have a significant bearing upon any industrial hygiene service whether municipal, State, or Federal, and the manner in which they are solved will largely determine the quality of service that is rendered.

A majority of those attending this conference are connected with industrial hygiene services which are still in the formative period. The speaker has anticipated the type of discussion that would be most helpful and has presented it in such a manner that his remarks can be applied to any type and stage of industrial hygiene service.

Definition of the industrial hygiene problem is the first and most important consideration of any industrial hygiene organization. This is the information which justifies the existence of the service and suggests the type of program that should be carried out.

Evaluation of the potential problem usually is best made through preliminary survey. This is accomplished by making a cross section study of general plant conditions as of a given

time. These findings in a representative sample of industries are then applied to all industries to show how the group rates. Such a survey usually involves observations of general welfare provisions and the environmental conditions under which people work.

The preliminary survey findings will suggest the type of permanent program that should be adopted. Here again the many administrative problems cannot be anticipated and solved in advance. Certain ones, however, will be found in any type of industrial hygiene service.

The scope of the service should be determined in the beginning. Whether it should be concerned with enforcement of regulations or should be kept strictly on a consultation basis will have to be determined locally. There are advocates of the supervisory, law enforcement type of program. There are others who feel that industrial hygiene officials can accomplish more by providing for industry and labor a consultation service which imposes no restrictions. Perhaps a combination of both is desirable. When the value of the service has been definitely demonstrated to the recipients, then it seems logical to impose regulations. If a service cannot be sold to an industry on merit alone it cannot be sold with a club. When and if the majority of those for whom the service has been designed are convinced of its value, then enforcement of regulations should be adopted for the benefit of the few who refuse to cooperate.

Whether enforcement of regulations will be left entirely to labor department officials is a question of variable importance. There are advocates of this procedure. They feel that industrial hygienists connected with public health agencies should render consultation service which imposes no restrictions and that enforcement of regulations should be left largely, if not entirely, to labor departments. They also feel that officials should be given specific information concerning studies and investigations that may be used for guidance in enforcing regulations. Such a cooperative arrangement will involve important administrative problems which will require mutually satisfactory solutions.

Accurate reporting of occupational diseases and deaths is one of the most difficult problems confronting industrial hygienists. Improvements in this service will be slow and will be dependent upon improvement in the methods of reporting and the selection of criteria for diagnosing occupational diseases and deaths. The success of the undertaking will also depend very largely upon ability of industrial hygienists to convince physicians and others concerned that something mutually beneficial will be done with and about the reports. Dr. McDonald gave an excellent example of the cooperation to be expected from physicians when they realize that they will profit by reporting cases.

Workmen's compensation legislation covering occupational diseases will stimulate reporting of cases, particularly those covered by the act. Information concerning the incidence and prevalence of such diseases can also be obtained from industrial

health and life insurance companies. Reliable statistics concerning industrial diseases will be obtainable only after those responsible for reporting them have been induced to cooperate willingly. This will be done when industrial hygienists have thoroughly demonstrated the value of the service and have designed a practicable reporting system.

Education is the most important factor in any public health activity and this is particularly true insofar as industrial hygiene is concerned. The success of the program can and will be measured directly in terms of the educational efforts that have been expended. The industrial hygiene service should be basically educational. It is true that certain routine corrective services probably will have to be rendered. They should be engaged in only when necessary to protect the public health and when no other agency can render the service. Much educational work must be done by demonstration, but one should not lose sight of the fact that such teaching is for the purpose of illustrating the importance of such work and showing how and why the recipient should provide the service in the future. The industrial hygienist should be responsible for certain specific duties such as providing consultation service, educational work, uniform regulations, etc., which only qualified coordinators can perform. Detailed studies of conditions under which people work are essential but their real purpose will have been lost if they cannot be used as object lessons by industry and labor in dealing with

similar problems which may arise at any time.

The relationship of the industrial hygiene service to other organizations will depend very largely upon scope of services being rendered by the organizations concerned. Industrial hygiene services usually are found in areas which already have established other types of health service. It is important that the new program be planned so that conflict with other activities will be avoided. If activities are confined to the conditions within the plant which are specifically related to occupational health, then the chances of the service conflicting with other services are not so great. If, however, the industrial hygiene program is concerned with all factors in the plant and elsewhere which directly or indirectly influence the health of the workers, it might be impossible to keep the service from overlapping that provided by some other agency.

Many municipal areas employ workers who commute from other sections. The question of jurisdiction in such cases may be important. If the industrial hygienist is concerned with all of the broader aspects of industrial hygiene, he is interested in the home environment of the worker regardless of where he lives. The extent of his services to such individuals residing in other areas will involve administrative problems requiring satisfactory solution with officials in the areas.

The scope of service to be rendered is a question which should be governed by several factors. The first responsibility

seems to be to control specific problems within the working environment. Then if time permits, conditions indirectly influencing health of the workers may be dealt with. How far industrial hygienists may go in this direction would seem to be governed by the magnitude and type of problems. Dr. McDonald cited an excellent example of such a question in connection with syphilis control. If syphilis among industrial workers is of sufficient relative importance then it would seem that the industrial hygienist would be justified in cooperating with any agency in efforts to control the disease. The extent of this participation would be governed by adequacy of other facilities for controlling syphilis.

The one big problem involved in the working relationship of industrial hygiene services with other agencies seems to relate to the similarity of the services, the value they can be to each other and mutual understanding and appreciation of the work being done. Industrial hygiene can be adjusted so that it will work in harmony with other public services.

There are other problems which are worthy of mention but time will not permit a discussion of them. Questions relating to type and qualifications of personnel, technical consultation service to the personnel, reference material, and many other administrative phases of the program will arise and demand

solution. Dr. McDonald has made some excellent observations which should be helpful to all industrial hygiene workers, particularly those concerned with administrative phases.

DR. GRAY: Is there any further discussion of this paper? If not, we will pass on to the next paper. Mr. Pool.

THE ROLE OF THE ENGINEER IN INDUSTRIAL HYGIENE

By
Charles L. Pool, Chief Engineer,
Division of Industrial Hygiene,
Rhode Island Department of Public Health.

The role of the engineer in industrial hygiene has been discussed widely of late (References 1 to 11). In January of this year, the American Society of Civil Engineers held a symposium on this subject with papers and discussions by Bloomfield, Phelps, Fair, Hatch, Pool, Pincus, Soper et al, but only published in their monthly, Civil Engineering, an abstract of some of the papers. Stenographic notes of the symposium were kept and it was moved and passed that these be put in form for distribution. Just now the question is in abeyance whether these will be published in the Society's other monthly entitled "Proceedings". The custom there is to publish in full the papers, followed in later months by discussions, and leave the discussion open for serial publication of letters of discussion by Society members and others for several months more. Finally, a comprehensive monograph (by many contributors) on the topic usually emerges. We bring this up now in order to make the suggestion that this Conference offer a resolution to the American Society of Civil Engineers recommending publication of that symposium in full in "Proceedings". Expression of interest on our part and calling of attention

to the fact that the subject is of importance today might add the touch that decides the fate of that mass of erudite material.

Having disposed of the subject in the objective sense, let us proceed to turn the engineer inside out and air such perplexing problems as he meets, by examples from the routine of a Division in constant contact with industry.

Dust Removal Study

One of these arose from a request by a manufacturer that a study be made of the performance of a dust collector, separator and filter unit for grinding wheels. The treated air is returned to the workroom. These units are intended for attachment individually to single grinders or to groups of grinders without long exhaust manifolds. It is claimed that there is considerable demand for these where it is not practical for one reason or another to exhaust air outdoors, such as where a nuisance would be objected to, or where the piping would be unduly long, etc.

The unit consisted of a hood over the grinding wheel, the suction to which was connected to a motor-driven blower and discharged into a metal box containing vanes to give the air a rotary motion, thereby achieving separation of dust from air by centrifugal action and by gravity. From the separator the air went on through a filter consisting of oil-impregnated steel wool packed closely in a flat wad. Steel wool is used because cloth gets on fire with sparks. The "wool", when

dirty, is replaced by another wad to eliminate apparatus for cleaning the filter.

A preliminary run for collecting samples at different points through the process was made, using the impinger and the Bausch and Lomb counter. The Bausch and Lomb instrument had been returned to the makers for the improvements they wished to make on all the earlier instruments distributed, so that it is supposed to be the latest model.

The impinger samples were counted by dark field illumination and by the standard light field methods. The three sets of results looked temperamental, therefore, another run was made with added precautions. To throw further light on some of the apparent discrepancies, samples were examined for the total amount of solid matter in the impinger samples, the total amount of iron, and the volume of solids which settled out in the impinger flasks in a week. The volume was carefully judged by eye, the smallest amount of sediment being arbitrarily assumed as one unit volume and the other readings related to this on a proportionate basis.

The determinations for volume were by far the easiest to make, and curiously enough, turned out to be as reliable as any of the counts or other more scientific determinations, and gave as consistent a picture of performance of the unit.

Six determinations were made on each of eight samples, and five determinations on the ninth. The samples represented room air before grinding, two samples from the exhaust system before treatment, two of this air after separation, two of this air after filtration and two samples of dust failing to enter the hood. A "soft" Norton wheel was used to grind steel during the run. The first sample of each pair represented a "fine cut" by the wheel of .0005 inches thickness of steel. The second of each pair represented a "coarse cut" of .002 inches. The following table shows the results of the determinations:

Performance of Dust Removal Unit

Sample No.				Samples (by impinger except column "c") Millions of Particles Per Cubic Foot			Mg. per c.f.		Units of Vol. per c.f.
				Dark Field (a)	Light Field (b)	Bausch & Lomb (c)	Total Solids (d)	Iron (e)	Volume (f)
1	General room air before grinding			23	1	1	1	.002	.1
2	Air caught by exhaust system	Not Separated	Not Filtered	(90)	(18) est.	(6)	(11)	(.2)	(5.6)
3	"	"	"	167	35	10	40	.5	(17.7)
4	"	Separated	"	(61)	(17)	(2.5)	(8)	(.04)	(1.4)
5	"	"	"	60	12	5.4	2	.1	3.2
6	"	"	Filtered	(45)	(5)	(1.4)	(.3)	(.01)	(.2)
7	"	"	"	51	16	5	.1	.03	.7
8	Air near grinding wheel escaped from exhaust system			(36)	(3)	(1)	(.5)	(.006)	(.2)
9	"			27	6	-	.2	.01	.1

Note: Figures in brackets are for the "fine" cut.
Figures not in brackets are for the "coarse" cut (sample #1 excepted)

All determinations were made in our laboratory except the Bausch and Lomb counts which were made by the safety director of the manufacturing concern. None of our Division has, as yet, had any practical experience with this instrument, though two had its use demonstrated during a course in air analysis taken at Harvard last year.

In spite of taking the precaution of adding alcohol as recommended in "Industrial Dust" by Drinker and Hatch, extreme difficulty was had with flocculation. Samples not counted the afternoon or night they were taken were a total loss.

Several of us spent hours studying these figures, including the manufacturer's technicians. Attempts to apply certain criteria of statistical analysis occupied two of us two or three days. No two contemplators of these figures drew the same conclusions. It took considerable study in the first place to decide whether the figures meant anything.

All things considered, one type of determination was about as good as another for showing the effects of the different steps of treatment and points of sampling. Several runs instead of one would prove most interesting.

The iron was less than 6 percent of the total solids in all the samples of air (except in one the iron was 30 percent). Dust as scraped from the bottom of the separator contained over

75 percent iron. This is a tremendous discrepancy. Before studying these figures to show that they correlate, one might be inclined to think that this discrepancy might be due to laboratory error, but it is more likely that the iron dust was not sampled by the impinger in any important proportion of the total present. The dust collected from the separator, that is, that proportion which went to the bottom of the tray by centrifugal action and gravity, was separated into its constituent parts by a toy magnet. This separation showed the steel dust to be soft and uniformly fine, and the stone dust to be very gritty and vastly coarser. When first collected the impinger samples were clear but after several days got very cloudy from precipitation, perhaps of iron out of solution. Some iron was probably caught by the impinger as fumes and dissolved.

The company's technicians made an estimate of the amount of material ground away, from measurements taken from a micrometer on the grinding machine. The steel dust produced (.0005 in., "fine" cut) was 463 mg per minute, or 99 percent of the total, the rest being alundum (.00024 cu. ins. per min., wheel density 0.59# per cu. in.) The steel dust in the air which was exhausted, according to this estimate should have been 1.4 mg per cu. ft. (at 97 percent caught by hood), whereas the corresponding air sample showed 11 mg per cu. ft. for total

solids and 0.2 mg. per cu. ft. for iron. For the coarse cut, four times as deep, the estimated dusts produced were about four times as great and the quantities found in the impinger samples were 3.6 (T.S.) and 2.5 (FE) times as great.

In all, eight technicians were involved in the various determinations, including those connected with the company.

Aside from furnishing material for speculation on the reliability of the procedures involved, the figures showed each step of the unit to accomplish an improvement in the air. The figures showed further that the unit collects most of the dust, and that the room air was cleaner than the other air sampled. The samples of this run (and of the first run, not recorded herein) indicated that improvement in efficiency of filtration was to be desired. It also seemed that a better filter medium than steel wool could be found. The company was advised to write for samples of glass cloth described by Atkinson (12) as appearing promising for dust filtration. Its developers proved unwilling to supply glass cloth for trial purposes yet, but suggested glass wool.

Not only to plan tests of this kind but properly to interpret the results the engineer feels the need of sound understanding, amongst other things, of the physics of aerosols, the techniques of the determinations involved, and mathematical statistics.

Calibrations

As another type of problem, a main concern has been with calibration of laboratory instruments and methods. It is usually quite impossible to take an untried method out of the books, go into the field, and get results reliable enough to use. One calibration caused unexpected difficulty. A new impinger bought from a manufacturer arrived calibrated. Presumably, setting of the liquid level in the manometer for the corresponding orifice would guarantee a cubic foot a minute or a liter a minute according to which was desired. Our calibrations to check those of the manufacturer have never checked them, and have never checked one another for more than a few days at a time. Everything under the sun was considered as a contributory cause to the irregularity. No way was at hand for knowing the sampling rate except by using instead of the orifices, the flow meter from an old impinger, home-made from U. S. Public Health Service directions. The flow meter did not show this fluctuating tendency and could be relied upon. Some time ago this problem was taken up with Hatch in New York, who suggested the possibility that the Reynolds number, as might be calculated from calibration data already plotted, would show the readings for the orifice in question to be in the region of turbulence, and therefore, of unreliability. As we understand it, an orifice of a slightly different size would probably straighten out the trouble for the cubic foot reading, and a corresponding change in size of the orifice for

the liter a minute reading would do likewise. Time has not yet been found to study the mathematics of air flow to get to the bottom of, instead of merely around, this difficulty.

This case is mentioned to indicate another branch of science very necessary to the engineer practicing industrial hygiene, namely, that of hydraulics of fluids, including gases. We are trying to illustrate the point that the engineer has a real problem in the great variety of effort which this work demands.

Ventilation of Fumes

Our most recent study has had to do with the ventilation of fumes. A rubber product is immersed in a bath of bromine and carbon tetrachloride, and while the material is being withdrawn from the bath, it is dried by a jet of compressed air to prevent dripping outside the bath. The bath consists of an enclosed wooden box provided with an exhaust and motor-driven blower discharging to the roof. The compressed air blast, we hope to show, interfered with the exhaust. While the box was supposed to be tight it had to let the product in and out, and leaked bromine and carbon tetrachloride vapors into the workroom. The amount and cost of vapors escaping to the roof were excessive. In addition to protecting the workmen, we hoped to be able to indicate to the manufacturers how to save carbon tetrachloride. The carbon tetrachloride was used merely as a vehicle for the bromine, it being thought that a stronger bromine solution can be used with this vehicle than with water.

One of our ever-present concerns has been to get instruments and methods ready for such calls which come in on short notice. The charcoal adsorption determination of carbon tetrachloride could not be made ready quickly enough. Consequently, it was decided to make our determinations on the bromine (since it was quite obvious to the nose that this escaped along with the carbon tetrachloride) and judge from these the rate of escape of the carbon tetrachloride, which, in this case, is probably the more important hygienically. The fritted glass bubbler was used in an impinger flask containing a solution of KOH. It was intended to determine bromine by precipitation and weighing. Since we did not know what to expect from this test it was decided to try out the reagent orthotolidin, which, as is the case with chlorine, gives, in aqueous solution, yellow colors that grow deeper the higher the concentration of bromine. This was fortunate because back in the laboratory none of the KOH samples gave any results for bromine. The orthotolidin showed in the field where the most bromine was escaping. The method used was to put a c.c. of the reagent into 100 c.c. of distilled water in an impinger flask with the bubbler. As soon as the color became distinct, it was compared with standard colors used for chlorine as prepared from "Standard Methods of Water Analysis" of the American Public Health Association. Later, quantities of chlorine were translated into quantities of bromine by preparing a salt of bromine which could be made quantitatively to give

colors which could be read against the chlorine standards when the salt of bromine was treated with hydrochloric acid. In the field the bubbler was run until the color was distinct enough but not too high to read. The readings were made immediately, recording the maximum color before fading. This ought to prove to be at least a useful rough test, but we have not had time to determine its reliability under various conditions. It may prove accurate.

Thanks to this test, it was possible to recommend various changes in the ventilation system and thereby gain a satisfied customer. The box needed redesigning to prevent the compressed air from blowing the fumes away from the mouth of the exhaust, and from agitating the liquid beneath it. The box needed leak-proofing and insulating against heat from a nearby machine. The method of mixing the chemicals and filling the box were to be changed to avoid exposure of the man doing the mixing. We have had frequent occasion to recommend changes in the type of face protectors used for various operations, since the common practice is to use the first thing at hand. Here, the suggestion was made that the respirator cloth be kept moistened for the time being with a weak solution of ammonia to absorb some of the bromine. We are curious to go back and see if that did any good.

In case the contemplated changes do not reduce the waste, it is planned to investigate the practicability of recovery of the fan-exhausted carbon tetrachloride either by freezing the vapors, somewhat after the fashion of a degreasing tank where a similar

thing is done for trichlorethylene, or by adsorption with activated charcoal.

Difficulties of Routine Problems

A difficulty has been to have methods ready for quick use. In the majority of cases the most accurate determinations are not necessary. The transportation of a cross-section of the laboratory into the field is impracticable enough to reduce the number of samples. A larger number of less precise samples would often be good. A class of research in which the State and city units could do some valuable work is the type that might be termed "field research" rather than pure research, especially along the lines of short cuts and simplifications.

Another difficulty has been to find simple descriptions of successful installations for removal of fumes or of other ventilation problems of miscellaneous character. It is true that much can be found for certain problems, such as in the thorough study by the United States Public Health Service of chromium plating, but for a great many conditions engineers are urged to write up simple descriptions which would be of great value to those who have not seen an installation for that particular purpose, giving the amount of power required to move the air, the size of the ducts, inlets and bends, the results achieved, velocities, cost, the materials used, etc., in such manner that anyone designing a system for the same or a similar substance could have something to go by other than mere expectations.

Field Personnel in Industrial Hygiene Engineering

Another problem ever present is the paucity of trained persons in the field amongst those with whom industrial hygiene engineers deal. In the case of the older established sanitary engineering problems on water supply and sewage treatment, the city engineers and the plant operators over a period of years have been pretty well "trained" so that much of the technical direction and impetus given by a State or city bureau can be spread out into practice. This is not so in any comparable degree with plant engineers, safety engineers or others in industry having to do with industrial hygiene engineering. The amount of ventilation for miscellaneous purposes in present use is extremely vast in comparison with the personnel of the bureaus for inspecting its performance. Repeatedly when visiting factories we see various installations and wonder whether their performance is effective. Part of a comprehensive program would be to instruct persons in these plants to make determinations such as now are confined to the laboratories of these bureaus or divisions. There was a time when the question arose whether it would be wise to put into the hands of water-works operators other than the obviously trained chemist sundry chemical tests for determining whether the plant is running properly. Many opposed giving a pump-house engineer any of the more delicate determinations to make. Gradually, however, sheer practicability saw to it that these men were little by

little instructed more and more in a larger number of tests, so that now it is common to find that even in the smallest treatment plants at least one or two chemical readings are made routinely. The net result has been increased efficiency of operation of sanitary works. Of course, the tests are not all ready in industrial hygiene work to pass out in this manner, but here is a field for expansion.

Another wide-spread improvement in application of industrial hygiene engineering data waits upon the submission of plans to these divisions and bureaus and the "education" therefrom of the engineers, pipe-fitters, or sheet metal workers who design or throw together ventilation systems, local exhaust units, etc. Until they are compelled to submit for approval at least a sketch of what they intend to install, all kinds of faulty contraptions will be encountered. Here again the industrial hygiene engineer can adopt one of the successful leaves out of the book of the longer established sanitary engineer. Perhaps Hatch will have more to say about this since his Division for a number of years has required that plans be submitted.

Ingredients of Solvents

Still another problem of perplexity has been to know the nature of unknown solvents, lacquers, sprays, etc., which we find in use. As yet it has not been possible to work out satisfactorily with our chemists a means of knowing when it is practical to make an analysis of unknown solutions. It

has usually only been possible briefly to establish the absence of benzol, methanol, etc. Might it not be possible to get interstate action so that once a commercial product is analyzed a list of findings could be interchanged and save repititions? Manufacturers will often furnish reliable data on ingredients. Would it be possible to require some sort of labeling on new products?

A case arose where it was desirable to substitute a less offensive solvent in jewelry manufacture. We could not lift it out of the hat with our meagre resources for industrial chemical research, therefore wondered if a concern manufacturing such products might investigate the possibilities. In spite of putting the case before a certain large concern in Delaware, not to mention names, the same liquid is in use, though increased ventilation has reduced the difficulties. In cases like this the need of access to greater knowledge of organic chemistry is felt. With it, pertinent suggestions might be made to some small manufacturer to whom it might prove worthwhile to develop the solvent needed.

Definition of Industrial Hygiene Engineer

The time will come, no doubt, when chemists will do the analytical chemistry and the industrial hygiene engineer will not have to go into the technicalities of every branch of industrial hygiene. At present, industrial hygiene engineering might be described as the application of all the sciences except medicine to the solution of problems which everyone else finds it expedient to ignore. At least from the perch

on which we sit, that seems to be the case, and in spite of the fact that we have not made any unusual attempt to advertise the services of our Division, we have more technical problems awaiting solution than can be solved for a long time. The chemist who undertakes to engineer problems on through to solution falls within our meaning of "Industrial Hygiene Engineer". The term "engineer" is becoming more and more restricted to persons qualified to design as well as direct engineering works. Professional engineers object to assumption of the title by pseudo-engineers, but we are no more perturbed when operating or stationary engineers arrogate it than physicians are when prestidigitators call themselves "doctor".

Unknown Organic Compounds

The need of the industrial hygiene engineer for knowledge of chemical processes, machinery, mechanical controls, etc., is exemplified by a striking case described briefly in the following article reprinted from the monthly bulletin from our Department.

Escape of Poisonous Vapors:
Lesson from an Accident

A chemical accident which might have had grave consequences was the direct result of a serious mechanical accident in an industrial plant this November, an occurrence which our Division of Industrial Hygiene had reasons to investigate.

From the unusual chain of circumstances of this case, morals may be drawn, and consideration of the peculiar facts on the part of any persons whose responsibilities include the

prevention of catastrophes may lead to the thinking out and rectifying of some obscure conditions which, ordinarily, might be considered either not at all or else too late.

A man stood on a mixing tank to adjust a belt over a moving pulley. He gambled with his life and at this writing it is not known whether he has lost it.

Men rushing to his aid shut off the power. Thirty feet away a drum holding 300 gallons of a dangerous mixture was developing by the action of strong sulfuric acid upon organic chemicals, resulting in a hot paste which had to be artificially cooled to keep it below the boiling point of water. This cooling was accomplished by a power-driven mixer which pushed the mass against the water-cooled drum. Vapors and fumes from the process were discharged to the roof by a power-driven blower.

The shutting off of the power from the pulley likewise stopped this mixer and blower. The mix got excessively hot; a visible cloud of fumes filled the loft and began to spread to the floor below. Rescuers and workmen nearby were almost suffocated.

The plant chemist thought the suffocating vapors were sulphur dioxide. Unless combined with other chemicals, fumes of butyl alcohol which have been shown to damage animals when breathed in a concentration of 100 parts per million parts of air were present, and probably present in excess of this concentration. Unless combined with other chemicals, fumes of the coal-tar derivative, naphthalene, which when hot and concentrated are capable of injuring the eyes were present, and may easily have been present hot and concentrated. There is no telling what fume or vapor may have been formed from combinations, one chemical with another. To determine the possible damage to the persons who were exposed presents an eminently involved study.

No matter how much damage may accrue from the chemical accident, and no matter how much may be the grief of those close to the man who was maimed and who, it is hoped, may recover, the results might have been worse, for the situation had in it the elements of a major catastrophe. For all the plant chemists knew, conditions may have closely approached those of explosion.

The morals we draw from this case are that too much cannot be known about the potentialities of hazards inherent in substances and devices with which we have to deal, that superficial consideration of the routine running of the

process does not establish its safety against a combination of peculiar yet possible circumstances, that gadgets upon which safety depends must be protected from mechanical and human error in design, installation, and operation, and insofar as is humanly predictable, from unexpected outside interruptions. Furthermore, that the simplest elements of safety engineering must be applied not only to prevent the accident to the individual but adjoining or interrelated operations must be protected against confusion and interruption.

What if the running water had stopped cooling the outside of the drum had it been dependent on the same electrical circuit as the agitator and blower? What if the interruption had occurred at a stage of the chemical reaction which had allowed the mixture to reach a still greater heat? The controls for this process cannot continue to be subject to interruption.

The limitless intricacy of Rhode Island industry calls for the application of all the astuteness that can be focused upon the eternal vigilance which is the price of safety. And be it remembered that nothing is of too slight possibility to be worthy of consideration when the stakes are nigh enough--when a trifling outlay may cheat the devil of a major disaster.

This case too makes one stop and wonder what circumscribes the limits of industrial hygiene engineering. That is just one more problem: to know where to stop before you get into the field of industrial accident prevention. Often, the Industrial Hygiene Division has the best technical facilities for solution of certain accident prevention problems. We had occasion to make determinations after this accident, trying to set up conditions somewhat resembling those which had taken place. The determinations were woefully inadequate. The indications were that sulphur dioxide might have been the gas that overcame the men. We tried to demonstrate the quantities that might have been given off. Even that test

taken into the field in a hurry caused us difficulties. Perhaps, all such difficulties might have been avoided by a laboratory doing this test frequently. The samples were bubbled through water containing iodine in measured amount, and starch to give color, but amongst the mistakes made were failure to put enough bubblers in series to prevent the loss of iodine, difficulties in making the titrations back in the laboratory, due to some interfering agent in the laboratory air, possibly H_2S, tobacco smoke or other reducing agent, and finally an uncertainty whether the samples, when taken, were free from influence of SO_2 from nearby smoke rather than from the process for which the determination for SO_2 was desired.

We have felt the need in the available tabulations of procedure for the various tests which arise from time to time of additional data on what substances interfere with the tests and are to be avoided or allowed for.

Carbon Monoxide

Carbon monoxide determinations have given us no trouble, but even here, we wish we had more descriptive material at hand by which we could judge when a given installation is likely to be a carbon monoxide hazard and when not. The peculiarity about carbon monoxide determinations is that often you are trying to make a routine examination illustrate an exceptional occurrence. It is somewhat as if firemen engaged in fire prevention took a thermometer to test the building which might later catch on fire. We use the MSA indicator which,

by thermoelectric measurement of the oxidation of CO to CO_2 indicates directly in parts of CO per ten thousand of air. We have had it in mind to calibrate this instrument by mixing gas from the city mains with air, since the amount of CO in the city gas is supposed to be fairly constant and to be known. Meanwhile, we have had no reason to suspect the accuracy of the instrument.

One queer case in which we used the CO indicator followed a fatality where a man working outdoors on top of a pile of soft coal collapsed and died. His job was to shovel the coal down towards an automatic scoop for loading conveyor buckets. The coal had spontaneously caught fire within. When this happens, we understand that the only remedy is to move it. We were able to demonstrate that measureable amounts of CO escaped from burning coal in a situation similar to the accident. No one present knew enough to resuscitate the man from possible CO poisoning. In larger coal companies the practice is to put pipes in these piles so that an opening will extend from top to bottom, down which a thermometer can be lowered on a string. If the temperature gets up to a certain point danger is indicated and that pile can be moved, perhaps sold ahead of some other pile which is cooler. The main dependence on prevention of these fires is on the overturn of the material.

Another case where the CO instrument was used was in a round house where doctors suspected that headaches of workmen

might be due to CO. Perhaps they were, but we scoured the shop and the only place we could find positive readings was on top of a Diesel driven locomotive over the "smoke" stack. The place was full of what might offhandedly be called potentialities for CO, but the ventilation was apparently good.

Amongst other cases where we felt we should be able to demonstrate its presence, from the descriptions of workers or from possibilities inherent in the surroundings, one was in a large badly ventilated repair garage, another in a W. P. A. sewing room over a commercial garage and opposite the end of a chimney for a large heating plant, still another in an apartment opposite the stack from a shop where automobile springs were annealed. Here we felt sure the headaches of apparently responsible complainants were due to carbon monoxide, but many of these apparent discrepancies are to be explained by the capriciousness of gas clouds in the atmosphere.

Miscellaneous Gases and Vapors

On this subject of stock instruments for determinations, we would like to know whether anyone has had any successful use with the MSA H_2S aspirator. We have not, but again, have had no time to subject it to a rigorous calibration, especially under operating conditions.

Still another type of investigation we may mention in our attempt to show the wide variety of study required was in a plant

which treated cloth for such uses as book-covers and window shades. This concern gave us a delightful blanket invitation to go through every detail in their plant and decide for them just where they might have potential hazards and just what should be done to reduce such. Various and sundry solvents, lacquers, dyes and miscellaneous chemicals were mixed and used. With all the various samples we took, one of the two principal points of interest turned out to be a drying cabinet which men had to enter to clean, after it had been used to contain a vapor. Apparently, routine leakages from coating machines were not important, but when men must enter such a space, is often the most important angle. In this case we, more or less, stumbled upon it, by virtue of having been in the plant with our sample instruments for several days. Some of the substances of interest were formaldehyde, methanol, methyl acetate, butyl acetate, "troluoil" (a petroleum naphtha), potassium dichromate, ammonia, HCN, and various lacquers.

Exposure to Cold

Exposure in a damp cold cloth conditioning room was of great interest to the management. The literature is contradictory concerning the amount of cold to which men may safety be exposed. General statements are made in "Occupation and Health", International Labour Office, Geneva, 1934, Volume II, pp. 11-12, to the effect that in closed workrooms the temperature should not

fall below 59° F., and where artificial humidification is practiced, the temperature should not fall below 50° F., the wet bulb should not go higher than 75° F., and should not approach too closely the corresponding (dry bulb) temperature reading.

Charts showed us for that room indicated that the temperature was down near 50° F. from time to time with the wet bulb close to the dry, giving a high relative humidity, approaching 90 percent. These are conditions of discomfort but we had no evidence that they are detrimental to health of persons working in them with suitable clothing. Of course, with poorly adapted clothing it would be bad to sit around or remain inactive under such conditions for long. With provisions adopted about the time of our visits for keeping the temperature above 60° F., and the relative humidity at 90 percent, we were unable to say that work could not be done safely with suitable clothes, footwear, personal hygiene, activity and absences from the room as might be desirable for certain individuals.

In order to determine whether other work places are commonly used under similar conditions of cold and damp, we visited two breweries. Beer is stored in large tanks in cold rooms where hose rinsing is practiced almost constantly. These rooms varied in temperature according to our measurements from 37 to 43° F., and in humidity from 87 to 96 percent. Men spend the bulk of their working time in these rooms at active work

with heavy woolen clothing, hats and rubber footwear. It is common for men to spend a working lifetime under these conditions. While brewery workers recognize that precautions must be taken against effects of cold and chilling, there is no evidence of which we have knowledge that old men who have worked under these conditions suffer any more ill effects which might be attributable to cold than corresponding old men in the general population.

This type of inquiry is illustrative of the borderline where engineering investigations overlap the medical. It should be noted that all of these examples under consideration have been investigated under medical advice and direction. No division of industrial hygiene should attempt to apply its engineering principles without adequate medical guidance. Conversely, no division should attempt to operate without adequate engineering direction. It is the emphasis on the extensive implications of the meaning of "adequate" here which prompts these examples.

Atomized Metal Sprays

In Rhode Island the new process of spraying metal surfaces with a film of metal has begun to appear. Large metal surfaces not easy to move may be sprayed in place to prevent corrosion. Tanks may be lined. Many potential commercial applications appear. Since any metal may be sprayed, including lead, this process is among those ever-arising developments of industrial processes which must be followed understandingly.

Control of Odors

Slightly unrelated, perhaps, to industrial hygiene was a problem of odors from a wool scouring plant causing widespread complaint in its neighborhood. This case demanded a great deal of time for searching the literature, with scant reward. Very little indeed is recorded on the actual installation of plants for scrubbing, burning or absorbing odors, that is, so far as revealing what degree of removal to expect for a given installation and cost. Plenty of theory is written up, but when it comes to recommending to the concern that a certain installation be made, with the assurance that certain accomplishment will result to relieve the neighborhood of odors, we are unable to do it. Engineers are therefore urged to publish this type of information when they run across it so that a body of information can be built up. The wool scouring troubles in our case were mostly caused by a centrifuge for recovering grease from the waste liquors, installed partly to recover the grease and partly to take the load off the river flowing past the plant. We had to be content to recommend to the manufacturer that an experimental plant be put up on the roof so that design data might be obtained for a unit through which the collected foul air might be passed. Whether the unit would consist of sprays, chemical deodorants, activated charcoal, or combinations of steps, it was likewise unwise to specify without trial. From the literature examined, almost any conclusion one wished to

draw could be drawn, but experience in such cases leads one to be pretty wary in promising too much.

Dust in a Power Plant

A power plant producing steam by passing hot furnace gases through a brick-lined chamber into a second chamber containing nests of tubes full of water was the source of an invitation to a costume party by our impinger crew, the costumes consisting of union-alls and old hats. The trouble was that the fuel contained large quantities of refuse and wastes with organic matter. The hot gases caused the tubes to take on a hard insulating scale. Every two or three weeks, men had to go in and scrape one or another set of tubes, using chisels, power tools, and compressed air, raising in the process a frightful dust in one of the worst ventilated spaces which could be imagined. As roughly estimated, there was enough silica in the dust to endanger the men if they worked in there too constantly without adequate respirators. Changes in plant design were being studied to lengthen the runs so that the men would not have to chip this scale so constantly. The first chamber through which the gas passed was to be baffled, but we were not so sanguine as to believe that more than a 20 or 25 percent improvement might be expected, therefore concentrated our efforts toward securing an improvement in respirators, the ordinary ones on the market being more or less hopeless to wear in such a place and the helmets with air lines having to pass through

such a complicated labyrinth that they could scarcely be worked with. The nature of the problem was placed before some of the concerns which make respirators but, thus far, no new equipment has evolved.

Lead Poisoning

At least one problem of a type which we feel competent to solve without any qualms should be mentioned. This example arose this month in a small storage battery manufacturing plant which has caused lead poisoning. Samples have shown excessive lead in the air. The plant is growing. The management intends to install improved ventilation and better facilities, having asked our advice. For this, definite yard-sticks are at hand.

Difficulties are usually more intriguing, and we thought that perhaps a candid discussion with the different members here, along these lines, might prove more interesting than description of the smooth-running parts of the machinery.

Evaluation of Industrial Hygiene Engineering

At the present time no one possesses more than a rough estimate of the magnitude of the industrial hygiene engineering problem and of the intensity to which various parts of the field are worked and by whom. Therefore, it will save a vast amount of work for all concerned if, at the outset, it is decided routinely to collect certain statistics and serve notice on those who think up questionnaires that they need not expect much

more than the reasonable statistics decided upon. Furthermore, these statistics could be published from year to year in a form to send to those needing them and let them answer their own questionnaires. We doubt whether the industrial hygiene engineer has begun to receive the barrage of this type which he will receive from numerous agencies. These requests cannot all be ignored. The National Conference of Governmental Industrial Hygienists would do well to put itself in the position of deciding what statistical efforts should be made for the coming year as the major contribution rather than wait for these questionnaires to come in and enforce upon different bureaus the collection of scattered or unrelated information. We would almost be so bold as to suggest a committee to take this in hand if it had not been for a remark by Hatch on "the alarming birth-rate of committees".

Training of Engineers

The summary problem resulting from such sundry problems as described above is the training of engineers and technicians for this field. We have thought from time to time, from a non-academic point of view, of various items of possible interest, and have developed some notions or obsessions, if you like, which might bear discussion. A separate session should be devoted to do this topic justice.

All of the engineers and chemists with whom we come in contact in this work have felt the need of sounder or greater training somewhere along the line, or else we have felt it for

them, exceptions excepted, of course. The rapid expansion of this work, with no field of experts to draw on, has given rise to this peculiar situation which, however, has been admirably met in a stop-gap sort of way by such agencies as the United States Public Health Service, Harvard, etc.

To begin with, we might consider how the under-graduate at M. I. T. spends his time toward gaining a B.S. degree in two branches of engineering. The following tabulation shows the percentage of time spent on each class of subject:

PERCENT OF TIME ON UNDER-GRADUATE STUDIES

Subjects	Sanitary Engineering	Public Health Engineering
Mathematics	10%	10%
Physics, incl. applications	23%	17%
Chemistry, including sanitary & organic	13%	13%
Biology & Bacteriology	5%	7%
Drafting & Surveying	11%	10%
English & Economics	10%	10%
Engineering & Design, including sanitary	17%	11%
Health & Sanitation	0%	8%
Military and Physical Training	3%	3%
General Science, incl. electives	5%	4%
Thesis	2%	3%
Industrial Sanitation	0%	4%

We are familiar with these courses and do not consider this schedule sufficient for the industrial hygiene engineer. A fifth year on specific industrial hygiene engineering subjects is scarcely enough. It is more than doubtful whether the above

table could be pruned to make place for the fifth year subjects within a four-year compass. Upon condensing this tabulation from the M.I.T. catalog, we thought places might be found where cuts could be made, but these are so few as to be negligible.

A favorite point with us, however, is a constitutional dislike for descriptive subjects as under-graduate engineering study. What you get, you need so badly that there is no time for such things as you can learn by general reading. Looking back, exacting studies like branches of physics and chemistry were all too scantily covered. Various subjects, such as the descriptive part of vital statistics, or any statistics for that matter, which are not entirely mathematical, four-fifths of the material generally contained in courses on public health administration, non-design courses in municipal sanitation, descriptive biology, etc., waste much priceless time for the undergraduate. One consideration may make this waste necessary, that is, a softening down of the rigor of the curriculum by the inclusion of easy lessons like these to enable the student to keep up with his schedule. If the subjects were all engineering, laboratory and mathematics, perhaps the pace would be too stiff.

Anything which can be learned during the four or five years spent at institutions, out of books without the aid of the academic equipment and staff should be omitted just as rigorously as possible, and a required course of outside study for

three or four years after graduation might be required to take its place before the full degree is given. If there is any merit in this suggestion, it might prove a means of keeping the training of an industrial hygiene engineer down to four or five years.

In some of the indispensable courses given, the propriety of inclusion of specific items for the industrial hygiene engineer may be questioned, such as in courses of ventilation and air-conditioning engineering, the devotion of perhaps four-fifths of the course to heating engineering and design. Another type of detraction from time sorely needed in immediately usable training is stuffing the engineer full of ability to read chest pictures by X-rays, which he never should be permitted to express an opinion on. Ten minutes' instruction on what the X-ray can do should be sufficient for all engineering purposes. The courses given to the engineer in physiology should be <u>most</u> carefully thought out in the interest of not giving him too much, thus saving valuable time. A certain amount of knowledge of skin reactions, and of respiratory functions as related to dust, etc., is indispensable, as is a little basis for understanding epidemiology, and a basis for the understanding of the action on the system of different groups of toxic chemicals, but outside of this, there appears to be little justification for a lengthy course in physiology. Please consider that these comments are not intended to be as

dogmatic as they sound, but rather to be sent out to give rise to discussion from different viewpoints. Though the groups must be made mutually intelligible, we would like to indict courses wherein engineers are tucked into classrooms containing 50 percent physicians.

Summary and Conclusions

Working examples have been given to show that the industrial hygiene engineer must have command of a wide knowledge of several basic and applied sciences in order adequately to promote his work in the field. His training needs to be broader than that for most branches of engineering and it is imperative that men of outstanding ability be attracted to the work if governmental units are to retain leadership.

In his contacts with industry the industrial hygiene engineer must deal, in an engineering age, with the country's ablest technical men. He is likely to find himself in a position seriously to affect production costs and commercial competition.

Existing opportunities in governmental units offer to this type of engineer no more than a valuable training for lucrative positions in the commercial world. Witnout a high order of engineering, the broad front of industrial hygiene will be seriously restricted to an activity of no great importance and it may confidently be predicted that unless the engineer is given equal opportunities with the physician to fill the highest administrative positions in industrial hygiene, the departments cannot inspire the continued effort necessary to the advancement

of the program which its administrators have their hearts set upon.

The writer's recommendation is that all public health engineering in these departments be organized under one head with assignment of industrial hygiene engineers to service in divisions of industrial hygiene where these are headed by physicians. In this way the engineer specializing in industrial hygiene may have equal opportunity with sanitary and other public health engineers for advancement to the head of his engineering division.

Organizational difficulties are insufficient excuse for failure to make possible the building of strong divisions of public health engineering. Difficulties do exist but these are of slight importance in comparison with the building of an organization of able men, without which no organization can possibly achieve greatness.

REFERENCES

1. Engineering Control of Occupational Diseases. J. J. Bloomfield. Jour. A.P.H.A., 25:1196, November, 1935.

2. A New Field for Sanitary Engineers. Charles L. Pool. Civil Engineering (Monthly of Am. Soc. C. E.) 6:193, March, 1936.

3. Industrial Sanitation as a Public Health Engineering Activity. Charles L. Pool. Jour. A.P.H.A., 26:613, June, 1936.

4. The Trained Public Health Engineer in Public Health Departments. Charles G. Hyde, Ibid. 26:697, July, 1936.

5. Integrated Control of Occupational Diseases. C. O. Sappington. Ibid. 26:781, August, 1936.

6. Industrial Hygiene Activities in the U. S. R. R. Sayers and J. J. Bloomfield. Ibid. 26:1086, Nov. 1936.

7. Aspects of Air Sanitation. E. B. Phelps. Civil Engineering. 8:166, March, 1938.

8. The Engineer in Industrial Sanitation. J. J. Bloomfield. Ibid. 8:167, March, 1938.

(Most of these articles have bibliographies. The next three papers were given before the 23rd annual meeting of the American Association of Industrial Physicians and Surgeons, June 6-9, 1938, and published in Industrial Medicine, Vol. 7, No. 7, July, 1938.

9. The Engineer's Place in Industrial Hygiene. Warren A. Cook.

10. The Insurance Company and the Control of Occupational Diseases. J. B. Lamenzo.

11. Engineering Aspects of Problems in Industrial Epidemiology. J. J. Bloomfield.

12. Filtering Gas Through Glass. W. H. Atkinson (Owens-Illinois Glass Company, Newark, Ohio). Chemical and Metallurgical Engineering, 45:176, April, 1938.

DR. GRAY: Mr. Pool's paper will be discussed by Mr. Theodore Hatch.

ROLE OF THE ENGINEER IN INDUSTRIAL HYGIENE

Discussion by
Theodore Hatch, Associate Dust Control Engineer,
Division of Industrial Hygiene,
New York State Department of Labor.

The subject assigned to Mr. Pool is a difficult one to treat except in a general way. The author attempted to picture the engineer's work in industrial hygiene by recounting some of the experiences gained in his own office since these are representative of the experiences met with in most divisions of industrial hygiene. Such experiences simply confirm the view we all hold, namely, that the role of the engineer in industrial hygiene is simply to apply engineering technics for the corrections of unsatisfactory conditions; in this case, the correction of hazardous working conditions in industry. These technics, so far as they apply to industrial hygiene, differ in detail from the technics employed in other fields, but in principle they remain the same. The reasoning involved is as follows:

(1) What is the problem?
(2) What is the condition to be effected?
(3) What are the instruments and procedures necessary for evaluating the problem?
(4) What methods are available to produce the required correction?

After having answered these questions the engineer proceeds to design and install corrective equipment and to check the results.

Mr. Pool points out that many of our present testing

technics are not wholly satisfactory and suggests the need for a great deal of practical experience with these technics before they can be used with the highest efficiency. He points out further the need for simplified instruments and procedures for use by plant engineers for the purpose of routine checking of plant operation. These points are well taken and undoubtedly the experiences gained will bring about rapid improvements. The need for routine testing procedures is to be emphasized in particular since the introduction of routine checking of plant conditions by industry itself constitutes one of the most important of our present day problems.

By way of discussion of this paper, I can do no better than to follow the author's example and describe some of the activities in the Division of Industrial Hygiene in New York from an engineering standpoint.

The most important single engineering activity has to do with the examination and approval of plans for ventilating systems, designed for the removal of hazardous dusts, fumes and gases in industry. This work is required under the provisions of the industrial code which has to do with the control of these substances; in the course of this work, the Division engineers examine 1500 to 2000 sets of plans every year. Plans come to the office for the control of all kinds of substances ranging from the most toxic to harmless and in size from 1-machine installations to systems providing for hundreds of connections. In capacity,

they range from 1 to 200 cfm up to as much as 500,000 cfm. On one job the total horsepower required was over 400.

The examination of the plan is not casual; in every case the plant is visited and a study made of the condition to be corrected and, in addition, the design, capacity fan size, power consumption, etc., are checked to make certain that proper engineering has been applied to the design. In many cases the examination has disclosed serious mistakes and the correction has saved industry considerable sums of money. The education of ventilating engineers and contractors has constituted an important part of this work. Similar education is undoubtedly required in other States. The code under which this work is done was one of the first adopted in this country and although it has certain drawbacks, both from the standpoint of engineering requirements and administration, it has nevertheless served a very useful purpose and has been widely copied.

The experience in New York over a period of twenty years or more suggests that the examination and approval of plans for ventilating systems constitutes one of the most important single functions in a program of prevention and it is therefore of great importance to the engineer in industrial hygiene.

The present code in New York has certain limitations which have been emphasized in recent years as our knowledge of ventilation in industry has increased. At this time several new codes are being written and this presents an opportunity to remove some

of the limitations of the old code and provide in the new ones for measures which did not appear in the earlier code. Thus, it is desirable to leave out in the code itself any engineering details which are certain to change as our knowledge and experience increases. The old code stressed static suction at the throat of the hood as a measure of operation. Modern concepts show that this index is too limited for use in a fundamental code in which the results to be obtained should be stressed rather than the way of obtaining them. A code should set up requirements for the industry as a whole rather than individual machines. We do not have full information concerning the permissible concentrations of dust, fumes and gases but we must nevertheless recognize the need for specifications in codes pertaining to permissible concentrations. With respect to engineering design the code must establish certain fundamental requirements which will insure the functioning of the system in a certain way but the details of design necessary to accomplish these fundamental results should not be written into the code itself since they can be expected to change as knowledge increases.

Another important part of the engineer's work has to do with field studies of ventilating systems or other control procedures in order to increase our knowledge of ventilating requirements, etc., and also to provide information necessary to the writing of a new code or the proper administration of an existing code.

DR. GRAY: The last paper for this session will be by Dr. Louis Schwartz, Medical Director, United States Public Health Service. Dr. Schwartz.

MODES OF INVESTIGATION OF OCCUPATIONAL DERMATOSES

By
Medical Director Louis Schwartz,
United States Public Health Service.

When we realize that 70 percent of all occupational diseases are dermatoses, then we are impressed with the importance of studying the skin hazards in industry and the causes of occupational dermatoses.

In order to investigate intelligently the causes of occupational dermatoses, one must at least have a sufficient knowledge of dermatology to distinguish from contact dermatitis such ordinary skin diseases as psoriasis, impetigo, urticaria, ptyriasis rosea, etc. In addition, one should also have a fair knowledge of chemistry. The actual investigations in factories will give one knowledge of industrial processes which is also an essential requirement.

Before we can hope for success in finding the cause of a particular outbreak of occupational dermatitis, we must have the experience and knowledge gained from studies of the normal skin hazards and the normal incidence of occupational dermatoses in the basic industries. Such studies not only acquaint us with the irritating properties of various chemicals and compounds, but often lead to the discovery of health hazards not previously reported. It was in the course of such routine studies that we first noted the health hazards connected with the manufacture and use of chlorinated naphthalines and certain synthetic resins.

The basic industries are usually selected for routine studies, because they handle or manufacture the chemicals used in all other factories. We also make it a practice to scan the reports which are submitted periodically to our office by the Compensation Boards of the various States to see if there might be an unusual occurrence of occupational dermatoses in any one factory and, if so, we usually inquire first by letter and later perhaps make a personal investigation as to the cause of the unusual incidence in that factory.

In order to gain entrance into factories to make such studies, we must awaken the interest of the owners or management of these factories in the importance of our work. This is done by first writing a letter explaining that we are engaged in the study of occupational skin hazards with a view of learning their actual causes and formulating methods of prevention and that we would like to have a personal interview to discuss the subject. When such an interview is granted (and it usually is) we explain that our studies are purely for scientific purposes and will be of benefit to the industry; that there will be no sensational articles published as the result of our findings. Also, that our study will be conducted in such a manner as not to alarm the workers, nor to seriously inconvenience the routine of the factory; that in any report which may be later published as a result of the investigation, neither the names of the factory nor of the workers will be mentioned, and that a copy of such a report will be furnished the management if they so request. In addition, we assure the management that no matter what the

findings, we will not officially censure them and that we will try to answer whatever questions they wish to ask concerning the prevention and treatment of occupational skin diseases occurring in their factory So far in our experience, after such an interview, permission to inves gate has always been granted.

In proceeding with an investigation, the first step is to discuss with the plant superintendent the occurrence of occupational diseases, especially those of the skin, which to his knowledge have occurred in the factory. Also to obtain from him a list of the raw materials used in the factory and of the products manufactured. The next step is to consult with the plant physician, if there is one, or with the nurse o first-aid attendant, concerning the kind of infections or diseases treated in the dispensary and to obtain from them a little better idea of the incidence of skin diseases than perhaps was obtained from the superintendent. The next step is to examine the medical records, if a have been kept, as far back as two or three years, and note the number of cases of skin lesions treated, the departments in which the patient worked and the causes given for their occurrence. This often yields a clue to what part of the factory has the greatest skin hazards. It is also well at this time to request that workers who have or have had oc pational skin diseases be called into the dispensary to be questioned examined. This enables us to check and evaluate the criteria used by plant physician in making a diagnosis of occupational dermatitis. We then request the superintendent to appoint someone familiar with all t

industrial processes in the factory to escort us through the plant. In many instances he himself, together with the plant physician, accompanies us in our inspection. We begin at the point where the raw materials come in and follow them through the manufacturing process until the finished product is ready for shipment. In each department visited we first interview the foreman, asking him if he knows of any workers who have now, or ever have had skin diseases and what in his opinion caused these diseases. We then go through the department and have the manufacturing process explained to us. We examine the hands and face of the workers for skin lesions, at the same time taking note of their work clothes--whether they are clean or dirty, whether protective clothing in the form of gloves, aprons, boots, respirators, etc., are worn. We note the cleanliness of the room -- whether there are any safeguards such as ventilating hoods, etc., on the apparatus, and ask each worker if he has now or has had before, any skin diseases. The names of workers who are found to be affected with some skin lesion or who state that they have been affected at some time or other, are taken and at the end of the day's inspection these workers are summoned to the dispensary and examined further.

The primary inspection of the men at work takes but a short time--not over half a minute to a man. The same procedure is followed in each department, notes concerning the industrial processes and hazards being taken. At the end of the day's inspection, usually an hour or so before the end of the day's shift, we go to the first-aid room and send

for the workers singled out during our inspection as being affected wi skin diseases.

Such workers are examined one at a time with only the plant physi cian, nurse, or first-aid attendant present. The worker is required t disrobe completely and his body is examined for the presence of skin diseases. It is very important to strip the patient because in this w many conditions come to light which are otherwise overlooked.

A card record of the patient is made, noting the name, sex, age, color, and a detailed description of the occupation, giving the chemic with which there is contact. The date of entering on the present occu pation is also noted, as is a history of previous occupations. A reco is made of previous skin diseases and of any allergic history. A hist of the present skin disease is taken, putting down the date of onset a the symptoms. A detailed written description of the skin lesions and their location is made on the card. On the record cards are also described such patch tests as were performed, giving a list of the chemicals applied as patches, the length of time they were allowed to remain on the skin, and the resultant reactions. The diagnosis, base on all the data gathered, is recorded and the actual skin irritant is named. On the card we also place a heading "Remarks", under which we record complicating skin lesions and the preventive treatment advised, such as change of occupation, to discontinue work temporarily, or to continue work using protective clothing or ointments. Also, the personal habits of cleanliness of the patient taking special notice

of soaps and cleansing agents used after work, because strong alkali soaps and irritant solvents used to clean up after work are often the causes of dermatitis.

After all the workers found to have skin lesions at the primary inspection have been examined, we inspect whatever locker, toilet, and eating facilities may be present in the factory.

Before patch tests are performed on the workers we explain to the superintendent and to the plant physician and to the workers themselves our object in performing them. The worker is told that patch tests are a regular diagnostic procedure and that the materials with which he is patched are the ones with which he comes in daily contact. He should be told that the usual positive reaction consists of an irritation at the site of the patch and that while in some cases inflammation of the skin on other parts of the body may occur, they do so only in rare instances and that at no time has anyone died from patch tests. Consent to patch tests are in many instances not given. We never try to persuade anyone to submit to them. It is better not to do them than to persuade a reluctant patient to be tested and then have him blame every subsequent illness on the patch test.

In performing patch tests we should be careful never to patch with a primary irritant. The known skin irritating properties of the substances can often be ascertained from the chemists at the plant. If the chemists do not know them, it is best to patch one's own skin before patching a worker, because if it is found that the substance is a

primary irritant, we can remove it before any serious damage is done, whereas a worker may leave it on long enough to receive a severe burn. If it is found that the substance can be left on the skin for 24 hours without causing a reaction, we know that it is not a primary irritant and that it is safe to perform patch tests with that substance on other people. I cannot enter into a discussion of the technique of patch testing, but will state that the patch test is an important diagnostic procedure in occupational dermatitis but it must be performed by some one familiar with it, by one who knows how to evaluate the results.

After the examination of the factory is completed, a report is written and when a number of factories manufacturing the same product have been examined, a fair idea of the skin hazards in that particular industry is obtained.

The knowledge and experience gained by routine studies of industrial processes and skin hazards in basic industries prepare us to undertake intelligently the investigations of the causes of outbreaks of occupational dermatoses. The requests for such investigations come from insurance companies, managements of factories and labor unions. Outbreaks of occupational dermatoses usually occur when new chemicals are introduced, when new manufacturing processes are being installed, or when there is some change made in old manufacturing processes.

While outbreaks of occupational dermatoses usually occur in only one department of a factory, it is necessary to study not only that one department, but the whole process of manufacture, or at least, all of the processes which precede the one in which the outbreak occurred.

Here again we should study the sickness records of the plant for at le one year previous to the outbreak, in order to determine whether the (break occurred suddenly or whether there was a gradual increase in th number of cases of dermatitis and whether there was any connection be- tween a sudden increase in the incidence and the use of new chemicals, new processes, or changes of old processes in the factory. Detailed inquiries should be made of the superintendent, the foreman, and the workers as to changes in manufacturing processes and the introduction new chemicals preceding the outbreak of dermatitis.

Patch tests should be performed with all of the materials handle by the affected workers in an effort to track down the offending sub- stance. In some instances the management purchases under trade names from other concerns the chemicals which they use and do not know thei composition. It is necessary in these cases to trace the chemicals t their original source of manufacture and thus determine what they real are.

By way of illustrating how such outbreaks of dermatitis are studi I will outline a few actual investigations which we made. The first (I will outline was done by Mr. Pool of Rhode Island and myself.

I

We were requested to investigate an outbreak of dermatitis in a cotton mill. It was found that the cases occurred only among workers whose forearms came in contact with new heddle frames in the weaving machines. The skin of the forearms touched by the heddle frames was first affected. The frames were made of spruce and were painted with

yellow waxy varnish. Patch tests with the varnish scraped off the frames gave positive reactions, while patch tests with the wood itself gave negative results. Removing the varnish from the heddle frames checked the occurrence of dermatitis. This established the fact that the varnish on the new heddle frames was the cause of the dermatitis.

Wanting to ascertain what in the varnish caused the dermatitis, we visited the manufacturer of the heddle frames. There, it was found that the varnish on the heddle frames was purchased from a different paint factory than was the varnish which had previously been used and which had caused no dermatitis. The new varnish was introduced because it produced a smoother and more waxy finish on the heddle frames. It was also learned that some of the workers in the heddle frame factory who were engaged in applying the new varnish to the wood also contracted dermatitis. The names of all the cotton mills which had purchased the new heddle frames were obtained and letters to them brought out the fact that cases of dermatitis had occurred among the workers in these mills since their purchase of the new heddle frames. The makers of the varnish were then visited and the ingredients of the varnish obtained. These were taken back to the first cotton mill reporting the outbreak and patch tests were performed with all of the ingredients in the varnish on those workers who had suffered with dermatitis. It was found that chlorinated ceresin--a wax--was the chief irritant although a dark cumaron resin also played a minor role in causing the dermatitis.

Patch tests were performed in other cotton mills and these tests confirmed the results obtained in the first mill. The varnish maker stated that the chlorinated ceresin was put in the varnish to produce a smoother waxy finish and it was this smooth waxy finish which induced the heddle frame makers to discard the old varnish and change to the new. Under the atmospheric conditions prevailing in cotton mills, 80 percent relative humidity and 80° F. temperature, the workers perspired considerably and the perspiring skin coming in contact with the chlorinated wax caused a liberation of chlorine from the varnish and this was the actual cause of the dermatitis.

While patch tests are a great help in determining the causes of occupational dermatitis, it is not always possible to use them and we must sometimes devise other methods of approach. For example:

II

An outbreak of dermatitis among cable splicers occurred in Chicago and in New York City and in no other place, although the process of cable splicing is the same all over the United States. After several unsatisfactory attempts by others to determine the actual cause of this outbreak, the problem was referred to the Public Health Service.

The workers affected had been patch tested by previous investigators and refused to submit to any more patch tests. Therefore, we decided to divide the operation of cable splicing into seven stages and to have the workers who had been affected and who were now well, work a number of days on each stage and then rest a few days before taking up the

succeeding stage. In this way we hoped to find out at what stage in cable splicing the dermatitis actually occurred.

It was found that the dermatitis occurred during the operation of "boiling out" the green and blue paper-wrapped wires in the cables. The "boiling out" was done with a mixture of paraffin and mineral oil and was done for the purpose of removing all moisture from the wires. The dyes used on the green and blue papers were malachite green and methyl violet. Although some of the stages of operation consisted of "boiling out" other colored wires with this mixture, no dermatitis occurred while splicing wires dyed any other color nor did it occur from the "boiling out" mixture itself. Patch tests performed with strong concentrations of the two dyes produced dermatitis on some of the workers. By the time that we had reached this stage of our study, the workers had become so interested that they consented to our patch testing experiments.

Further experiments showed that in the processes of "boiling out" the dyes were partially decomposed and that the decomposition products were dissolved in the "boiling out" compound. The "boiling out" compound was used over and over again and in this way it contained a high percentage of these decomposition products. When the "boiling out" compound was heated to 400° F., (the "boiling out" temperature) these decomposition products came off in the fumes and irritated the skin of hypersensitive workers. It was also found that at the time the outbreak occurred there was an extra large amount of cable splicing being done for the Chicago Fair and that the workers therefore had an unusual

large exposure to the fumes of the "boiling out" compounds. Also, th in New York City at about the same time new cables larger than any that had been laid before, were being installed. These cables contai 3600 strands of wire and entailed more cable splicing than is usually done. These facts explained why the outbreak occurred only in New Yo City and Chicago.

As a result of these experiments new dyes having other decomposit products were satisfactorily substituted for the old dyes in the manufacture of telephone cables.

III

Recently we were requested by an insurance company to investigate dermatitis occurring among workers in a factory manufacturing conduits made of paper impregnated with coal tar pitch. The workers inside the factory were not affected, but those working in the yard where the finished conduits were stored suffered considerably from dermatiti A number of investigations were made by others in an effort to find the cause, but resulted in no satisfactory explanation. A visit to th factory was made and examination of the workers brought out the following facts:

The workers exposed to the fumes and dust of the coal tar pitch, whether in the yard or inside the plant, all had a marked melanosis. The workers in the yard suffered with a dermatitis like sunburn, especially on bright days. The workers inside the factory, while not usually affected, stated that they also sunburned very easily and suffered more from sunburn on their days off from work than did other

people. Patch tests performed with coal tar pitch dust gave no reactions upon removal of the patch, but upon exposure of the patch area to sunlight there developed a marked sunburn. This showed that exposure to coal tar pitch sensitized the skin to light. Examinations of workers in other factories making conduits where there was an exposure to coal tar products revealed the same conditions. This was the first time that photosensitivity produced by occupation was reported in America. Effective preventive measures were devised.

Because of the experience we have gained in making studies of industrial processes and the skin hazards connected with them, we are often called upon to investigate the causes of outbreaks of dermatitis occurring among the users of manufactured goods. To illustrat

IV

A certain manufacturer of wrist-watches decided to use jet black, sweat-proof wrist-watch straps on his products. He ordered such straps from a leather strap maker. After about 100,000 of these strap had been sold to stores, complaints and law suits began to come in because of dermatitis on the wrists of the wearers of the watches, caused by the leather straps. The straps were sent by the watchmaker to a leather research institute and to a well known dermatologist to find if they contained a skin irritant. Reports from both stated that they did not. Before contesting the suits for damages, however, someone in the factory suggested that a number of the workers be asked to wear the straps as an experiment to see if any of them would develop dermatitis. Accordingly, 50 workers were given the straps to wear and in

a few days six of them had developed a dermatitis of the wrists. The Public Health Service was then requested to investigate.

We visited the manufacturer of the straps and learned from him where he obtained the leather and the dyes. It was difficult to trace the leather because it had been purchased from a jobber in New York who, in turn, had purchased it from another jobber who had gone out of business, but after considerable effort we found that the leather was made in a factory in Lynn, Massachusetts, about five years previous to our investigation and that it consisted of a chrome tan calf skin. The method of tanning was obtained. We ascertained the chemical nature of the dyes by visiting the factory where they were made and obtained samples of all the ingredients in the dyes. We then returned to the watch factory and patch tested the workers who had worn the wrist-watch straps with the undyed leather, the dyed leather, and with each of the chemicals used in the dyes. We obtained positive patch test reactions only from the dyed leather and from one of the dyes used in the dye mixture. This dye is known as butter yellow and has the chemical name of amido-azo-toluine-hydrochloride. This dye had never before been reported as a skin irritant. In fact, it was thought to be so inocuous that it had been used to color oleomargerine. We found that the yellow dye was mixed in with the black dye (negrosine) in order to give the straps a jet black color instead of the blue black color imparted to the straps if only negrosine is used. The elimination of butter yellow from the dye mixture stopped dermatitis from the wrist watch straps.

We have had similar experiences with fabrics, paints, and cosmeti

These are in brief the methods of investigation which we adopt in studying the causes of occupational and other forms of contact dermatitis. Most of the investigations in factories and the problems of contact dermatitis are interesting, instructive and fascinating and some of them will tax to the utmost the ingenuity of chemists, allergists, and dermatologists.

DR. GRAY: This paper will be discussed by Doctor Kenneth D. Smith, Chief, Bureau of Occupational Diseases, Ohio Department of Health. Doctor Smith.

MODES OF INVESTIGATION OF OCCUPATIONAL DERMATOSES

Discussion by
Dr. Kenneth D. Smith, Chief,
Bureau of Occupational Diseases,
Ohio Department of Health.

After reading Dr. Schwartz's paper which he kindly sent to me before the meeting, I am impressed with the fact that he has covered the subject of modes of investigating occupational dermatoses so thoroughly that there is little left to be said. Consequently, I will discuss his paper as it relates to Ohio.

In the past decade, 12,931 compensable occupational diseases have been reported to the Ohio Department of Health. Of these, 8,730, or 67.5 percent, were dermatitis. Dr. Schwartz's excellent paper, then, is of more than ordinary interest to us.

In Ohio, where the reporting of occupational diseases has been in effect for more than 23 years, dermatitis has always led all other occupational afflictions. It has never been below 60 percent of the total reported.

The fact that dermatitis is compensable and the fact that the medical profession knows that the skin of the industrial worker is constantly subjected to irritants, opens the question of the accuracy of those statistics. In only a very small percent of the cases reported to us have patch tests been done. In fact, in the last 500 cases reported, patch tests had been done in only 25. In addition to this is the fact that outbreaks of dermatitis in specific work-places in Ohio have been a rare occurrence. Since

I have been associated with the Bureau of Occupational Diseases I can recall but four such outbreaks.

I was happy to note from Dr. Schwartz's paper that our technique in investigating these outbreaks was essentially the same as that outlined by him with the exception that we did not do patch tests. We did not consider them necessary in these cases since the offending agent in each was apparent. I might state at this time that we, in Ohio, are placed in a happy position by our reporting law. Section 1243-3 of the General Code of Ohio states: "Reports made under this act shall not be evidence of the facts therein stated in any action arising out of the disease therein reported". By a more or less broad interpretation of this section, we are able to assure both the employer and employee that our findings are privileged by law and they need fear no unpleasant sequelae caused by our investigation.

Fortunately, these outbreaks were easily managed. Two were among machinists and were due to contaminated oils, one was caused by a weak solution of formalin used by bottle cappers on the rectifying and blending of spirits, and the other resulted from hand dipping of aluminum parts in naphtha. Each of the establishments where these outbreaks occurred is familiar with its problem and corrective steps had been taken before we investigated. However, we felt that a thorough check was indicated and completed the investigation. Corrective measures were successful and no recurrence has been reported.

In the face of the fact that the great majority of our cases are single cases, with allowance for a margin of error due to mistaken diagnosis and with proper attention to the primary irritants, I believe that we can assume that most of the cases reported to us are due to individual susceptibility of the workers.

In 1937, almost a fourth of the 1069 cases of dermatitis reported was caused by oils, greases, and cutting compounds. Cleaning compounds and solutions caused 83 cases, and plants and woods, petroleum distillates, rubber and its compounds, paints and lacquers, stains and dyes, plating and cyanide solutions, lime and cement, and synthetic resins were the offending agents in the order named. I might state in explanation that the dermatitis which was reported to be caused by "rubber" and its compounds was probably due to the antioxidants or accelerators used. On the reports received by us, however, the causative agents were merely listed as "rubber" or "occupational".

While we have been fortunate in Ohio in rarely having outbreaks of dermatitis in specific establishments and these up to the present have been easy to handle, it is only logical to assume that we are bound to encounter one sooner or later that will tax our diagnostic and investigative facilities. I am sure, however, that if we follow the technique given us by Dr. Schwartz we will be able, as the police say, to crack the case.

DR. GRAY: Is there any further discussion of Dr. Schwartz's paper? Any questions you would like to ask?

I would like the committees that have been named and the old and new executive committees to get together for just a few minutes before leaving. The Chair is open to a motion for adjournment.

MR. JOHNSON: I move that this meeting adjourn.

DR. NAU: I second the motion.

The conference adjourned at 5:00 p.m.

Morning Session, Tuesday, June 28, 1938.

The meeting was called to order by the Chairman at 9:25 a.m.

DR. GRAY: Doctor Flinn, of the United States Public Health Service, has an announcement to make concerning tomorrow morning's program.

DR. FLINN: At our laboratory we have a few exhibits from the field studies and there will be some demonstrations of instruments and methods. I know many of you are familiar with most of the material we have, but there will be some of it that will be new and of interest to some of you. Everything will be informal; we want you to see the exhibits or demonstrations you want to see, and to take as much time as you wish in any one place, and ask all the questions you can think of.

DR. GRAY: The Division of Industrial Hygiene has arranged a splendid program. There will be no formal lectures or papers, and you can spend as much time there as you want. I think you are going to get a great deal out of this trip, more than if we had arranged a series of lectures for you.

I am very glad to observe in our audience this morning a good friend of mine, who spent two or three days with me, and who has been several months in this country--largely under Dr. Sayers' direction. Doctor Parney, Director of Industrial Hygiene in Canada. I would like him to tell us what he thinks

of what we are doing, and I would like him to tell us of the splendid job he has done among the Civil Service employees in Canada, and how that is going to be integrated--as I am quite sure it will be--with his industrial hygiene activities. I want to introduce Doctor Parney to you as somebody well worth listening to, one who has been all over the country and has seen what we are doing in industrial hygiene. Doctor Parney, won't you speak to us for a few minutes?

DR. PARNEY: After a week of conferences in Chicago, and a few hectic days at headquarters at Ottawa, and another week of conferences at Halifax--it is still very early in the morning. However, I won't take very much of your time at this stage of the game. It is more like an old-home town reunion. I see at least 60 percent familiar faces, and every one of them friendly. And I am still bubbling over with the old home feeling, rather than with industrial hygiene. But seriously, for just a moment, like many other people, I started out with the idea that industrial hygiene meant occupational disease and industrial hazards only. First of all, I realized that I needed to get down to the center of all knowledge, so I visited the United States Public Health Service and met Doctor Sayers, who upset the whole apple-cart by telling me that industrial hygiene is a very simple thing. He said, "Just look into the dictionary. Sure, occupational diseases and industrial hazards come into the picture, but even though

they are a little more dramatic, they are secondary." That is another picture. As he talked I tried to absorb a little here and there, and realized that the field is so large and the one rope I was able to get hold of was our own little show in Ottawa. We had been doing some industrial hygiene and didn't know it. We thought it was just an ordinary day's work that had been forced upon us. He gave me words of encouragement--generally speaking, a pat on the back. Doctor Gray tells me the same thing. Doctor Greenburg says, "That is fine", and so on. Doctor Gray asked me to mention our experiences in Canada. It seems that for many years back the Civil Servants in the Federal Government in Canada had been receiving a very generous sick leave allowance--in that it is cumulative. They are allowed 18 working days a year, and if they do not use it all that year it may run into the next, and so on. So if a man was employed for 10 years and was not sick at all, he would have 180 working days to his credit, which would be very convenient in case he ran into a serious accident or sickness. Somebody got the bright idea that there was some abuse of this privilege. They said, "Give the civil servants an inch and they will take a mile. I think we had better supervise it a bit." A certain amount of supervision was established and we hadn't been at it very long until we realized there was a tremendous amount of very valuable information going through our hands, if we would but analyze it

statistically. One of our doctors has a flare for statistics. And he discovered we had to have a medical code, and after playing with this for one year he put it on the basis of the international list of the causes of death. And now we are able to supervise sick leave in that all medical certificates from family physicians for all illnesses have to go through our office. We have built up a very cordial and cooperative relationship with the family physician. At first he thought we were planning to force a little state medicine down his throat, but it wasn't very long before we were able to refer a few cases to the family physician. We would call him and say, "So and so returned to work this morning, and I think it wouldn't do him any harm if he had another couple of weeks' leave. It would be better for him and better for the government." And the doctor said, "Well, I had the same idea myself, but the patient had said he had been away from work so long and was afraid he would be criticized." We said, "We will take the responsibility for the criticism. We will deal with the department. That is fine, we will send him back for another certificate." So we have a very friendly relationship, and now we get a record of time lost, diagnoses, and these are coming in more correctly all the time because the doctor realizes they are going to be checked by another medical man. At the end of the year we can say that of about 30,000 people, there were so many that were ill. Altogether they lost so many days, and

this age group lost so and so, and lost it for such conditions. There is very little time lost for occupational hazards and accidents. One cause is "civil-servicitis". It is a nervous and emotional upset arising out of the nature of the work--monotony of the grind. A little upset will occur when somebody with political influence can't get over the other fellow's head. All these things eventually produce grist for the doctor's mill. Incidentally, the government is benefited. We figured that in one field alone there was a feeling that a man had the right to stay away one to three days and come in and say, "I had a cold", or "I had a sprained ankle". He doesn't have to have a medical certificate for that. We call it casual leave to a maximum of 8 days in the fiscal year. Most of the civil servants are fairly honest but just a little careless. And this casual leave amounted to 4 or 5 days per man per year. We checked on it when it exceeded 8 days. When we began to supervise and check on it, we'd get hold of these people. "Well", they'd say, "I had a cold." We didn't ask them about that cold. We'd say "I take it your 8 days have been exceeded. What happened to the 8 days?" "I had a cold." "Well, your cold didn't last 8 days." Then they'd say, "I had two colds". "Now, there is just one of two answers--either you are just not as healthy as you should be or you have been careless. Now, it's kind of up to you to figure it out. You should have the old machine checked

up and overhauled, and if there is anything wrong with it, have it made right. If it has been carelessness, you have the answer right in your own hands, and it's up to you to fix it up." He says, "I never take leave unless I have to." "Fine, that is settled. What about going to your doctor and having a thorough check over?" The man is probably willing. "Let me call for you and make an appointment, and the doctor can go on from there." And, as a result, we get the cooperation of the doctor, and as a result we cut the casual leave down to 1½ days a year, which in that group amounted to 180,000 days. In dollars and cents, with an average salary of $1500 a year, you can figure the saving of about $600,000 annually. You can't depend on it, but nevertheless, it was good propoganda, and as a result we are getting a little more interest in it and cooperation from government circles, and we hope we will have a collection of figures which have to do with nonoccupational diseases which may give us something to work on with regard to occupational diseases. These figures refer to white-collar classes, and may be a norm against which can be compared industrial and nonindustrial diseases in industrial groups, and see whether or not they are really getting pneumonia and heart diseases any more frequently than in the general run.

DR. GRAY: Dr. Parney has been doing industrial hygiene and didn't know it. He is now going to be a member of this conference, or at least we hope he will be. The meeting starts at 1:00 tomorrow

afternoon. Please remember we would like you to be back at 1:00 instead of 2:00 tomorrow. Our secretary has an announcement.

MR. BLOOMFIELD: Dr. Sayers has just called to my attention that those of you who are members of the American Public Health Association are eligible after two years' membership to become Fellows, and he wishes me to announce that he will be very happy to sponsor any of you as Fellows if you will make your wishes known.

DR. GRAY: Our next order of business is concerned with a short discussion by the personnel of each unit regarding the questionnaire that Mr. Bloomfield sent out to us. I would like to have the personnel from each unit respond, and we would like to hear from all of you. We are going to ask you to limit the discussions to five minutes. We thought it desirable under the circumstances to continue to hear from each unit, and this afternoon to have a discussion of all the problems that are put before us. I am going to call, therefore, on the personnel from each unit to discuss the problems you have met with in your unit, and we would like the discussion limited to about five minutes. First we will hear from Dr. Queen of Alabama. Dr. Queen.

DR. QUEEN: The Division of Industrial Hygiene was set up in the Alabama State Health Department immediately following the industrial hygiene seminar which was held here last year. The personnel has consisted of one person, the speaker, and the budget has amounted to approximately $4500. The budget and personnel for the coming year will not be developed until after July 1.

During the past year a catalog of all the manufacturing, mechanical and mineral industries employing eight or more people has been completed. Also, a preliminary survey of about 30 percent of these industries has been under way for the past eight months. This is not completed as yet.

In addition to these functions, the director of this work has assisted other State departments, presented papers before medical societies, industrial groups and safety conferences, contacted a large number of physicians, especially those with industrial connections, and served as consultant in his specialized field.

Our most difficult problem encountered thus far has been our inability to secure reports of occupational diseases to the State Health Department. Last year one case was reported. This was a case of silicosis which, alas, turned out to be a case of bronchiectasis.

Statement sent in by Dr. J. P. Russell, Director of Industrial Hygiene Service, California State Department of Health.

State (or city) California (Berkeley)

Title of Industrial Hygiene Unit: Industrial Hygiene Service

Agency (department) Responsible for Activity: State Department of Public Health

Annual Budget (1937-38): $22,020

Funds Expended to Date on:

Library	Medical Equipment	Engineering Field Equipment	Laboratory
$104.20	$31.50	$923.65	$499.02

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
1	1	1 (chemist)	1	0	4

Brief History of Unit: Organized July 8, 1937. Temporary quarters, University of California, Berkeley. Present personnel: Physician, industrial hygiene engineer, chemist, stenographer. Working arrangements have been made for cooperation with other State departments, city and county health authorities, and various departments of the University. At the request of the State Industrial Accident Commission, studies have been made of current industrial health problems, including dust control methods in metal mines; the use of gasoline compressor engines in railway tunnel repair work; the use of coated lather's nails; redwood bark insulation and spun rock wall insulating material in building construction; the carbon

monoxide hazard involved in transportation of employees in canvas-covered trucks; and the use of methyl bromide as an insecticide in the dried fruit industry. Numerous requests received from interested groups and individuals for information on industrial hygiene subjects have been answered. A State-wide survey of motor vehicles is being made in cooperation with the California Highway Patrol, to determine the extent, causes, and prevention of carbon monoxide poisoning resulting from inhalation of engine exhaust gases during operation of vehicles on the highway. A preliminary survey of the iron and steel industry is being made to determine the extent of safety and medical provisions, material exposures by occupation, and control measures in effect in representative plants in this industry. A reference library is being assembled and catalogued. Current occupational disease cases reported by physicians and insurance companies are being tabulated and classified, and some of these cases have been investigated in cooperation with the State Industrial Accident Commission. Talks on industrial hygiene subjects have been given to civic organizations, employers' associations, and classes in the University curricula in public health.

Proposed Program of Unit: Completion of present carbon monoxide survey of motor vehicles. Completion of preliminary survey of iron and steel industry. Similar surveys of other industries to determine the nature and scope of industrial hygiene problems

in California. Quantitative studies of potential health hazards in petroleum refineries. Arrangements for securing and investigating reports of current occupational disease cases. Continued cooperation with other State agencies, employers, employees, and civic organizations in the investigation and control of industrial health hazards, and in the collection and dissemination of information on industrial hygiene subjects. Requests have been received from State agencies, city and county health officers, industrial establishments, and insurance companies, for field and laboratory studies of specific industrial health problems, including determinations of carbon dioxide and alcohol vapors in wineries; the carbon monoxide hazard in garages, repair shops, and steel mills; dust hazards in diatomaceous earth quarries, flax mills, cement plants, sandblasting establishments, granite quarries, cotton gins, and talc mines; carbon monoxide determinations in city streets, in railway tunnels, and on fleets of commercial trucks and busses; the prevention of bakelite poisoning; and dermatoses among employees in fruit and vegetable canneries and fish packing and reduction plants. These studies will be undertaken as soon as possible.

Major Unsolved Technical and Administrative Problems: Technical: The development of an accurate and simple chemical method of determination of blood hemoglobin saturation with carbon monoxide to be used in conjunction with the pyrotannic acid method now being used. Administrative: Arrangements for more accurate and

complete reporting by physicians of occupational disease cases; compilation of a complete list of California industrial establishments, to be used as a basis for preliminary industrial hygiene survey.

DR. GRAY: Dr. Kronenberg, of Illinois.

DR. KRONENBERG: In our particular State in the past year our activities have centered chiefly around the State-wide survey which we are now completing; we have over 3400 plants studied. I think that this group is interested chiefly in the discussion of major unsolved technical and administrative problems. I have listed occupational disease reporting, examination and copies of claims filed for occupational diseases, and the follow-up and investigation of occupational disease cases filed or adjudicated. That does not mean we do not have many other problems. We have received excellent cooperation from Illinois industry and labor both. Many of the labor unions have come to us for assistance, and as far as approval from industry is concerned, our relations have been most cordial. The reason I have listed these as major unsolved problems is that when our new occupational disease law was passed, the reporting of occupational diseases was removed from the Health Department to the Industrial Commission of our State. This happened suddenly, over night. A political group banded together, and the next day we found that the Health Department did not have anything to do with the reporting of occupational diseases. So all occupational diseases are reported to the Industrial Commission. We have attempted

to extend the friendly hand to the Industrial Commission of our State for copies of these reports, but have not been successful to date. We have extended the facilities and personnel of our Division to investigate cases that are reported, either for compensation or otherwise, and we have received a good old-fashioned cold shoulder. I feel that if we were able to receive some degree of cooperation from them, to receive copies of these reports, we might be of assistance not only to the Commission, but also to the arbitrator who hears the cases, to the worker, and to the plant. And, if there is a hazard in this plant we can do a better job for the company in which that hazard exists, and increase our usefulness to the particular organization. At present, all we are able to do, should we run into a plant that presents a hazard, is to determine the degree or extent of the problem, to prepare a report of our survey with recommendations, and to turn it over to the Labor Department to issue orders. The Labor Department in our State is very happy to get these reports, and we make every effort to give as complete a report as possible. This particular phase of our problem is difficult and I present it here with the idea that perhaps you may have run into similar problems in your States, and may have some ideas as to what method we may use to correct it.

State (or city) Illinois

Title of Industrial Hygiene Unit: Division of Industrial Hygiene

Agency (Department) Responsible for Activity: Department of Public Health

Annual Budget (1938-39) $37,600 (requested)

Funds Expended to Date on:

Library	Medical Equipment	Engineering Field Equipment	Laboratory
$200	$75	$1000	$1800

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Tota
2	2	3	2	0	9

Brief History of Unit: Created July 1, 1936. Laboratory and offices set up in the Medical School Building of the University of Illinois at Chicago. An occupational disease clinic operates in connection with our unit. Plan agreed upon was that we function as a fact-finding unit to detect and determine industrial health hazards. When abnormal conditions are present and excent ascertained, a copy of our findings with recommendations are sent to State Labor Department for regulation and enforcement.

Proposed Program of Unit: With the completion of our State-wide survey, which will represent about a 25 percent sample of Illinois industries (3300 plants), a more systematized method will be undertaken to study groups of typical plants from a medical, engineering and laboratory standpoint.

Major Unsolved Technical and Administrative Problem:

Occupational disease reports

Examination and copies of claims filed for occupational diseases

Follow-up and investigation of occupational disease cases filed or adjudicated

DR. GRAY: Thank you, Dr. Kronenberg. Dr. Spolyar, of Indiana.

DR. SPOLYAR: The Indiana unit was organized February 13, 1938. I think we are one of the youngest units in the country. The personnel consisted of one medical director, and within a short time a secretary was added. On April 1 we secured an engineer, and thus our permanent personnel is one medical director, an engineer, and a clerk. We are engaging ten chemical engineers and three or four clerks to aid in the industrial hygiene survey to be started the tenth of this month--rather the tenth of July. As for the budget last year, we had approximately $4000 from February 13, and our regular budget runs about $11,000. As to the activities, the engineer was detailed to go to Arkansas to see the survey there. So we have some experience in preparation for our actual survey in Indiana, starting July 10. Our file shows that we have about 3,813 plants, employing 5 or more, accounting for 380,000 people. The sample for our actual survey will include about 2800 plants and about 300,000 people. Our problems have been varied. I would like to take up the problem of absenteeism.

MR. BLOOMFIELD: What classification of industries and service groups are you including in your sample? What are you covering?

DR. SPOLYAR: We are including extraction of minerals (in Indiana we have coal mines); all of the manufacturing group; laundries and dry cleaning establishments in the personal service groups; no transportation.

DR. GRAY: About what percentage of the people are industrially employed, including mining?

DR. SPOLYAR: I don't know, exactly.

DR. GRAY: In Connecticut the percentage is about 50. Mr. Houser, of Iowa.

MR. HOUSER: Our program is approximately the same as that for Indiana. We really have a slight head start but are by no means complete with our preliminary survey of all industries. We are including the extraction of minerals, manufacturing industries, and laundries and dry cleaning of the personal service group.

State (or city) Iowa

Title of Industrial Hygiene Unit: Division of Industrial Hygiene

Agency (department) Responsible for Activity: State Department of Health

Annual Budget (1937-38): $8,350

Funds Expended to Date on:

Library	Medical Equipment	Engineering Field Equipment	Laboratory
$256	0	$1,214	$2,080

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
0	2	0	1	0	3

Brief History of Unit: Began operations July 1, 1937. Preliminary surveys of all types of industry now under way (over 50 percent completed). Act as consultants to State Department of Labor on special investigations of hazardous conditions.

Proposed Program of Unit: Make studies of occupations which preliminary surveys indicate to be hazardous. Investigate specific conditions in cooperation with industry, the State Labor Department, and other interested organizations. Inaugurate a system of reporting occupational disease cases by the attending physician. Cooperate in formulating, adopting and enforcing an occupational disease compensation law if one is proposed.

Major Unsolved Technical and Administrative Problem:

Administrative: Persuading industry and the medical profession of the importance of industrial hygiene and obtaining their cooperation in the proposed program. Technical: Toxicity of wood rot-proofing solutions containing pentachlorophenol.

DR. GRAY: Mr. Dills, of Kansas.

MR. DILLS:

State (or city): Kansas

Title of Industrial Hygiene Unit: Industrial Hygiene Section

Agency (department) Responsible for Activity: Division of Sanitation

Annual Budget (1938-39): $8,650 (supplemental budget of $2260)

Funds Expended to Date on:

Library	Medical Equipment	Engineering Field Equipment	Laboratory
$376.76	- -	$1131.67	$1413.08

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
0	1	1	1	0	3

Brief History of Unit: The Industrial Hygiene Section was established in March, 1936, but the work of the section was not started until July, 1937. This delay was to permit training of personnel. A preliminary study of the zinc-lead mines has been completed, a carbon monoxide study of the commercial busses started, and a general preliminary study of the industries in the State is being conducted.

Proposed Program of Unit: To conduct preliminary industrial hygiene surveys of each specific group of industries in the State and prepare reports of each study. It is believed that this procedure is conducive to the rapid development of industrial hygiene and also to its proper recognition in the public health program. Individual plant studies will be made

upon request, and plans for industrial surveys of different groups of industries will be made upon completion of the preliminary surveys.

Major Unsolved Technical and Administrative Problem: Technical: Technical problems relate principally to the development of field analysis procedure that are not only accurate but adaptable to the environment under which they must be conducted. Further research work should lead to the establishment of standard laboratory procedures to be adopted by suitable national associations. Administrative: 1. Of vital importance is the defining of local policies for the promotion of industrial hygiene and sanitation by a proper balance between educational programs and regulatory procedures. 2. The enactment of legislation recognizing the distinction between the public health problems of industrial hygiene and sanitation and the labor relations problem of compensation for injury and occupational disease. 3. The extension of industrial hygiene and sanitation program to include studies of similar character in nonindustrial environments.

DR. GRAY: Mr. Dills, don't you have occupational disease reporting?

MR. DILLS: No. The State Board of Health requires a small group of occupational diseases to be reported, and those could be recorded in that fashion.

DR. GRAY: Dr. McDonald, of Baltimore, Maryland.

DR. McDONALD: I am going to ask Dr. Schulze to describe the activities in Baltimore. Dr. Schulze.

DR. SCHULZE:

State (or city): Baltimore, Maryland

Title of Industrial Hygiene Unit: Bureau of Occupational Diseases
Bureau of Environmental Hygiene

Agency (department) Responsible for Activity: Baltimore City Health Department

Annual Budget (1937-38) $12,900

Funds Expended to Date on:

Library	Medical Equipment	Engineering Field Equipment	Laboratory
$250 1/	2/	$1200	3/

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
1	2	3 1 part time	2 1 part time	0	8

Brief History of Unit: A domestic gas appliance ordinance passed in 1925 to control carbon monoxide hazards in the home led to occasional studies of similar hazards in industry. Beginning in 1929 increased attention was given to industrial health hazards, and in 1933 three inspectors of industrial hygiene were appointed. The same year a survey was made of many of the industrial plants in Baltimore to evaluate the local industrial hygiene problem. In 1936 the Bureau of Occupational Diseases was established to develop the medical phases of industrial hygiene, and during this year a representative survey of Maryland industries was made under the direction of the United States Public Health Service. Numerous technical studies have been carried out since the inauguration of the industrial

1/ Not including subscriptions to journals and other volumes in library bought out of general Health Department funds.
2/ Health Department clinics have furnished necessary equipment.
3/ Services are made available through the Bureau of Laboratories of the Health Department.

hygiene program in the Baltimore City Health Department.

Proposed Program of Unit: Evaluation of exposures to specific hazards; periodic inspections of certain types of industries; review of plans for proposed industrial construction; educational and consultant services to industry and industrial physicians; keeping of occupational disease records.

Major Unsolved Technical and Administrative Problem: Obtaining reports of occupational diseases and the lack of a law providing compensation for same.

DR. GRAY: The next speaker will be Dr. Elkins, of Massachusetts.

DR. ELKINS:

State (or city): Massachusetts

Title of Industrial Hygiene Unit: Division of Occupational Hygiene

Agency (department) Responsible for Activity: Department of Labor and Industries

Annual Budget (1937-38): [1] $19,200

Funds Expended to Date on:

Library	Medical Equipment	Engineering Field Equipment [2]	Laboratory [2]
$2200 [3]	None [4]	$8100 [3]	

1/ 1938-39 budget will not be considered until October 1938.
2/ Accounting does not permit separation of these items.
3/ Approximate
4/ It is planned to add a physician to the staff in June 1938.

Number and Kind of Personnel: 1/

Medical 2/		Engineering	Other Technical 3/		Clerical	Other 4/		Total	
0	0	1	2	1	5	2	5	1	0	5	12

Brief History of Unit: Created by Chapter 331, Acts of 1934, approved by Governor June 25, 1934; established September 25, 1934; quarters secured November 1, 1934; technical organization completed March 1, 1935. Active since that date.

Program of Unit: To perform its statutory duties, which are: To investigate conditions of occupation with reference to health hazards; to determine the degree of such hazards; to assist in the preparation of rules and regulations for the preventing of occupational accidents and diseases; and, in cooperation with the department of public health or otherwise to promote occupational health and safety education.

Major Unsolved Technical and Administrative Problem: Securing adequate medical reports of occupational disease cases.

DR. GRAY: We will now hear from Mr. Hepler, of Michigan.

MR. HEPLER:

State (or city): Michigan

Title of Industrial Hygiene Unit: Bureau of Industrial Hygiene

1/ First figure under each heading permanent personnel; second figure temporary part-time personnel.
2/ It is planned to add a physician to the staff in June 1938.
3/ Chemical.
4/ Director.

Agency (department) Responsible for Activity: Michigan Department of Health

Annual Budget (1937-38): $16,500

Funds Expended to Date on:

Library	Medical Equipment	Engineering Field Equipment	Laboratory
$146.25		$1305	$1015

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
0	3	1	1	0	5

Brief History of Unit: After a period of orientation and preparation, preliminary surveys in industries were started. To date foundry, paper, furniture, dry cleaning, and printing industries have been surveyed and reports issued. Some data on stone cutting, chrome plating, electrical apparatus and storage battery plants has been obtained, but not sufficient for reports. Specific surveys are made whenever requested, which include a special survey of pneumonia in a large foundry during the past two winters.

Proposed Program of Unit: Continue preliminary surveys as rapidly as possible while intensifying the specific survey work. This anticipates return to plants already surveyed to make actual determinations and studies.

Major Unsolved Technical and Administrative Problem: Developing the services of the bureau while handicapped by both fund and space limitations.

DR. GRAY: Mr. Hepler, I would like to ask if your occupational disease law requires the reporting of the diseases as specified in the schedule.

MR. HEPLER: No. The occupational disease law sets up its own definition as to what is to be reported. The disease must result from long exposure; it must be a disease that has been recognized in the past as an occupational disease. The law sets up four specific definitions, and if the disease can meet any one or more of these definitions, it is supposed to be reported.

Statement sent in by Mr. Witheridge, of Detroit, Michigan

State (or city): Detroit, Michigan

Title of Industrial Hygiene Unit: Bureau of Industrial Hygiene

Agency (Department) Responsible for Activity: Detroit Department of Health

Annual Budget (1938-39): $29,000 (tentative)

Funds Expended to Date on: (approximate)

Library	Medical Equipment	Engineering Field Equipment	Laboratory
$300	$1800	$2400	$3000

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
2 (1 student)	3	3	3	1	12

Brief History of Unit: Preliminary organization period began March 1, 1936. Work of Bureau of Industrial Hygiene formally instituted on July 1, 1936, in present quarters at Herman Kiefer Hospital.

DR. GRAY: Dr. Dugger of Mississippi will discuss his activities.

DR. DUGGER: This report covers the following periods: September, October, November and December of 1935; January, June, July, August, September, October and November of 1937; and April, May, and June of 1938.

This program must be sold to the employer and the employee. The employer and health officer of the county in which the factory is located are contacted and the program is explained to them. If the employer can be sold on the program, of course, it is easy to solicit the health officer's assistance and he is always willing to cooperate. The next procedure is to sell the program to the employee. This is done by talking to groups and explaining to them the importance and benefit to be derived from examinations, tuberculin testing, and X-ray examination; also, giving detailed information about the tuberculin test and the importance of the Wassermann test. When your contact with employer, health officer and employee is complete, and all arrangements made for the examination, the procedure is as follows: A record for each individual is kept with name, address, occupation, and the number of years employed in the particular operation that he is doing at the present time. The reason for establishing the occupation and number

of years employed may have some bearing on the employee's present condition that may come out in the examination. The employee is also requested to state whether he has received typhoid inoculation in the last three years and smallpox vaccination in the last five years. We record the names of all employees who give a negative answer to these questions and send them to the health officer in the county where the program is carried out so that the health officer may contact them and try to bring their immunization against typhoid fever and smallpox up to date.

The history of disease experience is tabulated on each employee's record. The name of any employee giving a history of having had typhoid fever is recorded, and a list sent to the health officer so that an investigation may be made for epidemiological study of typhoid fever carriers. The employee is also requested to give information relative to diphtheria, smallpox, pneumonia, pleurisy, influenza, bronchitis, tuberculosis or dysentery, as any person having had these diseases might influence his present condition and give some history that will be of benefit from the standpoint of history-taking in the condition that might be found at the present time.

The throat is examined to determine whether tonsils are infected, stethoscopic examination of the heart is made, blood pressure determined. Blood for Wassermann test is taken, as well as a slide for malaria.

A tuberculin test is given using P.P.D. in Number 1 and

Number 2 strengths. All positive tuberculin reactors are X- rayed to determine if there are manifestations of active tuberculosis. All laboratory tests and tuberculin tests are recorded on the history sheet which makes them complete for future reference.

When the examination and laboratory tests are completed, a letter is mailed to each individual employee notifying him of conditions found, negative or positive, and he is requested to see his local physician for advice. The health officer is furnished with a complete list of positive Wassermanns and tuberculosis findings so that he may contact the employees who show positive findings and assist them in obtaining advice and treatment that the employee needs. Also, a list is sent to the employer of the plant and he is requested to assist the employee in obtaining medical advice and treatment to relieve any condition that he might have. It is understood in the beginning with the employer that nothing we do or find will have any bearing on the relationship between employee and employer in regard to his work. The following tabulations show the results of examinations.

Results of Laboratory Tests

Number of Wassermanns made	5,046	
Number of positive Wassermanns	268	
Percent positive Wassermanns		5.3
Total number of white Wassermanns made	4,498	
Total number of whites with positive Wassermanns.	59	
Percent of whites with positive Wassermanns		1.3

Total number of colored Wassermanns made	548	
Number of colored with positive Wassermanns	209	
Percent of colored with positive Wassermanns		38.1
Number of malaria examinations made	3,112	
Number of positive malaria examinations	55	
Percent with positive malaria examinations		1.7

Results of Tuberculin Tests:

Number of tuberculin tests given	3,824	
Number of positive tuberculin tests	1,347	
Percent positive tuberculin tests		35.2
Total number of white tuberculins given	3,196	
Total number of positive white tuberculins	974	
Percent whites with positive tuberculins		30.4
Total number of colored tuberculins given	628	
Total number of positive colored tuberculins	373	
Percent colored with positive tuberculins		59.3
Number of x-rays taken of the chest	1,271	
Number chest x-rays reported on	916	
Number chest x-rays not reported on	355	
Number positive chest x-rays	24	
Percent with positive x-rays		2.6
Number whites with positive x-rays	23	
Percent with positive x-rays (white)		2.5
Number blacks with positive x-rays	1	
Percent colored with positive x-rays		0.1
Total number with minimal tuberculosis	9	
Percent with minimal tuberculosis		0.8
Total number with suspicious tuberculosis	21	
Percent with suspicious tuberculosis		2.2
Total number with advanced tuberculosis	6	
Percent with advanced tuberculosis		0.6
Number with childhood tuberculosis	2	
Percent with childhood tuberculosis		0.2

Immunizations:

Total number examined	4,821	
Number needing typhoid vaccine	1,902	
Percent needing typhoid vaccine		39.4
Number needing smallpox vaccine	2,514	
Percent needing smallpox vaccine		52.1

Adjustments Needed:

Tonsils:

Total number employees examined	4,821	
Number needing removal of tonsils	612	
Percent needing removal of tonsils		12.6

Eyes:

Total Number examined	2,820	
Number needing correction of eyes	311	
Percent needing correction of eyes		11.0

Blood Pressure:

Total number examined	4,821	
Number with high blood pressure	668	
Percent having high blood pressure		13.8
Number with low blood pressure	650	
Percent having low blood pressure		13.4
Number with normal blood pressure	3,503	
Percent having normal blood pressure		72.8

Examination of the heart:

Total number examined	4,821	
Number with dicrotic heart	13	
Percent having dicrotic heart		0.2
Number with heart murmur	56	
Percent with heart murmur		1.1
Number with irregular heart	3	
Percent with irregular heart		0.6

B-2724

Urinalysis:

Total number examined	4,220	
Number having positive sugar	98	
Percent having positive sugar		2.3

Excess Eosinophile:

Total number examined	4,821	
Number having excess eosinophile	76	
Percent having excess eosinophile		1.5

Disease Experience: Total number examined 4,821

	Total	Percent
Typhoid	370	7.6
Diphtheria	227	4.7
Smallpox	239	4.9
Pneumonia	821	17.0
Pleurisy	327	6.7
Influenza	2,665	55.2
Bronchitis	167	3.4
Tuberculosis	11	0.2
Dysentery	44	0.9

Total Number of Employees Examined	4,821	
Number male employees	1,383	
Percent of employees that are male		29.7
Number of female employees	3,438	
Percent of employees that are female		70.3

POSITIVE WASSERMANN TESTS

Age Groups
(10 Year Periods)

WHITE EMPLOYEES

Ages	Positive Reactors	Per Cent
18-25	29	0.6
26-35	19	0.4
36-45	6	0.01
46-53	5	0.01

Total number Wassermanns taken on white employees	4498
White employees with positive Wassermanns	59
Percent whites with positive Wassermanns	1.

NEGRO EMPLOYEES

Ages	Positive Reactors	Per Cent
18-25	45	8.2
26-35	102	18.6
36-45	51	9.3
46-55	7	1.2
56-65	4	0.7

Number Wassermanns Taken on colored employees 548
Colored employees with positive Wassermanns 209
Percent colored with positive Wassermanns 38.1

TUBERCULIN TESTS

Age Groups
(10-Year Periods)

WHITE EMPLOYEES

Ages	Positive Reactors	Per Cent
6-15	60	1.8
16-25	390	12.2
26-35	282	8.8
36-45	167	5.2
46-55	58	1.8
56-68	17	0.5

Total number white employees tuberculin tested.....3,196
White employees having positive tuberculin test..... 974
Percent white employees with positive tuberculin test 30.4

NEGRO EMPLOYEES

Ages	Positive Reactors	Per Cent
14-20	81	12.8
21-30	120	19.1
31-40	96	15.2
41-50	47	7.4
51-60	24	3.8
61-68	5	0.7

Number colored employees tuberculin tested..... 628
Number colored with positive tuberculin test..... 373
Percent colored with positive tuberculin test..... 59.3

CHEST X-RAYS

Age Groups
(10-Year Periods)

WHITE EMPLOYEES

Ages	Positive X-Rays	Per Cent
12-20	2	0.2
21-30	5	0.5
31-40	9	0.9
41-50	6	0.6
51-63	1	0.1

Total number chest X-rays made (black & white).....1,271
Total number chest X-rays reported on..... 916
Number positive X-rays of white employees..... 23
Percent positive X-rays of white employees..... 2.5

NEGRO EMPLOYEES

Age	Positive X-Rays	Per Cent
53	1	0.1

Total number chest X-rays made (black & white).....1,271
Total number chest X-rays reported on..... 916
Number positive X-rays of colored employees..... 1
Percent positive X-rays of colored employees..... 0.1

State (or city): Mississippi

Title of Industrial Hygiene Unit: Division of Industrial Hygiene & Factory Inspection

Agency (Department) Responsible for Activity: State Board of Health

Annual Budget (1938-39): $9,100.00

Funds Expended to date on:

Library	Medical Equipment	Engineering Field Equipment	Laboratory
0	$1000.00	None	None

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
1	0	-	1	1 nurse	3

Brief History of Unit: Organization - March 1, 1929, as the Division of Industrial Hygiene and Factory Inspection. Duties of Factory Inspector are the enforcement of the Female Employment Law and Child Labor Law, visiting factories employing women and children three times each year to see that the factories are kept in a clean sanitary condition and looking to safety devices on all machinery.

Proposed Program of Unit: A program of physical examinations and immunizations has been conducted year after year since the organization of the unit. The program for the future will be practically the same as in the past under the present status.

Major Unsolved Technical and Administrative Problem: The chief problem is an industrial engineer to assist in making work-room survey of all the industries in Mississippi. We have an engineer at Harvard at the present time who is taking a great deal of work in industrial engineering. We are looking forward to making an industrial hygiene survey of Mississippi.

DR. GRAY: Dr. Dugger has integrated very definitely his industrial hygiene program with the public health service of the community. All the conditions he finds that need looking after are reported back to the Health Department. He has further statistics, and those interested can get more details from Dr. Dugger. I am now going to call on Mr. Johnson of Missouri.

MR. JOHNSON: Mr. Herbert Miller will tell you about our program in Missouri.

MR. MILLER:

State: Missouri

Title of Industrial Hygiene Unit: Industrial Hygiene Service

Agency (Department) Responsible for Activity: Sanitary Division, State Board of Health

Annual Budget (1938-39):

Funds Expended to date on:

Library	Medical Equipment	Engineering Field Equipment	Laboratory	Clerical Equipment
$211.57		$1175.48	$445.18	$241.75

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
	1				1

Brief History of Unit: Missouri began State-wide administration of industrial hygiene July 1, 1937, with one industrial hygiene engineer previously trained for one year on funds made available by the National Social Security Act. Activities have been chiefly administrative and statistical, including the assembly of laboratory and field equipment.

Proposed Program of Unit: It is believed that an adequate program of industrial hygiene to fit the needs of Missouri will necessarily depend upon the development of decentralized local services as well as a central service with the State Board of

Health. In our opinion the protection of the health of the industrial worker requires essentially the same type of organized effort as that which has proven satisfactory for the protection of the health of the general public. Further, we believe that in many localities a constructive approach to the protection of adult health can be logically and effectively made through industry. With the rapid development of district health units in this State, and the impetus which the activities of these district health units give to the development of more adequate local health service in cities and counties, it is felt that the time is opportune for approaching the health problem of industrial workers through these existing local health agencies.

Therefore, the administration features of the proposed program of industrial hygiene in Missouri are as follows: First, an adequately manned and equipped central service with the State Board of Health. The functions of this service will be mainly that of supplying technical advice, supervision and training to local health personnel, development of standards, and dissemination of information. Second, the development of such industrial health services as are warranted through the media of city, county, and district health departments. These local health departments will be expected to carry on the routine investigations and stimulate interest and compliance with good practices. In general, the local

industrial hygiene activities as indicated herewith will be a responsibility of local health officials with necessary aid and assistance from the State Board of Health.

The activities of the proposed program will be in general the protection of the health of the worker in industries and will be integrated as far as practicable with other local health activities. In more detail these activities will have for their purpose:

1. A determination of the nature and extent of the potential health problems of the industrial population by making surveys and collecting and summarizing all available information relative to occupations and industrial health conditions.
2. Quantitative studies of groups of industries presenting similar problems for the purpose of indicating accurately the health hazards in such industries and in order to make recommendations concerning the protection of the health of the industrial worker.
3. Endeavor to constantly improve the accuracy and completeness of reporting of morbidity among industrial employees.
4. The compilation of information for distribution to industries and other interested agencies as a guide for securing better health protection.

Major Unsolved Technical and Administrative Problem: Lack of specific information concerning problems, insufficient

inadequately trained personnel, and inadequate morbidity reporting.

DR. GRAY: Are occupational diseases reported to the State Board of Health?

MR. MILLER: Yes.

DR. GRAY: It is interesting to see that the State program of this bureau is very largely concerned with putting the responsibility up where it belongs, in the local health departments. I think we can have some more interesting discussion on that this afternoon. Mr. Dyktor of St. Louis will now present his report.

MR. DYKTOR: On May 1 of this year we will have completed two years of operation. So far we have been compelled to keep our total expenses below $8,000 a year. Such a low figure naturally did not permit hiring a large staff and we had to be content with the services of two engineers and one stenographer-clerk. In regard to the purchases of equipment, we are fortunate to be located in a division where the head of the chemical section has thrown open to us the facilities of his chemical laboratory and therefore the money that we had in our budgets for equipment was mostly spent for field equipment, with which we are fairly well provided at present.

The entire unit consisting of only two engineers naturally has been and is still handicapped by lack of man-power, In St. Louis we have about 2,000 plants that come under our care,

a figure which represents about 45 percent of the number of factories or plants in the entire State of Missouri. You will, therefore, appreciate the fact that the task before us looks gigantic, particularly if we want to do an honest piece of health work among this large number of plants.

Thus far we gave up quantity in favor of quality, feeling that little as we can do at least that little should be well done. We have endeavored and possibly succeeded in making the plants that we have checked just as health conscious as they have hitherto been accident conscious. This in itself, as you know, is no small task and required a great deal of educational work. Now, in regard to our mode of operation. This is quite simple. We make the quantitative study of the plant as thoroughly and with as little disturbance as possible. We inquire into possible hazards suggested by the management and do a little sleuthing on our own, such as closely analyzing the occupations and materials handled, to discover all hazards. The results of this study are gathered and sifted in a report which is comprehensive but without frills. This report is personally presented, discussed and interpreted, and we so arrange our recommendations that the most undesirable conditions are eliminated first in the easiest and least expensive manner. We work on the principle that if we once get a plant to cooperate with us on the less exacting recommendations, we shall have the same success when we reach the point when our

recommendations will call for more costly improvements. In our study of a plant we consider not only the occupational hazards but include also general welfare and sanitary investigations. We have obtained such improvements as installation of local exhaust equipment, maintenance of present control equipment, new p.p. helmets, better housekeeping including wet sweeping, better sanitary facilities including new toilets and approved drinking fountains. When you consider that industrial hygiene is more or less adult hygiene, you will appreciate the fact that our policy has brought us accomplishments that can be counted as definite improvements in the environmental conditions of the workers employed in the industrial plants we have checked. In other words, assuming that we have studied a certain number of plants employing, say, 2500 men, we have brought about a more sanitary and more healthy working environment for these 2500 men.

As I said before, the task before us in St. Louis is enormous and though we try to enlist the cooperation of all individuals and organizations with which we come in contact, yet we must rely entirely on our own efforts, and our efforts are directed solely to providing a more sanitary and healthful environment for the industrial workers of St. Louis.

State (or city): City of St. Louis

Title of Industrial Hygiene Unit: Industrial Hygiene Service

Agency (Department) Responsible for Activity: St. Louis Health Division

Annual Budget (1937-38): $7,080

Funds Expended to Date on:

Library	Medical Equipment	Engineering Field Equipment	Laboratory
$303.07	0	$1,543.31	$1,157.35

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
0	2	0	1	0	3

Brief History of Unit: As a natural development of the original potential hazard survey conducted in 1933-1934 (Public Health Bulletin No. 216) this unit was established on May 1, 1936, with funds provided under the Social Security Act of 1935.

Proposed Program of Unit: Since any local public health work calls for action rather than research, the policy was and will be to study industries, one by one, plant by plant, and to submit individual reports. Emphasis is placed on follow-up work to insure that recommendations are put into effect.

Major Unsolved Technical and Administrative Problem: Insufficient personnel and therefore inability to provide adequate field and laboratory service. Hence promotional and educational activities are inadequate to attract industries to make widest and most complete use of this unit.

DR. GRAY: I would like to ask what are your principal technical problems. Could you mention a few of your technical difficulties--what you long for more than anything else?

MR. DYKTOR: Personnel and reporting of occupational diseases. The task is a little bit too big for me to get physicians to report.

DR. GRAY: You are even better situated than a good many of them here who don't even have a reporting law. You have at least something on which you can start as a basis. Do you find difficulty in the fact that you don't have enough technical information?

MR. DYKTOR: No. The field is so great that we can probably be busy for the next three or four years doing simple things. Like Mr. Hatch, I am very strong on housekeeping. I am very much sold on housekeeping.

DR. GRAY: Mr. Vintinner, of New Hampshire.

State (or city): New Hampshire

Title of Industrial Hygiene Unit: Division of Chemistry and Sanitation

Agency (Department) Responsible for Activity: State Board of Health

Annual Budget (1938-39): $8,380 (Requested by U.S. P. H. S.)

Funds Expended to date on:

Library	Medical Equipment	Engineering Field Equipment	Laboratory
$200	0	$200	0

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
0	2	2	1	0	5

Brief History of Unit: Unit organized January 1938. A preliminary study of all industries with reference to potential occupational disease hazards was started and is expected to be completed September 1938.

Proposed Program of Unit: At completion of present study, unit will consist of one industrial hygiene engineer and one clerk. The engineer's duties will be technical work reporting to the Secretary of the State Board of Health, who will report to the Commissioner of Labor. The latter will be responsible for carrying out recommendations and enforcement measures.

DR. GRAY: Mr. Hatch, of New York.

MR. HATCH:

State: New York

Title of Industrial Hygiene Unit: Division of Industrial Hygiene

Agency (Department) Responsible for Activity: Labor Department

Annual Budget: $118,614.00 fiscal year ending June 30, 1937

Funds Expended to date on:

Library	Medical Equipment	Engineering Field Equipment	Laboratory
$200	$500	$1,500	$7,500

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
7	7	7 chemists	7	5 Safety Men	33

Brief History of Unit: The Division of Industrial Hygiene developed originally as an offshoot of the Division of Inspection

of the New York Department of Labor. In 1922 it became an independent division of the Labor Department under an independent director.

Proposed Program of Unit: The Division of Industrial Hygiene is devoted, primarily, to the study and prevention of industrial diseases and accidents in the State of New York. It makes independent studies of disease hazards and cooperates with other Divisions in the Department of Labor, such as: Codes, Compensation, Inspection, etc.

Major Unsolved Technical and Administrative Problem: There is no one problem that can be singled out under this heading. The Division has an enormous task in an industrial State the size of New York. Its problems are very numerous, and are being met by an expansion of the personnel and laboratory facilities available for its work.

DR. GRAY: Dr. Eason, of North Carolina.

State (or City): North Carolina

Title of Industrial Hygiene Unit: Division of Industrial Hygiene

Agency (Department) Responsible for Activity: North Carolina State Board of Health and North Carolina Industrial Commission

Annual Budget (1938-39): $27,500

Funds Expended to date on:

Library	Medical Equipment	Engineering Field Equipment	and Laboratory
$275	$7100 *	$5,000**	

*Includes cruising unit for medical examinations, fluoroscopy and chest X-rays.

**Includes $3,000 for X-ray films and chemicals.

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
2	2	1	1	0	6

Brief History of Unit: The inauguration of this phase of public health activities in the State took place in September 1935, with the employment of a physician and an engineer. A secretary was added two months later; another physician and an X-ray technician were procured six months later; and another engineer employed two years later. A survey of a representative number of plants in those industries involving siliceous dust hazards constituted the initial activity. The division personnel then assisted U. S. Public Health Service officers in the collection of data to evaluate the occupational disease hazards involved in the manufacture of asbestos textiles and the mining and processing of mica, kaolin, and feldspar. This work involved the examination of approximately 1500 workers. An extensive study of the State foundry industry has been made, threshold dust concentrations established and an illustrated report prepared. A study has been made to determine the effects of exposure to dust in the mining and milling of prophyllite and a tentative report prepared, which is to be corrected and enlarged in preparation for publication. Data collection has been virtually completed in preparation for the issuance of a report on the occupational disease hazards associated with grainite quarrying and cutting. Miscellaneous studies have

been made involving printing offices, a brick plant, a cotton mill, and some mining operations. All studies made to date, except the one involving printing establishments, have been based upon both medical examinations of workers and engineering studies of occupational environments. In all approximately 6000 workers have been given medical examinations and several hundred dust counts made.

Proposed Program of Unit: We propose to continue our investigation of the dusty industries and as soon as we are able to establish threshold limits, to spend a good bit of time with individual plants in an effort to demonstrate to them the most practical and economical measures for controlling their hazard. Meanwhile, we will continue to make preemployment examinations and when requested to do so will investigate hazards other than dust.

Major Unsolved Technical and Administrative Problem: Our most immediate problem is that of evaluating the dust hazard and of showing industry that the hazard can and should be controlled; also, we have numerous problems in connection with preemployment examinations and the handling of workers who on routine examination are found to have pulmonary pathology.

MR. BLOOMFIELD: Dr. Easom, what do you do with persons examined who are found to have active tuberculosis?

DR. EASOM: Those persons are handled just as if we were conducting a tuberculosis clinic. We discuss the situation with the patient and offer our services, and we discuss it with his

physician and with the health officer, and we make an attempt to get the patient into a sanatorium. I might say, industries are cooperating in those cases, too. They will agree to give the man a leave of absence so to speak and allow him to go away for necessary treatment, and they will take him back as soon as he is ready to return to work.

DR. GRAY: Is the tendency, when a man is found to have tuberculosis, to permit him to go on with his work after control measures have been instituted?

DR. EASOM: Unfortunately, we don't have control measures in many of our plants, so it will be a matter of removing him or allowing him to continue in the same environment. So we have removed very many workers.

DR. GRAY: Have you had to remove many from industry other than those actually affected?

DR. EASOM: On account of simple tuberculosis? No, we haven't.

DR. GRAY: Are your plants largely in one area?

DR. EASOM: The State is 600 miles wide and about 200 miles long.

MR. BLOOMFIELD: Do you do all your own examinations, or do you have some local physician to assist you?

DR. EASOM: When we are unable to get around to all of them, we suggest to the plant that they have some local physician make the examination, at their own expense, of course. Usually they use our case record forms.

DR. GRAY: Dr. Smith, of Ohio.

DR. SMITH: The personnel of Ohio's Bureau of Occupational Diseases consists at present of a medical staff of three (chief, medical supervisor, and assistant medical supervisor), an engineering and chemical staff of three (chemical engineer, chemist, and technical assistant), and stenographic staff of two.

The Bureau was allotted $25,300 total expenses of which $2,500 was allocated to equipment and supplies, $1,000 for rental of laboratory space, and the remainder to salaries and travel expenses of the staff. These figures just mentioned are Social Security funds and, of course, are Federal. In addition to these, the salary and travel expense of the chief and the salary of one stenographer are borne by the State.

The following was expended from funds for equipment and supplies to June 1, 1938: Library and printing, $189.63; medical equipment and supplies, $463.13; engineering field and laboratory equipment and supplies, $741.03; and laboratory supplies $1,251.96.

During the year, exclusive of the industrial hygiene survey, the Bureau participated in 1853 conferences and consultations and wrote 687 letter-reports on subjects pertaining to industrial hygiene and occupational diseases. Two hundred and thirty-two X-rays were studied for silicosis. In the field and laboratory, 71 dust counts were made and 16 air samples were analyzed for lead.

Ninety-four specific investigations, surveys and field studies were completed and special reports of these submitted. Two hundred and thirty-two employees were given complete physical examinations, 45 complete blood studies were made, and 148 radiographs were taken. The Bureau acted as a consulting agent to the Ohio Industrial Commission and the Tuberculosis Dispensary as well as to physicians and employers in evaluating X-rays of the chest for silicosis.

Included among office studies was the receipt and evaluation of 1,488 reports of occupational diseases received from physicians in accordance with Section 1243 of the Ohio General Code which makes all occupational diseases, or those diseases believed to be of occupational origin, reportable to the State Department of Health. In addition, 107 supplementary reports on lead poisoning and 79 supplementary reports on pneumoconiosis were received and evaluated.

The Bureau also receives reports of domestic and auto exhaust carbon monoxide mishaps even though they are not occupational. During the past year, 579 of such mishaps were reported, of which 146 were fatal and 433 were nonfatal.

It should be noted that the activities included in the preceding paragraphs, with the exception of the receiving of reports, were not the total of a year's work but, in reality, of less than 6 months.

For more than the past 6 months, almost the entire time of the staff has been spent on the industrial survey in Ohio in cooperation with the United States Public Health Service. The pursuit of this survey was made possible by a special grant of $25,000 from the United States Public Health Service. The findings of this survey will be used to appraise occupational disease problems and to construct a permanent industrial hygiene program in Ohio.

To accurately appraise the problem, a file-index of the more than 10,000 establishments in the extraction of minerals, manufacturing and mechanical industries and in the laundry, dry cleaning and garage group was arranged. These covered a work population of almost a million. A representative sample of more than 3,000 of these work-places covering over 350,000 workers, was selected for this study. To facilitate the study, a temporary staff of 16 surveyors and 4 tabulators was added. On June 15, 3,239 plants had been visited. Of these, 2,591 surveys had been received and tabulated and 648 were eliminated due to being too small, out of business, or shut down. Data on an additional 537 plants assigned has not yet been received by the office.

The long range problem attacked by the Bureau consisted of a study of health hazards in the clay industries of Ohio, with particular reference to silicosis. It includes physical and X-ray examinations of all employees and plants selected

as well as complete survey data of actual physical condition of the plants, including dust counts. This study was interrupted, soon after its start, by the survey when only 10 plants had been surveyed and 174 workers examined, 144 of which were radiographed. The study will be resumed following the survey.

To facilitate the study of silicosis, Ohio's mobile X-ray laboratory was conceived in the summer of 1936. After months of planning and construction, it was put in operation in October 1937. The unit consists of a special light-proof body mounted on a cab-over-engine truck with a wheel base of 172 inches. The cab-over-engine truck was selected to give maximum space for the body with minimum wheel base. The dimensions of the body are: Length 16 feet, width 7 feet, 11 inches, and height 6 feet 6 inches. A partition divides the body into two compartments. The rear compartment contains laboratory benches, cabinets, sink and water tank.

The forward X-ray compartment contains tube stand, transformer, cassette changer, control panel, fluoroscope, lead-lined film box and ventilating apparatus. The unit is shock-proof. Both flat and stereoscopic exposures are taken. Technique adopted is 100 milliamperes, 1/10th second at 72 inches with variable kilovoltage. The unit operates on 220 volts, 60 cycle current which is supplied at the plant. A special cable connects the truck with factory current.

B-2724

State (or city): Ohio

Title of Industrial Hygiene Unit: Bureau of Occupational Diseases

Agency (Department) Responsible for Activity: Department of Health

Annual Budget (1937-38): Regular $25,300; Survey $25,000

Funds Expended to Date on: (April 1, 1938)

Library	Medical Equipment	Engineering Field Equipment	Laboratory
		Regular	
$182.14	$718.51	$432.18	$924.23*
		Survey	
$23.94			$1044.64**

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	T
		Regular			
3	1 (chemical)	1 Chemist	2 Stenog.	--	
		Survey			
--	--	1 Tech. Asst.	4 tabulators	16 Surveyors	

Brief History of Unit: Division founded May, 1913. Industrial hygien survey completed February, 1915, under Doctor Hayhurst. 15 occupatior diseases scheduled as compensable 1921. List now numbers 22. Bureau panded under Social Security 1936 to present size, and laboratory add Mobile X-ray unit put in operation fall 1937. Industrial hygiene sur in cooperation with the United States Public Health Service begun Jan 1937.

*Incl. rent $729.43.
**Office necessities.

Proposed Program of Unit: Administration of Occupational Disease Reporting Law and "lead law". Medical and engineering investigations and studies of industrial health conditions. Cooperation with other agencies. Designed publicity. Special investigations of domestic and auto exhaust carbon monoxide accidents. Compilation of reference library.

Major Unsolved Technical and Administrative Problem: I. Ohio Industrial Hygiene Survey. II. A study of the clay industry in Ohio with particular reference to silicosis, including physical and X-ray examinations of employees of plants selected as well as complete engineering survey of physical conditions of the plants (including dust counts).

The following report was submitted in writing by Dr. Fulton, Director of the Pennsylvania unit.

State (or city): Pennsylvania

Title of Industrial Hygiene Unit: Division of Industrial Hygiene

Agency (Department) Responsible for Activity: Department of Health

Annual Budget (1937-38): $56,490.65

Funds Expended to Date on:

Salaries - $17,795

Traveling Expenses - $4,770

Other expenses, such as Material & Supplies; Telephone and Telegraph; Rental of Real Estate; Equipment and Machinery; Printing & Binding; Light, Heat, Power and Water; Automobiles - $33,925.65

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
2	9	0	1	0	12

Brief History of Unit: The Division was transferred from the Department of Labor and Industry on March 16, 1936, and has since been engaged in the expansion of the Division to include laboratories in Philadelphia, Pittsburgh, Altoona, Erie.

Proposed Program of Unit: 1. The Industrial Hygiene Division will continue under the direction of the Secretary of Health but shall function so as to give to the Department of Labor and Industry services as outlined herein, within limits of available funds.

2. The Industrial Hygiene Division will make health and sanitary inspections, appraisals, or surveys in factories or other work places which, under the jurisdiction of the Department of Labor and Industry, will supply data and assist in any enforcement proceedings when requested.

3. The Industrial Hygiene Division will provide suitable laboratory facilities and competent technicians for making chemical tests or analyses when requested by the Department of Labor and Industry.

4. The Industrial Hygiene Division will supply any needed technical service to the Department or the Industrial Board in connection with workmen's compensation administration, including expert advice and evidence in compensation hearings, when requested.

5. The Industrial Hygiene Division will collaborate with the Department of Labor and Industry in compiling and disseminating information, material and data on industrial health hazards and methods of control.

6. The Industrial Hygiene Division will assist the Department of Labor or the Industrial Board in the preparation of safety and health codes, rules or regulations, when requested.

7. The Industrial Hygiene Division, in addition to its regular program, will conduct such research in the field of industrial health exposures and conditions as may be desired by the Secretary of Labor or considered advisable by the Secretary of Public Health after consultation with the Secretary of Labor.

Major Unsolved Technical and Administrative Problem: None.

DR. GRAY: Doctor Deery, of Rhode Island.

DR. DEERY:

State (or city): State of Rhode Island and Providence Plantations

Title of Industrial Hygiene Unit: Division of Industrial Hygiene

Agency (Department) Responsible for Activity: Department of Public Health

Annual Budget (1937-38): $23,000

Funds Expended to Date on:

Library	Medical Equipment	Engineering Field Equipment	Laboratory
$150.64	$116.73	$259.50	$455.60

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
2	3	1 X-ray man	1	2 chemists part-time	7 full-time 2 part-time

Brief History of Unit: Established July 1, 1936, with equally matched funds from U. S. Public Health Service (Social Security), and State

appropriation. Personnel at inception essentially the same as at present. Professor Philip Drinker of Harvard University retained for one year as consultant. The Division has the use of all the facilities of the Department of Public Health that were established before its inception, including laboratories and office space. Several of its employees were already in the employ of the Department of Public Health at the time of its inception and were absorbed by the newly established Division. Employees have received special training at the U. S. Public Health Service yearly seminars and the Harvard School of Public Health. A preliminary survey of the State has been completed. A survey of granite-cutting establishments; various investigations in regard to cutting oils and compounds. At present, working on survey of jewelry manufacture.

Major Unsolved Technical and Administrative Problem: 1. Distinction between occupational diseases and occupational accidents. Where should dividing line be? Should Division consider accidents at all? 2. Problem of securing reports of occupational diseases. Is the practising physician always conscious of their existence? 3. Composition of trade-name solvents. Methods of detection and analysis.

Proposed Program of Unit: Similar to that recommended by U. S. Public Health Service.

DR. GRAY: Dr. Wilson, of South Carolina.

DR. WILSON: The personnel of the Division of Industrial Hygiene consists of the following: Secretary, Chemical Engineer, and Physician. No

changes nor additions have been made during the past year as far as the personnel is concerned. The total budget for the fiscal year 1937-38 was $10,525.00.

	1937-38	1938-39
Salaries	$7200.00	$7200.00
Travel	2000.00	2000.00
Contingent	725.00	700.00
Rent	600.00	600.00
Total	$ 10525.00	$ 10500.00

A summary of our activities is as follows:

1. Completed preliminary survey of industrial plants. This report was printed under the title of "An Evaluation of the Industrial Hygiene Problems in South Carolina". Copies of this report were sent to the various industrial hygiene units in the country.

2. Conducted study in cooperation with the Division of Industrial Hygiene, National Institute of Health, relative to the control of noxious and malodorous gases that were given off by paper mills in the manufacture of kraft paper.

3. Conducted study to determine the concentration of dust in the monumental and stone plants. This study has not been completed.

4. Technical study to determine the efficiency of control measures in three departments of an asbestos fabricating plant. The departments studied were twisting, cop winding and ring spinning.

5. Educational program for the control of syphilis in industry. A number of lectures and motion picture showings were given in connection with this program.

6. Educational program to acquaint physicians, medical students, and nurses, public health workers, others interested in the welfare of industrial workers and the prevention of occupational diseases.

7. Certain rules and regulations were adopted by the executive committee of the State Health Department and became a part of the Sanitary Code. These regulations deal with the following: reporting of occupational diseases, threshold limits for certain toxic materials and harmful dusts. The State Board of Health is authorized to investigate and to make recommendations for the elimination or prevention of occupational diseases. The State Board of Health is also authorized to study and provide information in regard to conditions that may be suspected of causing occupational diseases, provided information obtained upon investigations shall not be admissable as evidence in any action of law to secure compensation for occupational diseases through common law. Administrative and Technical Problems: 1. How to increase and encourage the reporting of occupational diseases by physicians, surgeons and nurses. 2. What are the best methods to increase the interest of county and city health officers in industrial hygiene work?

DR. GRAY: I think that this afternoon we shall wish to discuss the development of industrial hygiene activities in local health departments. I would like to see it discussed at that time. I notice that some of the speakers have prepared a little discussion of what their bureaus are doing. We would like to have those papers very much. Dr. Pharris, of Tennessee.

DR. PHARRIS:

State (or city): Tennessee

Title of Industrial Hygiene Unit: Industrial Hygiene Service, Division of Preventable Diseases

Agency (Department) Responsible for Activity: State Department of Public Health

Annual Budget (1938-39): $11,000.00

Funds Expended to Date on:

Library	Medical Equipment	Engineering Field Equipment	Laboratory
$87.15		$158.90	$58.00

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
1	1				2

Brief History of Unit: Organized in July 1937 as the first effort by the State Department of Public Health to render this type of service. Activities have been devoted entirely to preliminary survey of industries and planning of the program.

Proposed Program of Unit: 1. Preliminary survey for purpose of defining industrial hygiene problem in the State. 2. Permanent program studying and controlling specific problems in cooperation with industry, labor, medical profession and others concerned.

Major Unsolved Technical and Administrative Problem: 1. Technical: a. Providing adequate laboratory facilities. b. Providing more adequate engineering and medical service for permanent program. c. Provision for reporting occupational diseases and deaths. 2. Administrative: a. Administrative details related to above mentioned technical

problems. b. More effective engineering supervision and consultation service.

DR. GRAY: We will have just one more speaker this morning. There are not very many more, and we can continue this afternoon. Doctor Nau, of Texas.

DR. NAU:

State (or city): Texas

Title of Industrial Hygiene Unit: Division of Industrial Hygiene

Agency (department) Responsible for Activity: State Department of Health

Annual Budget (1938-39):

Funds Expended to Date On:

Library	Medical Equipment	Engineering Field Equipment	Laboratory
$209.00	$1,471.00	$3,520.00	$7,283.00

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
1	3	1	1	0	6

Brief History of Unit: Organized July, 1936; housed in temporary quarters for 10 months; now located in the State Health Department Laboratory Building and cooperating with the Chemical Laboratory. Activities confined thus far to about 1800 surveys, numerous talks, special studies, and consultation service to industries in the field.

Proposed Program of Unit: To make detailed studies of potential hazards uncovered in our preliminary surveys and to act as consultants in industrial health hazards.

Major Unsolved Technical and Administrative Problem: To create an interest and demand on the part of industry for a study of potential health hazards. To obtain permanent trained personnel.

Meeting adjourned at 12:40 p. m.

Afternoon Session, Tuesday, June 28, 1938.

The meeting was called to order by the Chairman at 2:00 p.m.

DR. GRAY: We will continue with the discussions. We have just a few more reports, and then we will have a general discussion on the various reports we heard this morning. We will start with Dr. Judd, of Vermont.

DR. JUDD:

State (or city): Vermont

Title of Industrial Hygiene Unit: Division of Industrial Hygiene

Agency (Department) Responsible for Activity: State Department of Health

Annual Budget (1938-39): $11,500

Funds Expended to Date on:

Library	Medical Equipment	Engineering Field Equipment	Laboratory
$131	$1500	$600	$800

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
1	1	0	1	0	3

Brief History of Unit: Medical and engineering study, granite finishing and inspection of dust control equipment installed throughout the State. Approximately 70 percent of granite sheds have adequate dust control. Granite quarry study, medical and engineering angle, with agreements signed to install dust equipment within 14 months.

Proposed Program of Unit: Study by industry of other hazardous occupations including talc, slate, asbestos and foundries. This for next year only.

DR. GRAY: I realize, Dr. Judd, that you are a Vermonter and you are very modest. I would like to have you tell us how it was possible to get 100 or so plants to put in dust control equipment in your State.

DR. JUDD: I think you are exaggerating a little. The Bureau was developed primarily at the invitation of industry and the labor unions in granite establishments. They asked the health service because I think they were as embarrassed as anyone, and wanted someone to try and help them out of their dilemma. There was a situation where men were dying, presumably of tuberculosis, at the age of 54--11 years earlier than the rest of the group. They were very anxious to do sometning about it, and because of some preliminary work done by the United States Public Health Service, they knew dust was primarily the factor. They didn't know what to do. That is where we stepped in and suggested that the dust must be controlled. We placed it, arbitrarily, at 10 million particles per cubic foot. They then agreed to put in dust control devices in the area and to try and bring the dust down to this point. They said they would install equipment as rapidly as they could. I think 60 or 70 systems have been completely installed and the remainder partially installed.
I might, in addition, say that in connection with granite quarrying we discovered a hazard that had been previously investigated by the Public Health Service, but less in detail, and have felt our findings indicated the need for dust control and we

told the industry so. We avoided telling labor just what we thought was necessary in the way of dust control but they found it out and requested that we write it into their union demands which were to be signed. I had the privilege of writing that in, and we are demanding a 10 million maximum dust count, and I think we have had splendid cooperation both with industry and labor, and have avoided completely some of the pitfalls that might have happened.

DR. GRAY: Dr. Tillson, of Virginia.

DR. TILLSON:

State (or city): Virginia

Title of Industrial Hygiene Unit: Bureau of Industrial Hygiene

Agency (department) Responsible for Activity: Department of Health

Annual Budget (1937-38): $19,000

Funds Expended to date on:

Library	Medical Equipment	Engineering Field Equipment	Laboratory
$150	0	$1000	$1500

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
1	1	1	1	0	4

Brief History of Unit: Organized July 1, 1936, with medical director, engineer, and secretary. Chemist added February 1937. Completed State-wide preliminary survey. Sample comprised

40 percent of industries studied. Detailed carbon monoxide study in illuminating gas plants. Detailed carbon monoxide studies in busses and bus garages. Detailed study in granite cutting establishments.

Proposed Program of Unit: Continue detailed studies in plants with potential hazards as indicated by the preliminary survey. Answer complaints. Comply with requests for services. Aid in the promotion of hygiene in general among industrial workers as well as in the prevention of specific occupational diseases.

Major Unsolved Technical and Administrative Problem: How to induce industry and others to use services of bureau. Should attempt be made to secure reports of cases from physicians before legislation is adopted? Should bureau sponsor legislation or simply guide proper legislation if and when sponsored by industry or others? In making detailed studies where physical examinations are purely voluntary on the part of employees, should plants be included where only a portion of the employees will volunteer for such examinations? Should results of physical examinations be made known to employers and employees when requested?

The following report was mailed in to the Conference by Mr. Roy Harris of Washington.

State (or city): Washington

Title of Industrial Hygiene Unit: Under "Division of Public Health Engineering"

Agency (Department) Responsible for Activity: State Department of Health

Annual Budget (1937-38): None

Funds Expended to date on:

Library	Medical Equipment	Engineering Field Equipment	Laboratory
$85	0	0	0

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
0	1	0	1	0	2

Brief History of Unit: Started July 1, 1937, with one engineer, clerk hired in October, 1937. Survey made of 205 plants employing 28,451 workers. Some advice given to State Department of Labor and Industries and individuals regarding occupational diseases.

Proposed Program of Unit: Discontinuing for present.

Major Unsolved Technical and Administrative Problem: 1. Action of Western Red Cedar and other wood dusts on the lungs of sawmill workers.

2. Reporting of occupational diseases.

DR. GRAY: Mr. Rothmann, of West Virginia.

MR. ROTHMANN: I feel like an orphan in a storm here. We have established a small engineering unit in conjunction with the Industrial Commission, known as the Workmen's Compensation Commission. The law in West Virginia is administered by the Compensation Commissioner, and in addition to that, we have set up in West Virginia a compensation fund for silicosis. In order to establish rates and classify the various industrial plants subscribing to our fund, it is necessary that we go out and make studies in these plants, not with the idea of contributing any massive data to research, but with the idea of roughly breaking industries down as to degree of risk with some hope of setting rates. We have a laboratory at Charleston at the State Capitol, and we have a chemist to do petrographic work, and our chemist also serves as X-ray technician. Our X-rays are taken in the field and read by our medical silicosis board, backed by the State Medical Association. This board is made up of a representative from the State Medical Association, general practitioners, and specialists in internal medicine. Our law specifically states three stages of silicosis: For the first stage we pay $500, the second stage we pay $1000, and the third depends upon the salary of the individual at the time of the last exposure. The problem is rather complex and we are not trying to duplicate the work of the Industrial Hygiene Division. We are going out and making dust count determinations,

as well as checking on the employees. At the present time we are engaged in a glass survey for the glass manufacturers' association in West Virginia, and we have completed three of their plants. We have some very interesting data. Our procedure is the same as that of the U. S. Public Health Service. We go into a plant, make preliminary surveys and go back to particular locations and make detailed studies. We take X-rays of employees in cooperation with plant physicians. The X-ray films are turned over to our board for interpretation. We hope before long we will have some workable material to use as a basis for setting rates. Thank you for the opportunity of speaking.

The following report was submitted by Mr. Roetman of West Virginia.

State (or city): West Virginia

Title of Industrial Hygiene Unit: Bureau of Industrial Hygiene

Agency (Department) Responsible for Activity: State Health Department

Annual Budget (1938-39): $17,500

Funds Expended to date on:

Library	Medical Equipment	Engineering Field Equipment	Laboratory
$587.77	$2634.55	$1278.63	$1461.94

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
1	1	0	1	0	3

Brief History of Unit: Organized in 1936 with assistance and cooperation of the United States Public Health Service who loaned an engineer to initiate the program.

Proposed Program of Unit: Development of morbidity reporting by industrial physicians. Medical and engineering studies in the various industries.

Educational program. (Program at present and for the near future.)

Major Unsolved Technical and Administrative Problem. Morbidity reporting by industrial physicians.

DR. GRAY: Dr. Brehm, of Wisconsin.

State (or city): Wisconsin

Title of Industrial Hygiene Unit: Industrial Hygiene Unit

Agency (Department) Responsible for Activity: State Board of Health

Annual Budget (1938-39): Not completed to date

Funds Expended to date on:

Library	Medical Equipment	Engineering Field Equipment	Laboratory
$254.37	$117.63	$1216.47	$1459.01

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
1	1 Sanitary 1 Chemical	Part-Time Petrographer	1 Secretary	0	5

Brief History of Unit: Organized May 1937. Cooperating with the Industrial Commission. Dust and ventilation survey completed of

of quarrying and wholesale stone cutting industry. Dust and ventilation survey of the foundry industry in progress. Started volatile solvent survey. Miscellaneous requested studies of dusts, fumes and gases.

Proposed Program of Unit: To divide activities into: 1. Planned surveys: a. Foundries--dust concentrations, composition of dust and ventilation studies. b. Preliminary survey of volatile solvents to be followed by detailed medical and engineering studies. 2. Miscellaneous: Requested studies of various hazards.

Major Unsolved Technical and Administrative Problem: Safe exposures to mixed dusts and to the various volatile solvents used in industry.

DR. GRAY: We have with us today someone I am sure we would all like to hear from, who has a very definite problem in industrial hygiene, and who we realize is entitled to become a member of this conference. I would like to hear from Doctor Strain of the Tennessee Valley Authority, Director of Safety and Health.

DR. STRAIN: I hope I may correct Dr. Gray. I am in the Occupational Hygiene Division. The Tennessee Valley Authority is engaged in the development of a rather large and important river in the south. Among the many of its activities is a Department of Health and Safety, of which Dr. Bishop is Director. This department has five divisions, which I will name briefly, and then I will discuss occupational hygiene.

There is a Sanitation Division, which has to do with environmental sanitation, stream sanitation studies, malaria studies and control of mosquito breeding and malaria, which are the result of impoundage of water, particularly in Alabama. Then there is a Division of Safety, which has to do with the study of industrial accidents and the prevention of accidents. There is a Division of Construction, and Medical Service. We have to render medical service to employees injured in line of duty and medical care to employees and their families in projects that are isolated from ordinary medical centers. The occupational hygiene division--this division concerns itself with the treatment of venereal disease or control of venereal disease and the control of other communicable diseases. It has a program of health guidance for which thorough physical examinations of all regular employees are made and this division has a unit of industrial hygiene. The reason for this industrial hygiene unit is because we have some very definite industrial hygiene problems in the Tennessee Valley Authority activities. At Hiawassee Dam in the southwest corner of North Carolina, the rock which is being excavated and crushed for concrete aggregate has a very high silica content, and it is necessary to protect the workers against silicosis. In addition to regular routine examination, we take X-ray pictures of all employees engaged in the activities at Hiawassee. They are classified according to findings on physical examination, and occupational history and X-ray, and

those employees who have evidence of pulmonary disease are rejected for employment in this dusty environment. They are placed where they are not likely to come in contact with much silica dust. We have instituted some rather efficient dust control measures there. I was over last week and was surprised to find I couldn't see any dust anywhere except a little cement dust in the mixer. One valuable point is that the construction superintendent on this job is so delighted with the dust control, not only from the standpoint of protection to the employees, but because of the fact that he says the removing of this abrasive dust has more than paid for itself in increasing the length of life of his equipment and dust crushing machinery. It is a dollars and cents sales talk and might be used in persuading persons in dustry occupations, particularly in handling stone, to install dust control equipment. Another very definite hazard is a fertilizer works. The old nitrate plant that was built during the war was particularly developed with some new construction as a plant for developing new methods of manufacturing phosphate fertilizer from the phosphate rock in Tennessee. In the manufacture of this fertilizer, great quantities of elementary phosphorus are produced. In connection with this manufacture, also, there is some fluorine gas and dust of various sorts containing in some instances silica, depending on the process used. When this fertilizer works started back in the fall of 1934, we realized we needed to protect the employees from phosphorus poisoning and

other occupational diseases that might result from their employment. We called upon the Public Health Service, and they sent Dr. Jones, Dr. DallaValle and Mr. Proske, a laboratory man, and made a study of our plant, and made recommendations which we have attempted to carry out. So we have now a fairly efficient staff in industrial hygiene, consisting of Dr. Welch, Mr. Hatch, an engineer, who is the brother of Theodore Hatch, Mr. Fleming who is with me here, who has had particular training in biological chemistry. We have also had some of the other members of the U. S. Public Health Service, Dr. Dreessen, for instance, as consultants in industrial hygiene. We also have a dentist in the fertilizer plant, who is very carefully examining the teeth of the employees and gives prophylaxis to the teeth, and also some fillings and things of that sort, thinking that phosphorus poisoning might be more easily attracted by improper dental hygiene. In spite of the fact that we have had histories of a good deal of phosphorus poisoning in the old phosphorus mixing industries, very little seems to have been written on the subject of the length of exposure and the amount of exposure necessary to produce phosphorus poisoning. We have succeeded in getting started just recently--Mr. Fleming is busy with that in experimental work, on trying to determine just what is the dangerous dose of phosphorus to guinea pigs and rats. Mr. Fleming has been very much concerned with the fumes which frequently escape. That we find is a very interesting and very

important thing to do, but ultimately, we feel, we have very definite and interesting industrial hygiene problems in the Tennessee Valley Authority, not only from these two particular projects, fertilizer and the Hiawassee Dam, but other problems, such as arsenic among those handling paris green in the control of malaria, and lead poisoning to a smaller extent. Also, problems of organic solvents in one department, and one or two cases of zinc poisoning in welders. We try to supervise all our activities in the Tennessee Valley Authority in protecting our employees from developing occupational diseases. It has been a privilege to be with you and very stimulating to me who is interested in industrial hygiene, and I think I will get a good deal out of having been with you. Thank you.

DR. GRAY: We also have with us Mr. H. E. Miller, Professor of Public Health Engineering at Michigan University. I wonder if you would say a few words, Mr. Miller.

MR. MILLER: I want to express my appreciation at being able to attend your conference. It has been most instructive and interesting to me, and I feel I am especially repaid by the benefits of listening to your discussion. In these talks, many of the questions I had in my mind have not been answered, but a little light has been shed on them. Of course, as you know, I am not myself engaged in the administration of industrial hygiene activities. Neither am I engaged entirely in industrial hygiene; yet I feel more at home at this conference that I have felt at

any time so far at a discussion of industrial hygiene. The thing has been a little bit in my mind recently as to just how public health in general was going to fit into this program of industrial hygiene or industrial health. Since I am engaged in teaching public health personnel such subjects, personnel who will be largely in county or district health units or State health departments, and being interested in seeing industrial hygiene advance as much as it can through these agencies, as well as others, I have thought all along that we should convey to that type of personnel a minimum of information that all health officers and all public health engineers should have with respect to industrial hygiene. From the discussions that have taken place here it looks as though that is not only the practical thing to look forward to, but a thing, I judge from the discussion, the industrial hygienists would like very much to have done. That being the case, I personally have received a tremendous amount of stimulation from these discussions and some ideas I think as to how local health personnel and health agencies in general may cooperate more effectively in advancing industrial hygiene interests and consequently have received some ideas as to some kind of preparation we may be able to give that will help in that general end. The sort of things that have been brought out in this discussion and the material available in your program is the kind of information that is exceedingly valuable to us in our job in

attempting to acquaint students with the general layout. I do not know what the future plans of this association are. Personally, I hope very much that through some means or other those of us in the public health schools may be able to have some kind of contact that will give us the benefit of discussions like these and such material as may be released or issued by this association from time to time, in the way of information. Thank you very much for the opportunity of being here. I have enjoyed your meeting immensely.

DR. GRAY: The following is a brief summary of the activities in industrial hygiene in my own State of Connecticut.

State (or city): Connecticut

Title of Industrial Hygiene Unit: Bureau of Occupational Diseases

Agency (department) Responsible for Activity: Department of Health

Annual Budget (1936-37): $25,557

Funds Expended to Date on: (From July 1, 1936, to June 30, 1937)

Library	Medical Equipment	Engineering Field Equipment	Laboratory
$90.00	---	Field & Laboratory equipment & laboratory supplies	$1550.00

Number and Kind of Personnel:

Medical	Engineering	Other Technical	Clerical	Other	Total
1	1*	3**	2X	--	7

* Industrial hygiene engineer (mechanical & ventilation engineer)
** 1 Chief industrial hygienist (chemical training)
2 Assistant industrial hygienists (chemical training)
X 1 Secretary
1 Stenographer-clerk

Brief History of Unit: Organized January 1928. Personnel of Director and secretary. Chemist added to personnel and laboratory work started. 1931 another chemist. 1936 a mechanical engineer, a chemist and clerk were added. Activities consist of surveys, studies and recommendations for control of health hazards in industry. Survey of the foundry and fur cutting industries and a study in the fur felt hat industry are among the recent activities. Investigate cases of occupational disease reported.

Proposed Program of Unit: Instructing technical personnel of local departments of health so that they may participate in this phase of public health work. Making surveys and studies with recommendations in industrial plants as the occasion requires and State-wide surveys and studies of complete industries and industrial processes. Following up recommendations to see that compliance has been made. Emphasis to be placed on securing more complete reporting of occupational disease cases. Investigation of cases reported.

Major Unsolved Technical and Administrative Problem: 1. Securing more complete reporting of occupational disease cases.

2. Working out program for effective participation of local departments of health in occupational disease control work.

3. Obtaining sufficient information on threshold limits of toxic materials used extensively in industry.

DR. GRAY: I shall now call on Dr. Schrenk of the U. S. Bureau of Mines.

DR. SCHRENK: I think I will confine my remarks to telling you I have enjoyed being with you. There have been so many points raised that for anyone to attempt to discuss any one of them would only hold the meeting up that much longer. I am just going to say thank you.

DR. GRAY: No, it is only Dr. Schrenk's modesty that prevents his giving us a very interesting discussion on some of the work he has done. Dr. Sayers.

DR. SAYERS: Dr. Schrenk, the group here needs to know some of the things you have done and are doing, in order that they may come to you and get some direct information. He has had long experience on a number of problems connected with the mineral industry. He has had experience on benzol and the method that was worked out for the control of the benzol hazard is his work. You know the approach he has on the control of benzol. He is trying to find a method whereby we can tell whether a man's exposure is great enough to be a hazard before he has been adversely affected. He can do that by examining body fluid, and he does that readily by examining the urine. I am not going to take more time on that line, because when he sees he missed his opportunity, he will probably remember it the next time. Furthermore, I might tell you Dr. Schrenk, representing the U. S. Bureau of Mines, and myself representing the Public Health

Service are doing cooperative work. What we are doing is not a competitive operation--it is a cooperative problem and we must do it on a cooperative basis. Most of the things that have been said the last few days have had this theme throughout. You have noted here representatives of a number of different departments and you have throughout all State and local health departments and the practitioner and the manufacturer and the labor departments and the laborers themselves--all of them having an interest in the work and having something to contribute. We mentioned the first day the various branches of the medical profession and the other professions to be taken into consideration and each has something to contribute to the solution of the problem we have of the conservation of the health of the worker. Now I could go along here and discuss a number of points brought up in this very nice compilation Mr. Bloomfield has prepared, and I believe the first is how you are going to get occupational diseases reported. That emphasizes the thing that is in your mind. I believe there are 11 States out of the group who wanted to know how to get better reporting on occupational diseases. That emphasizes two or three different things. One is that occupational diseases, in contradistinction to industrial hygiene, are important. Please don't forget it. We are likely to forget it in our enthusiasm for general public health. I have been talking of occupational diseases for a long period of years, but nevertheless, I am likely to forget that

(R-743)

FIGURE 1

SUMMARY OF ADMINISTRATIVE AND TECHNICAL PROBLEMS CONFRONTING INDUSTRIAL HYGIENE UNITS

Problem	Alabama	California	Connecticut	Illinois	Indiana	Iowa	Kansas	Baltimore	Massachusetts	Michigan	Detroit	Mississippi	Missouri	St. Louis	New Hampshire	New York	North Carolina	Ohio	Pennsylvania	Rhode Island	South Carolina	Tennessee	Texas	Vermont	Virginia	Washington	West Virginia	Wisconsin	Totals
Extension of Industrial Hygiene program to include studies in non-industrial environments							x																						1
Development of industrial hygiene services under handicaps of fund and space limitations										x																			1
Handling workers who are found on examination to have pulmonary tuberculosis																	x												1
Differentiating between an accident and an occupational disease. Should Division consider accidents?																				x									1
Should Division sponsor or guide legislation on industrial hygiene?																									x				1
Should results of physical examinations be made known to employers and employees when requested?																									x				1
More adequate occupational disease reporting	x	x	x	x				x	x											x	x	x			x	x			11
Plan for morbidity reporting													x														x		2
Examination of copies of claims for occupational diseases and investigation of occupational disease cases filed or adjudicated				x																									1
Funds and field personnel to carry out preliminary survey					x																								1
Program for local health department participation			x																										1
Cooperation of industry and medical profession in industrial hygiene program						x																	x		x				3
Additional personnel	x											x	x	x								x	x						6
Enactment of legislation recognizing distinction between public health problems of industrial hygiene and labor relations problems for compensation for injury							x																						1
Chemical method for determining blood-hemoglobin saturation for carbon monoxide		x																											1
Study of toxicity of wood rot-proofing solutions containing pentachlorophenol						x																							1
Development of field analyses and laboratory procedures for determination of toxic materials							x																						1
Methods of determining composition of trade-name solvents, their detection and analyses																				x									1
Control of noxious gases in pulp and paper mills																					x								1
The action of western red cedar and other wood dust on the lungs of saw mills workers																										x			1
Threshold limits for toxic materials			x																									x	2
Totals	1	2	3	2	1	2	3	1	1	1	0	1	2	1	0	0	1	0	0	3	2	2	2	0	4	2	1	1	40

occupational diseases are important. You are going to get more questions on occupational diseases than on general diseases because each individual on the street feels he knows quite a bit about most of the general diseases occurring to man. When it comes to occupational diseases, he feels he does not know quite as much about it. You must be prepared to answer questions on occupational diseases more than on any other subject. New questions will come up, new substances will be met in the chemical industry that are hazardous to the worker. So you will need to know more about these new things, and new things are always interesting because they are the newest. People are always more interested in new things than in anything else. We might mention radiation and how radiation affects people. We have mentioned skin diseases. You should be prepared to answer many questions in this field. We have here in the Public Health Service an organization from which you can get certain information. We get part of the information from you, too. We have to exchange information. But in your States you need a good strong central administration. That is emphasized by everything that has been stated. You want an organization that is prepared to give service, and I mean just what I said, to all those interested--private practice, yes; industrial physicians, yes; the industrialists, the labor department, the other departments in the State, and local units. In your local units you will have many of them

interested, your local health officers, you won't have a great deal of trouble interesting them in this work, especially if you show them where they can do better health work by working through industrial groups. They will need your assistance in undertaking and working it through. Physical examinations, case finding, such as Dr. Dugger and Dr. Fasom have described, and Dr. Parney has been doing a bit of it in his group in Canada. It can be done in any of our local health groups and is more efficiently done than if we try to do it on an individual basis. Research calls for a physician. I think it is worthwhile; but you are going to have to have some central organization to get the idea across to the local physician. You are actually going to carry some new information to them. I won't go so far as to say you are educating them--it takes too many years to educate--but you can at least call their attention to the fact that there is something to be done and they probably will accept it. They have to work on this program, and they will have to work in this program--referring to private physicians, the practitioner--there is work for him to do. All of this is very well illustrated. A complete organization now exists in one industry on what we believe to be industrial hygiene, in one of our southern States and exists in other places. Dr. Noland worked a long time on the Panama Canal, and he learned what he had to do if he was going to build a canal. He had to preserve the health of the people building the canal

or he would have no canal. So he got through building the canal, and as soon as he got through, this company hired him. He is a surgeon. He set up an organization down there which has in it an administrative unit that recognizes the need for preventive and curative medicine. They recognize that they need many professions and they are assigned to various duties. They look after sanitation, the prevention of malaria among their workers. They have a lake down there for getting water for power purposes; it is a breeding place for mosquitoes. They wash the banks of that lake every day, running a motor boat along the lake, though it is a fairly good sized lake. Nevertheless, the personnel for whom he is responsible live on the banks of the lake and will have malaria fever if not taken care of. He sees that they have the proper milk supply, that they have an opportunity to purchase the proper kind of food. All of those things, and vaccination, nutrition, are all part of his job. He looks after diseases, including silicosis, tuberculosis, carbon monoxide poisoning, the effects of high temperature--heat stroke, if you will--and if somebody happens to get injured, he looks after that. Finally, he keeps records of all that is going on. Now, that to me is industrial hygiene--the preservation of health. Ordinarily, we can't do as he does except by cooperation. We need education. Dr. Miller mentioned what can be done about education. We hope we can get some of this education across to the physician in

private practice, to our local health unit, and integrate it all. Mr. Miller said we might arrange for it when we begin to promote the establishment of units in industrial hygiene in the States, and we agreed right in the beginning there should be integration of industrial hygiene through all the public health organizations.

Now for exchange of information, we need some way of getting information from one group to another. We need some system, and some system should be set up of getting this information from one group to another. Some of it will be of little interest, some will be of value, but we do need to have a system set up. An analysis--maybe an analysis isn't worth much, and yet it may be interesting. It might be that is what we want. It may be that we can get them to label--and I think probably we can--to label their compounds and cleaning compounds, degreasers, etc., within reason, and if that is the problem you happen to have--we can have those attached as an example. They will say that it is going to hurt their business. They are not going to get very much difference in price for it regardless of the health hazard. If the health hazard is very great they are going to lose business anyway. We will exchange such information back and forth. Furthermore, methods of analysis will be of advantage. We must think out the methods whereby this can best be done--some of it can be done in your State laboratory, in the university laboratory--and some can be done by

the Public Health Service. As to the extra-curricula things, many of you are going to have information that is going to be useful to many other departments. And if we differ our program we must give our information to anyone who really can use it. We must be prepared to give it to them. You may come to a place where you have to decide which is the most important thing to do, and you may decide "I can't afford to do that particular thing." We are asked in the Public Health Service to advise the new cancer institute what to do on radiation, how to build their building for the installation of their radiological equipment. We do--why?--Because we happen to have associated with the Industrial Hygiene Division men who are very competent in that very particular line. Being in the Public Health Service, it is part of our duty to give them that information. Again, on housing, we have someone who can give advice on housing, whether for residence, store, for school room or school house lighting, and ventilation. Heating might come in on the same problem. But if you have this information, it is part of your duty to supply it. How far to go on it you will have to decide.

I would like to go to one other point. Dr. Gray here emphasized it almost enough, I think, and that is that you will need to act as an information bureau on problems of industrial hygiene and on occupational disease and injury. You will need to be helpful wherever you can be on subjects

or questions coming in to you. Don't hesitate under those circumstances to ask some other of the group if you think they know more about it than you do. But get the man his information. If we can answer the question better than you can, if you feel the Public Health Service has information, we will send it back to you, as best we can, in order that you may answer the question properly. We believe that this is proper integration. Suppose your county health officer asks you a question. Give him the information. There is only one hazard in answering those questions to people who are not really qualified in industrial hygiene, and that is they will think the answer to that inquiry should answer every similar inquiry that comes in. It may need a little bit more or a little bit different interpretation. If you get these inquiries coming in to you, you may be able to evaluate it better than he. It is your job; you not only know chemistry and public health, but you know industry, and our health officers can't all know industry. But I believe there is something for you to work out, and I believe we can do that by cooperative methods. I think that the next thing, the thing you would like to know first, is all of these other diseases in industry--physical examinations and case finding--what are you going to do with the cases when you find them. What is your relationship with the other bureaus of the health department? With the syphilis division, the tuberculosis division, school hygiene, child

hygiene division? What is going to be your relationship with them? It would seem to me that when you find a case, it could probably be referred for more specific diagnosis to the other bureau--in other words, it is a cooperative problem.

Coming back to the reporting of the cases for morbidity and occupational diseases. You have heard of a number of ways of getting them, and they will work out in time. Maybe through your insurance company, or perhaps you may be able to get them from the physicians. It may be that your law will be strict enough so that the manufacturer will demand it or the worker will demand it, but we believe that you will only learn what is going on when you get all absenteeism due to illness reported. You are not going to get that very soon. You will get it in a few places. They already have records in certain places. Try to get them to keep records. We hope they will keep them in a uniform plan. Many organizations are now interested in just this program. The American Association of Industrial Physicians and Surgeons are interested in developing a uniform plan for keeping such records. It isn't simply the principle of keeping records, but how to go about getting people who are absent due to illness to report their absences and the causes, how to find out whether it is a case of illness, and what is the matter, so it can be attached to the report. Where you have large industries it can be worked out. But even they want to know how to go

about it. The American Medical Association is likewise interested, the American Public Health Association is also interested, and I am quite sure all of you are interested. It is one of the things to be done in the future. I would like to have each of you for the next few hours, at least, think over whether you have a program in your mind for the next 12 months. Many of you are now either carrying out a preliminary survey or have carried it out. I believe there are about 18 States out of the group that have done something on it. I believe a total of almost 24 States have done something on it. That is going to be pretty well behind you. Are you going to take up specific surveys? It is worth while considering even for your own information. A number have already done so. You may want to ascertain that. You may want to modify or use a little bit different method. Do you want to put your greatest emphasis on trying to obtain reports of occupational diseases? Do you prefer to try to develop methods through industry of keeping records of absenteeism due to illness? Do you prefer to try to establish in your States a closer cooperation and integration with your local health department? I think those are all things you should try to think over as time goes on. I thank you.

DR. GRAY: Dr. Sayers knows very well that we suggested in that questionnaire what we thought was our most difficult problem. I know of nobody better fitted to suggest some

possible way of getting about it. Let us, then, take those questions and those of you who have some opinion as to the best way of doing these things, we would like you to get up and discuss the situation. I think it was Dr. Tillson of Virginia who wanted to know what this increased area of industrial hygiene--how it would affect people who are already doing this work--I mean looking for cases of venereal disease, tuberculosis and cancer--how those who are engaged specifically in doing this work would feel about it. I think Dr. Sayers has already answered that pretty well, but I think there may be some additional information he can tell us that would be to the point. Just what he feels in that regard a bureau of occupational diseases should do. We found in analyzing these questionnaires that there were 11 States that wanted to know how they could better secure occupational disease reporting. Dr. Sayers has had something to say about that. I would add this. I think it important and desirable that we secure these cases of occupational disease. We must realize also that we can still go on and do a very good job, even with the rather limited morbidity reporting we are getting, because as individuals who are more or less informed about the possibilities of potential hazards, we know the possibilities exist even if they are not reported. And certainly it is desirable at this conference to find means by which this may be improved, but it is still possible to do a good deal of

work in preventing their occurrence without even knowing they are occurring, because they are not reported as such. Eleven States wanted to know about occupational disease reporting. There were 2 that wanted to know about a plan for morbidity reporting. Dr. Sayers said something about that. He told you how certain industries have already worked out methods for doing this, and probably one of the most important things is that we see that it is done in a like manner by all of us in order that the results will be comparable and we can utilize all the results that we get.

MR. BLOOMFIELD: You men who are doing preliminary surveys will recall that on the first questionnaire, the general questionnaire, you are obtaining information as to what firms have adequate sickness records. And I think this is a clue as to where you can go for information of this sort. If you want to bring about a plan of morbidity reporting to the State health department, go back into those plants and see if the records are adequate. Try to persuade the management to help in getting this information to you by giving them some plan or some uniform type of record keeping. Some of you have not yet had an opportunity to analyze these surveys, but 5 or 6 States already have, and we learn that about 50 percent of the workers are covered by sickness records.

DR. GRAY: I would like to ask if anybody has made an attempt to secure from industry reporting of morbidity? I know the Public Health Service has a number of industries already who are reporting their morbidity records in the method that has been suggested. I wonder if there are any industrial hygiene units who have approached industry to see if they could secure records. Are there any in the conference? May we ask what your experience has been, Dr. Pharris?

DR. PHARRIS: My experience has been limited to surveys. Wherever I found them keeping sickness records, I have asked them to give us this information. They have indicated that they would. I think that is our best source of information as far as Tennessee is concerned. We are still concerned with the survey and haven't gone on with it, but some day we will try to get periodic reports from these industries.

DR. GRAY: There is probably no reason why they shouldn't keep on giving reports, and probably they would like to have a method of keeping these records. It is desirable so that the results may be comparable.

DR. KRONENBERG: In one plant where we conducted a survey of 3,000 employees, they turned over their sickness records dating back 5 years, and promised to furnish their absenteeism records regularly. We hope to extend that to at least 100 plants in Illinois which we will spot from the survey forms.

DR. GRAY: Dr. Sayers, may I ask whether the various members of the conference are familiar with the method you would like to have reports sent to you?

DR. SAYERS: We have been receiving sickness records for absences lasting 7 days or longer on about 200,000 individuals. We want better sickness records than that, down to one day or longer. That is the difficult part. However, just as Dr. Pharris and Dr. Kronenberg have mentioned, it is very much worth while doing. We found, for instance, in one large group of workers that the record had never been analyzed by anyone. And the presidents of these industries were surprised to know

that they had never been analyzed. They didn't know, and said sure, go ahead and analyze them. They put men at work and asked the Public Health Service to show them how they should go about it in order that their data will be comparable. Another large industry has started for the past two years to keep records on a plan developed by the Public Health Service. We would like these to be kept in as uniform a manner as possible, and if you decide to go on this part of the program, I would suggest that we get in touch with each other and try to carry it out in a uniform manner. And further, we would give them the service, if they are not able to do it themselves, of compiling and analyzing them. We will compile and analyze them and send them a report provided they will permit us to use their records.

MR. DYKTOR: My experience has been rather unfortunate. I approached a half dozen or so firms having records, and they felt that they were already hounded to death by various government institutions for information, and figuratively, they told me to go to blazes. I explained the situation to them and explained how to put the thing over, and they told me "sorry". That has been my experience.

DR. GRAY: Well, I think the story is just to keep at it and go back and see if you can get them, and insinuate the method the Public Health Service has suggested as to the proper way of doing it. That seems to be simple. We will have to do some

more difficult things than that. If any of us are thinking of instituting this course of procedure, it would be well to get in touch with the Public Health Service and make sure it is the type of information being obtained from other types of plants.

The next question on the questionnaire was the development of industrial hygiene services under handicaps of fund and space limitations. Well, gentlemen, we can't do anything about that. All of us have been through that, and you have just got to be better than the other fellow. You have to watch and see when the Commissioner of Health has had a good dinner and see if you can't get a piece of his money. It is your job.

We next have a question of handling workers who are found on examination to have pulmonary tuberculosis. I am going to ask those of you who have had that experience to tell us what you feel about it. It seems to me, from my understanding of the problem as it now stands, that if I found people with tuberculosis, I would let that be handled in the regular way that the tubercular individual is handled by the public health authorities in that particular locality. I doubt whether I would even suggest that he go to his family physician. I would feel that was a job for the tuberculosis association or the tuberculosis bureau in the locality. We would sell the man the idea of having something done, and take him and introduce him to the best people to take care of him. In other words, I would not

feel in many of these conditions--if I found tuberculosis or venereal disease or cancer--that I would attempt to take care of the situation except to persuade the man or individual that he needed to get under proper supervision. I would like to call on those of you here who have had that experience. I know Dr. Judd in Barre and Dr. Tillson in Virginia have had this experience. I would like to ask you what you do in those cases.

DR. JUDD: We do the same thing as we do with every case. We make a complete report of physical examination and X-ray to the family physician as a confidential report. We tell nothing to the patient. The family physician then does what he will with the case. As a rule in the type of cases we have had, they have not been turned over to the tuberculosis association directly. A few cases of tuberculosis not complicated with silicosis have been turned over to the sanatorium.

DR. DIGGER: In our case finding, after making an X-ray picture, those films are sent to the sanatorium and developed and read there, with the list of names of positives--1+, 2+, 3+, 4+. If his chest is negative, we simply mark "negative" after the name on the list. If there are any positive findings the men in the sanatorium who are experts give us a picture of this chest on a report. In other words, they write out what they see on the examination of the film, and also add recommendations for what should be done for this particular patient. In many instances

these men reexamine these people when they go into our field tuberculosis unit. They will call for these men to be reexamined and possibly x-rayed again, when they are visiting that particular county where the man came from. In many cases where incipient tuberculosis is found, they advise just what to do. Maybe a little more rest, a little better care of themselves, a little more nutritious food. When they go home at night, in place of going to a picture show and staying out until midnight, they tell them to go to bed. They tell him, "If you will take care of yourself, you probably can work every day and live a normal life." Always in my work, when we have finished a plant, I have all the positive tubercular reactors in a bunch, and I talk to them and tell them what I know about tuberculosis and advise them what to do.

DR. GRAY: I simply mention that as a personal opinion. When we find cases that are not occupational, we have to dispose of them as they are disposed of by the instituted authorities. I think we must be very careful that we don't attempt to get into that type of person who knows more about more and nothing about everything. That is what we are liable to become if we try to tell tuberculosis people what to do, if we try to tell the cancer people what to do. I think we have to be more like a family physician who knows how to diagnose and treat certain things, but who is more or less a screen through which to send his patients to those who are better able to give it to him. I

think we must be a bit careful that those things we do find that are not in our particular domain, that we don't take too much upon ourselves, and certainly if we do we are going to have and deserve, more or less, the condemnation of those whose work it is to do these other things. I think it is a very definite answer, that we are best able to act as a screen. We are very much better able to go over those cases and find the venereal disease and possibly pick them out and the other ordinary conditions that affect health, because it would not be possible for one expert to make an examination of a group to see whether they had cancer, and another to see whether they had tuberculosis, and another to see if they had venereal disease. We, as a matter of fact, are in a peculiarly excellent position to examine those men and to act as a screen. Because not only has industry confidence in us, but labor has confidence in us as well. When I was on a coal study in Wilkes Barre, we had a good bit of trouble getting the men to come in for physical examination. I took an office next to the principal speakeasy in the town and I got to know the speakeasy proprietor very well. So I said, "Joe, push us a few through. Tell them I am not such a bad fellow." That was the way we got our first few examinations. After they got to know we had nothing up our sleeve, that we were really trying to do them a service, we had them coming to us then so that we had to drive them away. The men were bringing their wives in to see if the wives were pregnant. What had we done? We had succeeded in getting the confidence of these people. And nobody has the confidence of the people like the people who

are working as closely as we are. We have a wonderful opportunity to act as a screen. We must see that we don't attempt to do those things for which already properly instituted agencies are organized.

Then we come to differentiating between an occupational disease and an accident. Should the division consider accidents? Well, I don't know. I suppose it is dependent upon how you are constituted. We don't. We definitely don't. That is a job for the Department of Labor. Somebody said that an occupational disease was chronic. That depends upon what you mean by chronic. Dr. Sayers, have you anything to add to that?

DR. SAYERS: There are some parts of accidents where the medical profession needs to come in, but the laws control, more than science or theory can control, whether you should or should not. In certain State health departments, accidents are part of their duties. In certain others they are not part of their regular functions. However, if you are thinking of industrial hygiene, accidents are part of it. Because, according to the best data we can obtain, the mechanical control of accidents is really a very small phase.

DR. GRAY: I think you would clear up a number of these if you had morbidity reporting, and if it has been in vogue for some time, I think your accidents will necessarily go down. I think it would affect your accident possibility.

The next question is, "Should the division sponsor or guide legislation on industrial hygiene?" I should say, let

your conscience be your guide. Maybe sometimes you have to, but it is dynamite. Certainly we ought to be able to be in a position to do so if we are asked. But I rather feel that we as industrial hygienists have not much to do with it. That is an administrative problem for the Health Commissioner, and I think it is best to talk it over with him. Certainly, if you have any idea that legislation is going to harm you, you should go right to him so he can sell the idea. If we putter in it ourselves, we are likely to get our fingers hurt. Does anybody wish to talk on this question?

The next question is, "Should the results of physical examinations be made known to the employer or employee?" Dr. Judd has just stated that they don't tell the employee. Do you tell the employer, Dr. Judd?

DR. JUDD: Only in rare instances, where they have made a request especially for it and we felt it was worth while, because otherwise we would probably not do the examination at all. In that case, I have tried to protect myself and the department by getting each man individually before I examined him to sign a statement stating he wished the company to have a report as well as his family physician. I think in that way you avoid potential trouble.

DR. GRAY: I should say from my experience if you can get a large group of men to sign that you could sell the Brooklyn Bridge to a New Yorker. As I said, in Vermont you do things differently. That may account for it. It just shows the way

these things can be done. Dr. Judd can get the men to sign a statement that he wants his employer to know. It shows it can be done. Now, most of us would say you just can't do it. I know when I went down to Wilkes Barre for the Public Health Service to examine coal miners, and asked the owner to let us get into the mine, and told him we wanted to examine the miners and fit the physical conditions with the environment, they said, "That is fine". Several said, "I have often wanted to know whether there is anything the matter with them or not." We explained we couldn't tell them and they saw why. They were quite willing they shouldn't know. And when we explained to the union, and the union was of the type that the speech I made had to be translated into two other languages, I knew they were between me and the door, and I said to the secretary, "What is the matter with them?" He said, "They are just chewing the fat. They just want to know what you are going to do." One of the others translated it into two other languages, and after we got old Joe on the job, they realized what we were doing. We didn't tell the men's wives what we found. That worked also very well for the doctors. When they found those cases trickling in, as the result, they were very glad we came and were sorry to see us leave. I would be interested in the experience of any of you in the conference who have given the results of examinations to employers. How do you feel about it?

DR. DUGGER: This is right down my alley. In going into a plant to do this work, it must be sold to the employer. I talk to

the employer first. When I sell him on the idea of making physical examinations in his plant, then I must sell the employees. We never go into a plant to work until we have talked to the employees and sold the idea to them. In many instances they shut down machines, we call them all together, and I talk to them. I tell them the benefits to be derived from this examination, tell them about syphilis, about tuberculosis, be frank with them, and tell them that if they have syphilis they should not be ashamed of it, that 40 percent is innocent syphilis, and they should get well of it. And I tell them frankly when this report is made each of them will receive a letter showing their condition and what we find. Then a list will be given to the employer, and it is already understood with the employer that none of them will be fired or anything said about what we find. And after that is done, the examination is made, the report is made, and each receives a letter. Many of them have different physicians. Some have mill physicians. Some mills have a physician, and he looks it over and interprets the findings. We don't tell anyone he has syphilis. We simply put down the laboratory report, and 1+, 2+, or whatever it might be. We let the physician interpret it for him. He doesn't know whether it is negative or positive until the physician tells him. It is up to them for treatment. They know how to go into syphilis clinics that will be established all over the country. They have come into the city as well as in the State. The legislature has appropriated $100,000 to begin this program. It will be from

Social Security. Our clinic will be established and the doctors will be paid so much an hour for working in these clinics and patients that are not able to pay will report to these clinics.

DR. GRAY: I think if we get various ideas and various methods by which this examination is carried on, we may realize it is a question of possibly the type of industry which method we will have to utilize. As a matter of fact, I like to be able to tell a man what he has. I wonder if you just send the report to the physician and the man is notified, whether it isn't a bit more practical than if that were suggested in the first place. Dr. Dugger has made it work. It is a practical demonstration, and the same happened in Barre. It just shows what can be done and in a fashion we haven't thought possible.

DR. TILLSON: We have had very little experience with this in Virginia, but the little experience we have had shows that the employers, as well as the employees, have wanted to know the results of these chest examinations. We gave them those reports. We have had no trouble. I don't think any of the employers felt they wanted to discharge anyone. We explained the situation to the employer, and he notified the men, or if the men were close at hand, we notified each man. They all wanted to know and we gave it to them. It seems to me that possibly it may be a good thing to do that because if there is a case of tuberculosis or syphilis or silicosis found in examination, sooner or later they are going to have to know it if they are going to get that case out of industry and out of contact with other workers. Prob-

ably the patient as well as the employer is going to have to know sooner or later. We want to get an active case or a contageous case of syphilis removed from contact with other employees.

DR. GRAY: I can see a justification more thoroughly when you have an occupational disease. You should tell the employer when he has lead poisoning because you can be sure the employee is going to tell him anyhow. It seems to me, also, I can see very definite logic in telling a man he is a public health menace if he has syphilis in a communicable stage, or tuberculosis. I, however, prefer to be more inclined to handle that through accepted agencies. We send a notification to them, when something has to be done and have them get to him and suggest what is necessary. But I realize that different localities handle things in different ways. To me it is very interesting to see how this can be done in the wide variety of ways it is done. In the New England area where we have very strong unions, one of the very definite reasons that labor objects to physical examinations is that the employer gets to know about it, and then he gets the gate.

DR. EASOM: We have had this problem confront us from the very beginning, and we ordinarily do not report the worker's condition to the employer, unless it is indicated that he should be changed or should have medical treatment for his condition. In our preemployment examinations, of course, when we make a physical examination, we tell the man about such things as high blood pressure, heart disease, and so forth. After we have read

x-rays, if we find he has a pulmonary tuberculosis which is apparently healed, we will inform the man of this by letter and tell him we think he can probably continue at his present job under observation, and we also tell him the precautions he should follow in order to avoid a breakdown, and the symptoms he might expect if there is a flare-up of the disease. If he has active tuberculosis, we do advise sanatorium treatment and discuss it with the employer, if necessary. And we feel free to consult with the superintendent of the State sanatorium, and there is no question about advisability of sanatorium treatment. If it seems he should be changed or even discharged, we inform both the employee and the employer. In case of syphilis, we do as Dr. Dugger does. We pass the laboratory report on to the man and advise him to take it to his physician or health officer for interpretation.

DR. GRAY: I think I can see a very good reason for not telling him because, as Dr. Sayers stated, you hardly like to make a diagnosis of syphilis on one serologic examination. The next question is a program for local health department participation. You will have to work that out with your local health departments. Dr. Sayers said something about that. We try to take technical personnel around with us. We have as many as we can handle come up to us. One of the men told us that if we did much more with his men he would not be able to keep going. They have to have some training and one way is to keep the men in constant contact

with us. We have tried to furnish them with a dissertation on some of the simpler factors that they may come in contact with, a form they can fill out with regard to some of the simpler problems in industrial hygiene. Would anyone like to talk on what they have done to foster the idea in some local department of health?

DR. SMITH: In our survey in Ohio the city of Cleveland has requested to be permitted to go ahead and survey the whole city rather than just a sample, and they will give us a copy of the surveys.

MR. BLOOMFIELD: I wish to discuss the question raised by Dr. Spolyar--how to get funds to carry on a preliminary industrial hygiene survey. It seems to me that here is your opportunity to sell industrial hygiene to your local community. We have been fortunate in being able to do so in quite a few States. We are doing it in Arkansas today. The industrial hygiene survey in Arkansas is being done in cooperation with district health departments. In Utah, where the Public Health Service carried out a survey recently, it was done by 6 medical men from the counties and 6 engineers. In other words, district and county health people. The same scheme was followed in Maryland, in Maine and in Colorado. This plan serves two purposes. In the first place, you get the survey done in a hurry. But, what is more important, we feel that you have more or less exposed local health unit personnel to the problems of industrial hygiene

in their own area, and industries become acquainted with them and they become acquainted with industry. You have sowed the seeds for a future program of integrating the central organization work with the people out in the field who can be of most service to you. Dr. Sayers has suggested that I mention Rockford, Illinois. Rockford cooperated on the survey in Illinois, and as a result of this contact, Dr. Kronenberg was invited down there and Rockford now has some permanent personnel engaged in industrial hygiene activities.

DR. GRAY: The next problem is the cooperation of industry and the medical profession in the industrial hygiene program. We have spoken about that, about what we have done, and Dr. Sayers spoke about that in particular. I think if there are any other questions, I am sure Dr. Sayers and Mr. Bloomfield are not exhausted yet. Are there any other questions you would like answered?

The meeting adjourned at 4:45 p.m.

Morning Session, Wednesday, June 29, 1938.

(See Page XVIII)

Afternoon Session, Wednesday, June 29, 1938.

The meeting was called to order at 1:00 p.m. The motion picture "Stop Silicosis!", prepared by the United States Department of Labor, was shown.

DR. GRAY: The chair will now entertain the consideration of any unfinished business. Mr. Dyktor.

MR. DYKTOR: I have prepared a short statement which I would like to read. I do not wish to talk extemporaneously, as I may speak straight from the shoulder and say some things I will regret.

You will agree with me, I am sure, when I say that yesterday we had a most interesting day. Every one of us got something out of the discussions.

There was only one thing that struck me, and that was the similarity of our aims and troubles. The reason for this similarity is obvious. We are all governmental industrial hygienists with no other objective than to do well a nice piece of health work. We have no other aim than to serve the people of our community. That is the reason why two years ago quite a few of us conceived this conference. According to Section 4 of Article 3 of the constitution, the membership is

restricted to "persons regularly employed by Federal, State, local and Territorial governments who are engaged in industrial hygiene activities". Now, I am agreeable personally to amend the constitution so as to permit other members of our various governmental industrial hygiene units to join this conference because that will still be within the restrictions made in the section I have just read to you. However, I am opposed to permitting persons not regularly employed in industrial hygiene or employed by commercial institutions because if we do that then our conference will cease to exist as such, and will merely become another organization competing with or duplicating the existing large organizations, such as the American Public Health Association, and so on. To my mind our conference must stay restricted to governmental officials because only then will we feel free to discuss our problems frankly as we did yesterday. In fact, I am looking forward to a still better meeting next year when we shall have a chance of "tearing apart" the committee reports in addition to further individual discussions. Now that I have had my say, I should like to have some other member give his views on the proposition to leave our constitution as is except for the slight modification concerning future associate members.

DR. GRAY: Are there any comments on Mr. Dyktor's statement? Mr. Dyktor feels that associate members should be restricted to those in government agencies, and should not include persons in any other health work outside of the government.

MR. BLOOMFIELD: Regarding Mr. Dyktor's prepared statement, he simply raised an objection by inference. Nevertheless, I gather that he objects to that portion of Section 4A which reads: "Personnel of educational institutions who are engaged in teaching industrial hygiene". Suppose I read this section of the amendment to you. "Section 4A. Associate members shall be limited to persons regularly employed by Federal, State, local and Territorial governments who are engaged in industrial hygiene activities, and personnel of educational institutions who are engaged in teaching industrial hygiene. They shall be eligible to serve on committees but not to hold office or act as chairmen of committees."

MR. DYKTOR: If we permit associate memberships to teachers of industrial hygiene (I do not mean to speak disparagingly of them, for I have the utmost respect for them), I feel that as time goes on we will want to get bigger and larger and will open our doors to industrial hygiene engineers or physicians in industrial organizations and insurance companies. We shall then lose sight of our original aim--to have a strictly governmental organization. We have argued this point over and over, and I recommend that we restrict membership to government agencies.

DR. GRAY: Of course, the constitution also says that the Executive Committee shall pass upon those which they consider eligible to belong to the organization. I do not think that you have need to fear that engineers and physicians from industrial

organizations and insurance companies will be permitted to become members. I can see with Mr. Dyktor that there may be reason for other openings. Will you please consider what Mr. Dyktor said? I rather feel that there is a wide divergence--the commercial or insurance company engineer, and instructors--but it would be a much wider breach to let them in than it is to suggest permitting the university professors to come in as associate members. I feel that there would be very little likelihood of commercial and insurance engineers and physicians entering our organization. Some of us have seen this situation and its effects in the American Public Health Association. Many commercial industries have memberships in this organization--the American Public Health Association--and they have a marked effect upon what is done by the Association. The suggested amendment will be sent to the members, by letter, and it has to be ratified by two-thirds of the members before it becomes a section of the constitution. There is ample time to express your approval or your disapproval of this suggested change in the constitution.

MR. DYKTOR: I do think that before you suggested such an extensive amendment to the constitution, and with all due respect to the Executive Committee, the members of this conference should have been consulted, because as you know when you send out these ballots the easiest thing in the world is to sign your name, send the ballot back, and say, "Oh, well, I don't exactly

agree with what is here, but why say anything." We should give this question a little thought before breaking up. I am very much interested in this conference, and I greatly desire that the membership in this conference be restricted to governmental agencies.

DR. GRAY: As Mr. Dyktor said before, I now say, I must not speak too straigat from the shoulder. But I do not think that we will break wide open. The conference had an opportunity to express their opinions as to whether the Executive Committee report should be accepted, but it should probably have taken more time and given more consideration to it before accepting. I cannot be too emphatic in saying that two-thirds of the members must vote in favor of an amendment before it can be adopted, and I feel that if after this discussion, and after the explanation of the Executive Committee, an individual should just sign the ballot because it is sent to him, there is nothing that can be done about it. Is there any further discussion on this? Does anyone feel that bringing teachers from universities in as associate members will upset the conference?

DR. DEERY: It is my belief that many of the units that are represented here are in some way connected with their State universities. I know the California unit is connected with the University of California, and possibly the Indiana outfit operates with the University of Indiana. Under these conditions it seems to me that we could consider these institutions government agencies--especially in regard to their industrial hygiene

divisions. We are dependent upon such sources for a good deal of our research, and if we should cut off their membership, it would be like cutting off our right hand.

MR. DYKTOR: Mr. Secretary, will you please read Section 4 again, that members shall be limited to two persons regularly employed by Federal, State, local and Territorial governments who are engaged in industrial hygiene activities?

Mr. Bloomfield complied with Mr. Dyktor's request.

DR. GRAY: I am quite sure none of them would like to come in unless they are definitely and directly invited by the constitution. You know what Dr. Deery said is true. We are not only going to get something from these people, but we are going to tell them what we want. And it is a little different from the commercial attitude. I should say it is very much different from that. I feel quite sure that those from the universities would be very willing to listen as to what we feel is desirable or necessary. We may get a good deal from them. One way to get it is by pretty close association. Mr. Dyktor's idea is to keep our conference pretty well closed.

DR. SCHULZE: I just want to endorse what you said. In our own experience in Baltimore with the Johns Hopkins University School of Hygiene, I am sure they would like to be represented and should be represented. We cooperate with them and they cooperate with us, and I am sure it would be a great help to have them with us.

MR. HEPLER: When I heard the Executive Committee's report on Monday, it was my understanding that the associate membership was to permit other members of our staff to have some connection with this organization. I got the impression we were simply opening the doors to the rest of the members of our staff to have some connection with our group. The discussion seems to be running into a question of admitting educators. I would like to ask that the new proposal be reread at this time so that I, at least, can get this straight in my mind--who are we going to admit?

MR. BLOOMFIELD: (Mr. Bloomfield reread Section 4A)

DR. GRAY: The vote, of course, still remains with the members, not with the associate members and affiliate members.

DR. JUDD: Will it be possible to present this amendment in letter form in two manners so that this particular phrase, that in some persons' minds is undesirable, may be either included or excluded and the remainder of the amendment remain?

DR. GRAY: I think, Doctor, that is going to unnecessarily complicate the thing. I would like more opinion from the floor as to whether you feel that including the universities engaged in teaching the subject is undesirable.

DR. KRONENBERG: We owe our State University a debt of gratitude, because were it not for the University of Illinois our Division would not have had any quarters when we were created. The University accepted us with open arms. They not only provided

space, but in their new medical school building have set aside a section of rooms which will be made available for a full teaching course in industrial hygiene in 1940, when the new budget is prepared. And the man who is responsible for this has been interested in industrial hygiene since 1926. He feels that this is the new field in public health, and if we are going to do anything for the future medical profession, the State University is the place to start. I am sorry, but I just don't agree with Mr. Dyktor.

DR. DEERY: Would it be possible to write another amendment to take care of Mr. Dyktor's objection, that never at any time would membership be proffered to commercial interests or underwriters?

DR. GRAY: I see the point. The fact is that just as you can't hold a congress to its future work, this congress can't hold the next congress as to what it is going to do. We might put it in and it may be changed at any time. This constitution isn't something that can't be changed. If the next officers come in and they decide something else is desirable, it could be presented to the conference and voted upon by them. Now we already have the vote of the conference on the fact that this may be presented in letter ballot. The Secretary has a suggestion to make.

MR. BLOOMFIELD: I simply want to suggest this. I am sure the Chair will entertain a motion to reconsider our vote on Monday

and take another vote, and present this all over again in different phraseology, and take a vote on the question. I don't think that we need to wait and see how the letter ballot comes out. According to the constitution, we can adopt amendments by a two-thirds vote of all voting members. So you still have an opportunity while we are meeting to amend the constitution. I don't know whether we have any parliamentarians here or not. I am not one, but possibly someone else may be.

DR. GRAY: Is it possible under those circumstances if we have a two-thirds attendance here to pass that without a letter ballot?

MR. BLOOMFIELD: We have to submit an amendment by letter ballot, but we can adopt a dozen amendments by a two-thirds vote of all the voting members. I understand that most of the voting members are present.

DR. GRAY: We might, as the Secretary suggested, reconsider that article, Section 4A, as to the constitution of the associate members. Then we could put the question to the conference as to whether they wish to accept it as it is or whether they would wish that the teachers in universities not be permitted to become associate members. Would that be satisfactory?

DR. SAYERS: Before you go any further, you might read the next section, section B, for affiliate members.

MR. BLOOMFIELD: That section deals entirely with foreign officials.

DR. SAYERS: I think you want to give a little consideration as to just who you want to pick out of a particular group to vote one way or the other.

MR. BLOOMFIELD: The affiliate members are also confined to governmental officials, and the only part opposed to is that

dealing with personnel of educational institutions. Otherwise, they are all government officials.

DR. SAYERS: May I ask one other thing? Voting here today means that it is just voting whether it shall be submitted by letter ballot or not?

MR. BLOOMFIELD: Yes.

DR. GRAY: Although I think that if the majority present suggests that those associated with universities shall be left out of Section 4, that will be left out in the submission of the ballot to the members.

DR. SAYERS: Yes, if it loses here it would not be in the letter ballot.

DR. GRAY: That's right. Dr. Schrenk.

DR. SCHRENK: May I offer a suggestion? You had a three-day meeting. Why not have the first day, for example, more or less of an open meeting to which you invite guests, and then confine the second and third days to the same group you have now or to yourselves?

DR. GRAY: I see your point, Dr. Schrenk. I wonder if it would not be a rather difficult thing to invite someone for one day of a three-day meeting. I am inclined to think that it would be better to invite a person for the three days, even though he may not even be an associate member. What do you think, Dr. Sayers?

DR. SAYERS: We have just gone through with this same story elsewhere. That is, of restricted membership. They undertook to amend the constitution, and they have been doing just what

Doctor Schrenk suggested, and it has been working successfully for a few years. The amendment to the constitution was put over for another year. They didn't say yes or no. They put it over in hopes of working out a plan that would be more agreeable to the whole group. In other words, they felt that membership should not be so easy. They felt that this other group was worthwhile and should be associated with them, but to come in as members on either an associate basis or as regular members, they thought they should be a little careful about what they did. I may suggest one thing. I am favorably impressed with the amendment. I may suggest another thing. It has been brought to mind by Mr. Dyktor that we are government workers. It has been questioned by the State Health Officers as to whether we should exist, in view of the Industrial Hygiene Section of the American Public Health Association. My reply to those particular officers was that it was not applicable. The American Public Health Association did not serve our purpose. We should keep that in mind.

MR. BLOOMFIELD: Are you referring to the clause regarding personnel of educational institutions or to associate members as a whole?

DR. SAYERS: I think it is to the educational institutions. I think that is not too serious. There are a few that we would like to have present, at least part of the time. There are only a limited number; you can count them all on the fingers of one

hand. So it really does not mean very much at the present time. I think those people would come in, and they are broadminded enough to understand. However, the group I had in mind thought that they should think it over for another year before they invited additional desirable personnel--and they were desirable personnel. I think much of that is true in this case. I don't think there is much question in our minds as to the desirability of the personnel.

DR. GRAY: Mr. Dyktor is afraid that if we let somebody in that will be an excuse for somebody else.

MR. BLOOMFIELD: Of course, I do want to call to the attention of the members that the title of this organization, being the National Conference of Governmental Industrial Hygienists, has a limiting influence.

MR. DYKTOR: I am very tolerant and agree fully with what has been said. But the impression seems to be abroad that I am opposed to the personnel of educational institutions per se. Nothing is further from my mind than that. I yield to no one in my respect, admiration and adulation for these men. I know them personally, and I think they are very desirable men. I think perhaps they may be of very much higher caliber than some of us are. So therefore there is no personal animosity whatever. What I had in mind was just to stick to our own meeting. We are more or less engaged in health work. We are paid to do just that work. But at the same time we are responsible to our State Health Officers or local health officers. They are not. And

so far as I am concerned, it does not matter very much either way. I shall still belong to and still do my best to promote the existence of this conference. But at the same time, I wanted to have my say and give my opinion so that there may be no misunderstanding in the members' minds, because although some of them agree with me, they do not care to get up and say so. It seems that I alone must carry the battle, although I am a pacifist at heart. I am not for war. Whatever you decide will be alright with me.

DR. PHARRIS: We have done a lot of talking. I would like to suggest that this proposed amendment be divided so that we can vote on whether or not other members of the various governmental organizations might come in if we wish; another section as to whether we will take in representatives of educational institutions. Those who are in favor of Section 1 can pass on that, and those who are not can vote against that, but vote for the other members of the various governmental agencies to belong to the conference. As it stands, some of us are objecting to educators strongly and would vote against the other men coming in.

DR. GRAY: I would suggest that a motion be made that we reconsider Section 4A, and it is the sense of the meeting that we should do that. We can make a motion asking those who wish to have included in the constitution the men connected with educational institutions and find out whether that is a majority or not. If it carries, then it will go through. If it is lost, they won't be considered

as associate members.

DR. GRAY: If I hear a motion that Section 4 be reconsidered, we will put it to a vote.

MR. JOHNSON: I would like to make a motion that we do not reconsider Section 4A of the constitution as amended in the report of the Executive Committee.

DR. NAU: I second the motion.

DR. GRAY: A motion has been made and seconded that we do not reconsider Section 4A of the constitution as passed on Monday. All in favor say aye--all opposed nay. Motion carried. It still has to be voted by letter ballot, however. It seems definitely the sense of this meeting, at least the majority of this meeting. Is there anything else to be brought up before the conference? If there is nothing else, I shall call on Dr. Deery to read the resolutions presented by that Committee.

DR. DEERY:

Resolution I

Known to all men whom these presents meet, greetings.

Whereas, the National Conference of Governmental Industrial Hygienists have enjoyed a most successful and profitable initial meeting and being mindful of its debt and obligation to many who have worked faithfully and diligently in its behalf, it is therefore

RESOLVED, that the Conference is particularly grateful to Doctor Sayers for aiding the organization, and it is further

RESOLVED, that it recognizes and appreciates the fine services rendered by Mr. Bloomfield and the various committees; and it is further

RESOLVED, that it is indebted to the United States Public Health Service for making available a place in which to hold the meeting; and it is further

RESOLVED, that a copy of these resolutions be spread upon the minutes of the Conference.

RESOLVED, voted and proven by the Conference in session at Washington, District of Columbia, this twenty-ninth day of June, Anno Domine One Thousand Nine Hundred and Thirty-Eight, and in the one hundred and sixty-second year of our independence.

Resolution II

WHEREAS, the organization of governmental and other technical units for the improvement of industrial sanitation has recently been and is still progressing and growing so as to affect a considerable number of engineers, and

WHEREAS, the National Conference of Governmental Industrial Hygienists is interested to promote this advancement, and

WHEREAS, through Conference members who are also members of the American Society of Civil Engineers it has been learned that a symposium was held at the Society's annual meeting, January 23, 1938, with papers and discussions by E. B. Phelps,

J. J. Bloomfield, G. M. Fair, T. Hatch, C. L. Pool, S. Pincus, and Doctor Soper, et al, on the subject of The Engineering Aspects of Industrial Sanitation, and

WHEREAS, the Society's Sanitary Engineering Division moved and passed that the previously written and stenographically recorded discussion be put in form for distribution, and,

WHEREAS, the only material which has appeared was in abstract form in the Civil Engineers Manual, 1938, pp. 166-167, covering only: "Aspects of Air Sanitation", by E. B. Phelps, and "The Engineer in Industrial Sanitation", by J. J. Bloomfield, and

WHEREAS, it is understood that the Society has had or now has this symposium under advisement publication in "Proceedings", be it

RESOLVED, that this Conference in Executive Session through the Resolutions Committee to convey to the American Society of Civil Engineers expression of their interest in the subject and of the thought that the publication of this material would prove of wide interest, therefore be it further

RESOLVED that this society express the hope that this material can be published in the "Proceedings" and that letters of discussion may be accepted, not only from members of the Society but from others interested in industrial hygiene.

RESOLVED, voted and proven by the Conference in session at Washington, District of Columbia, this Twenty-Ninth Day of June, A. D., One Thousand Nine Hundred and Thirty-Eight, and in the

one hundred and sixty-second year of our independence.

Resolution III

Known to all men whom these presents meet, greetings.

WHEREAS, the National Conference of Governmental Industrial Hygienists is a group organized to study, promote, indemnify, enrich and preserve the health of the workmen throughout the several States, Territories, Counties and Municipalities of this great Commonwealth, the United States of America, and

WHEREAS, at this present, its First Annual Meeting, called in Washington, District of Columbia, on the 27th, 28th and 29th days of June, A. D. 1938, it has been observed and sensed that the common band holding the several groups represented here together, namely, Industrial Hygiene, is rapidly growing in scope and knowledge, and

WHEREAS, these several groups, many of which were conceived and fostered by the United States Public Health Service, are amassing vast experiences and tomes of agenda from private investigations, which material is of interest and common good to all amalgamated here, and

WHEREAS, these groups working in widely separated and widespread areas are quickly maturing and giving evidence to wit: by the rise of independent thought, and

WHEREAS, these groups are not yet aged enough, nor willing ever, to sever that bond of filial devotion to their author and

life-blood, the United States Public Health Service; and

WHEREAS, it is deemed urgent that these groups seek a medium to collect, evaluate and edit the stores of good gathered and possessed by single units and disseminate them into the hands of all here represented, and

WHEREAS, the United States Public Health Service, our parent, has had meritorious experience in this field of work, and

WHEREAS, their staff is adequate in numbers and qualifications to do this work well, then be it

RESOLVED that it is the consensus of this Conference that the Surgeon General of the United States Public Health Service be humbly requested to direct the Division of Industrial Hygiene of the National Institute of Health to act as a clearing house for such information as may be desirable to distribute to the members of the Conference, within the limitations of its personnel and appropriations, and be if further

RESOLVED that a copy of this resolution be presented to the Surgeon General of the United States Public Health Service, appraising him of our desire in this regard.

RESOLVED, voted and proven by the Conference in session at Washington, District of Columbia, this twenty-ninth day of June, Anno Domine, One Thousand Nine Hundred and Thirty-Eight and in the one hundred and sixty-second year of our independence.

DR. GRAY: Do I hear a motion that we accept these resolutions?

MR. JOHNSON: I move that the resolutions be accepted.

MR. DYKTOR: I second the motion.

DR. GRAY: Motion carried. Is there any further business to come before the conference? I am ready to hear a motion to adjourn.

MR. ROTHMANN: I move that this conference adjourn.

DR. NAU: I second the motion.