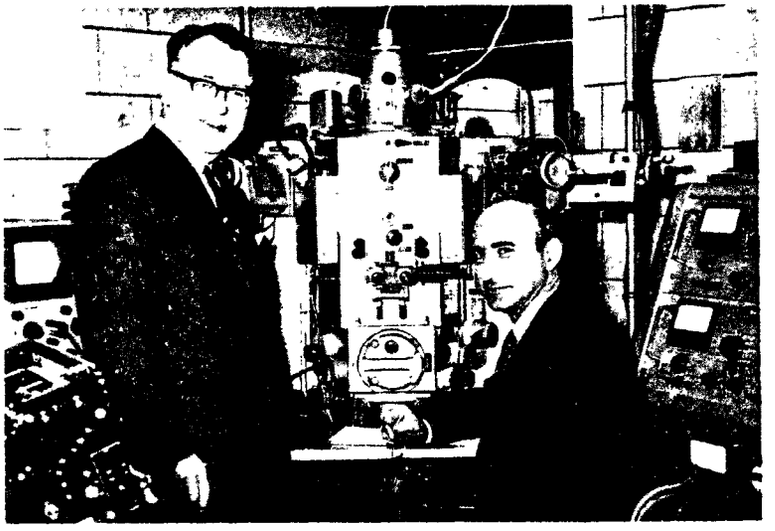
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INDUSTRIAL HYGIENE FOUNDATION OF AMERICA, INC.



1966 ANNUAL REPORT

4400 Fifth Avenue
Pittsburgh, Pennsylvania 15213

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CONTENTS

Board Chairman's Message

Report of Managing Director.

Committee Reports.

32nd Annual Meeting Dates.

Annual Meeting Photos.

News Coverage.

Board of Trustees.

Financial Summary.

Publications.

IHF Members.

COVER

Mellon Institute's Electron Microprobe is being used by the Industrial Hygiene Foundation to help identify the fibrous cores of ferruginous (so-called asbestos) bodies (see page 4). Shown by the microprobe are Dr. G. A. Webb, Director of Administration, Mellon Institute, and Dr. R. T. P. deTreville, Managing Director, Industrial Hygiene Foundation.

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AN IMPORTANT MESSAGE FROM:

E. K. DAVISON
CHAIRMAN
BOARD OF TRUSTEES

I am happy to announce that Industrial Hygiene Foundation's (IHF) financial situation is greatly improved over last year. The response of the Foundation's members to the dues increase in 1966 has been very gratifying. It has helped correct the slight deficit which had been recurrent for several years, but even more important to the Board of Trustees, it has given a strong positive indication of continued interest on the part of the membership on which to build new IHF programs.



However, the need for increased income in future years becomes more evident when we consider the proposed merger between Mellon Institute and Carnegie Institute of Technology to form a new university, Carnegie University. While there is no reason to expect a change in our relationship with Mellon Institute in 1967, it is obvious that after the merger becomes effective, the Foundation cannot expect Carnegie University to continue subsidization of IHF. We must, therefore, anticipate need for increased funding to make up this expected deficit in succeeding years.

Since 1935 Mellon Institute has regularly subsidized the Foundation's operations. When I became Chairman of the Board of Trustees, I recognized the impropriety of our dependence upon the continued generosity of an endowed research institution in support of an association of industries. Freedom from need for such aid would be an indication of sound management of our affairs in the accomplishment of the Foundation's mission in support of its membership. Our thanks is extended to Mellon Institute for its contribution for so many years and for its continued generosity in offering to extend such support to the Foundation again in 1967 despite expected completion of plans for the Carnegie University merger in the near future.

The Board of Trustees will continue its efforts to insure the Foundation's financial integrity. Increased income from projects and expanded membership is expected and the Board will need the help of the full membership to guarantee the continuity of our Foundation as an independent organization.

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REPORT OF MANAGING DIRECTOR

ROBERT T. P. DE TREVILLE, M. D.

Industrial Hygiene Foundation of America, Inc., formed by industry in 1935 to help support enlightened management of environmental and occupational health research and education at the national level, continues in its efforts to further genuine health conservation of workers and the public without unduly hampering technological progress.



The Board of Trustees, containing a broad sampling of industries, administers the affairs of the Foundation under a charter from the Commonwealth of Pennsylvania and By-Laws. As is traditional, members of the Board of Trustees were elected at the 31st Annual Meeting of the Membership and the officers were elected by the Board in a session immediately following the Membership Meeting. All outstanding professional, technical or top management representatives, the Trustees share a common interest in hazard control and health conservation.

IHF's headquarters and research laboratories, located in Mellon Institute, occupy a total of about 10,000 square feet. Location within Mellon Institute also has the distinct advantage of providing the Foundation with expert technical advice and use of costly equipment, such as the electron probe shown in the cover photo. The 20 professional, technical and secretarial persons employed by Mellon Institute and assigned full time to IHF are, therefore, considerably augmented, as needed, by Mellon Institute's staff of about 500, half of whom have advanced scientific degrees.

In addition, to aid in developing its programs on the highest possible level, the Foundation has obtained the agreement of experts from other research and educational institutions to assist in IHF programs of environmental and occupational health as Advisory Fellows of Mellon Institute. Close working relationship is also maintained with representatives from various branches of government, particularly the U. S. Public Health Service, Division of Occupational Health, which has assisted IHF in many of the research and educational projects by providing funds, facilities, consultation and other forms of support, as exemplified by the Mental Health Project, Fibrous Dust Studies and some of the other laboratory projects.

IHF benefits greatly from close proximity and professional relationships with the University of Pittsburgh Graduate School of Public Health. Drs. David Minard, William E. Rinehart and Morton Corn of the Department of Occupational

Industrial Hygiene Foundation of America, 1966 Annual Report (1966)
ACL Doc 24498 · Page 4 of 17
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Health and Dr. Antonio Ciocco of the Department of Biostatistics have appointments as Advisors to the Foundation, and Drs. Gross and deTreville of IHF are Adjunct Professors in the Department of Occupational Health. Theodore F. Hatch, Professor Emeritus of Industrial Hygiene Engineering of the University of Pittsburgh, who retired in 1966, continues to serve the Foundation as Trustee and as an advisor in matters of research and policy.

RESEARCH LABORATORY

The Foundation's experimental research is performed by Dr. Paul Gross, Director of the Research Laboratory, and his staff. During 1966, the following significant progress was made.



Emphysema Study. In the investigation of emphysema, a study has been concluded on the effects of chronic exposures of nitrogen dioxide and of papain on the lungs of small laboratory animals burdened by common industrial dusts. Contrary to expectations, the prolonged exposure to high concentrations of nitrogen dioxide (25 to 75 ppm) did not result in a more extensive involvement of the lungs by emphysema in animals with pneumoconiosis than in normal animals. Papain-induced emphysema tended more commonly to be localized in lung tissue not affected by dust than in regions where dust is stored. (Sponsor: American Iron and Steel Institute.)

A related study, now in progress, deals with the effects on the lungs of small laboratory animals of sulfur dioxide and nitrogen dioxide adsorbed on activated carbon, when the latter is inhaled as a dust. Also being studied are the effects of the inhalation of industrial dusts upon an established emphysema. (Sponsors: American Iron and Steel Institute, American Petroleum Institute, Automobile Manufacturers Association, Inc., Bituminous Coal Research, Inc., and Manufacturing Chemists Association.)

Asbestos Bioeffects. A four-year investigation on the effects of the inhalation of chrysotile asbestos dust on the lungs of hamsters, rats and guinea pigs is nearing completion. In addition to the determination that the fibrogenicity resulting from chrysotile dust approximates that of quartz dust, it was found that asbestosis in hamsters is a progressive, nonhealing, and fatal disease; whereas in rats, the disease is nonprogressive and heals. Also, it was found that 26 percent of the asbestotic rats developed primary lung cancers. One of these tumors was a malignant primary pleural mesothelioma. (Sponsor: U. S. Public Health Service.)

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JM - 83

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Fibrous Dust Study. A four-phase investigation dealing with the pulmonary effects of fibrous dusts has begun: Phase I is concerned with the production of "curious" or so-called "asbestos" bodies by the lung in response to fibrous dusts. It was found that such bodies were formed not only in response to asbestos fibers but also to certain other inorganic fibers. These bodies, regardless of the character of the central fiber, are composed of an iron-containing protein. Because of this common characteristic, the name "ferruginous" body has been proposed to replace the above terms. (Sponsors: U. S. Public Health Service, Division of Occupational Health, Johns-Manville Corporation, Owens-Corning Fiberglas Corporation, Pittsburgh Corning Corporation and PPG Industries.)

Phase II is concerned with the nature of the carcinogenic component of chrysotile. Implicit in this investigation is the assumption that the crystalline hydrated magnesium silicate of which chrysotile is composed, is not carcinogenic. This assumption is partly based on the finding that synthetic chrysotile (prepared by Dr. W. T. Granquist of Mellon Institute) is biologically inert. Synthetic chrysotile has been injected intratracheally into rats alone and in combination with various trace metals known to be associated with natural chrysotile. Benzopyrene also has been added to the various combinations with synthetic chrysotile injected intratracheally. (Sponsors: Johns-Manville Corporation, Owens-Corning Fiberglas Corporation, Pittsburgh Corning Corporation and PPG Industries.)

*Phase III has been developed at the request of the asbestos industry but is still under discussion. It proposes a comparative study of the pathogenic components of the three main types of asbestos dust, chrysotile, amosite and crocidolite.

*Phase IV, begun late in 1966, has two parts. The first is an investigation of the development of ferruginous bodies in the lungs of hamsters. This work (in cooperation with Dr. R. V. Rice of Mellon Institute) involves the electron microscopic examination of hamster lung tissue in which these bodies have been demonstrated to be developing. (Mellon Institute's electron probe, shown on the cover of this report, originally cost around $100,000 in 1962 and about $30,000 has been added for various improvements.) The second part is concerned with the identification by means of electron-probe analysis (in cooperation with Dr. L. F. Vassamillet of Mellon Institute) of the central fiber of the ferruginous bodies found in 30 to 48 percent of the lungs of the general population of large cities.

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* Full support has not been obtained for Phases III and IV of the fibrous dust project, but in view of the interest expressed by representatives of the Foundation's membership, it is expected that sufficient funds will be forthcoming in the next year to complete and perhaps extend these studies.

Industrial Hygiene Foundation of America, 1966 Annual Report (1966)
ACL Doc 24498 · Page 6 of 17
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Prerequisite to this study was the development of a method for isolating and concentrating the ferruginous bodies in human lungs which has been satisfactorily accomplished. (Sponsors: National Institutes of Health and U. S. Public Health Service, Division of Occupational Health.)

Lung Clearance Study. In a study of the clearance mechanism of the lung, a lung dust burden is imposed upon hamsters and rats. One series, composed of three groups, is exposed to quartz, antimony trioxide and ferric oxide dust, respectively. Another series, also composed of three groups, receives the same dusts by intratracheal injection. Subgroups of these animals receive a small amount of mineral oil on top of the dust burden. The number of cells recoverable from the lungs by washing (modified technique of La Belle and Brieger) are counted at various intervals after the imposition of the lung dust burden. The cell counts will be correlated with a histopathologic study of the lung sections. (Sponsor: U. S. Public Health Service.)

Mechanism of Action of Silica. A study in collaboration with Dr. Heinrich Brieger, Professor Emeritus, Jefferson Medical College, of the fibrogenic potential of stishovite, a polymorph of silica, is nearing completion. The results of this investigation indicate a seemingly anomalous situation. This crystalline form of SiO_2 is biologically inert.

Experimental Oncology. An attempt is being made to develop a model for determining the potential of suspected materials to develop lung cancers. Rats and hamsters were exposed to x-ray irradiation over the chest according to a previously established technique (de Villiers and Gross: Cancer 19:1399-1410, 1966). About one-half of the irradiated animals were then given intratracheal injections of DMBA (dimethylbenzanthracene) with ferric oxide. The requirement for an acceptable model is the prevalence of lung cancer in either species significantly higher in animals that received the irradiation plus DMBA than in the animals that received irradiation alone, at a dose level of DMBA that, by itself, is sufficient to produce lung cancer. (Sponsor: U. S. Public Health Service.)

Range-Finding Toxicity Studies. Range-finding toxicity studies on compounds used in industry are conducted in the Foundation's laboratory under Dr. Gross and his staff with the assistance of Dr. William E. Rinehart. A Chemical-Toxicological Bulletin describing the results, in tabular form, of 43 compounds tested over a number of years for several member companies was recently made available to the membership.

Dr. Gross was assisted in the laboratory full time in the above studies by Mary Ann Babyak, Guy E. Dent, Marianne Kaschak and Ethel Tolker. Additional assistance was obtained from Dr. Morton Corn, Theodore F. Hatch and Dr. William E. Rinehart of the University of Pittsburgh Graduate School of Public Health.

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JM - 83

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ENVIRONMENTAL AND OCCUPATIONAL HEALTH PROGRAMS

During the year a number of studies were performed in the field for member companies ranging from evaluation, diagnosis and control of occupational disease hazards to the development of baseline environmental information on the sites of new plant construction. IHF's long-term study of sulfur dioxide in the Beaver Valley air basin, reported by Corn et al in 1966 ("Observations From a 26-Year Sulfur Dioxide Area Survey." Arch. Environ. Health 12:445-451, April 1966) was continued. Theodore F. Hatch visited Europe to assess the progress of research in coal miners' pneumoconiosis in order to assist the Foundation in developing its program of research in support of the coal industry.

Occupational health surveys of employees exposed to dusts thought to be inert in one plant of a member company were initiated in 1966. Analyses of personnel and health records spanning a twenty-year period and clinical studies, including pulmonary function, chest x-ray and dermatological evaluation, are either in progress or planned. Information obtained will create data based on human experience in industry with measured exposures to materials of potential or unknown pathogenicity. One purpose of this study is to help develop and validate threshold limit values on the materials involved. Dr. Antonio Ciocco, Chairman, Department of Biostatistics of the University of Pittsburgh Graduate School of Public Health, developed the statistical research protocol. Dr. George Wright, Head of Medical Research Department, St. Luke's Hospital, has suggested clinical and laboratory investigations. Dr. Donald J. Birmingham, Professor and Acting Chairman of the Department of Dermatology and Syphilology, Wayne University, will also assist by evaluating dermatological requirements of the study. Experience gained in this project will be used in preparation of the Foundation's central data repository. The Chemical Industry has expressed interest in extending this program.

MENTAL HEALTH PROJECT

Results obtained from a successful experimental course in Employee Mental Health and Industrial Nursing Practices, given by IHF in 1964, were the basis for a grant of $639,522, for a five-year training program, from the National Institute of Mental Health on July 1, 1966. This grant helps cover the costs of developing improved means of measurement of the mental health problems in industry, and of estimating success of control procedures used by occupational health personnel, especially nurses. The American Institutes for Research in Pittsburgh will receive the major portion of the National Institute of Mental Health grant, for its important part involving research psychologists and technicians, with whose help educational tools are being created and tested in selected companies in the Foundation's membership which are, in essence, serving as a pilot plant. Several member companies have agreed to help support the program by permitting their personnel and facilities to be used without charge. This IHF study exemplifies a constructive working partnership between government, private institutions, universities and industry.

Industrial Hygiene Foundation of America, 1966 Annual Report (1966)
ACL Doc 24498 · Page 8 of 17
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PUBLICATIONS

The Industrial Hygiene Digest, containing selective abstracts from a wide range of literature on environmental and occupational health, is now in its 31st year and continues to be the major publication of the Foundation with a monthly distribution of over 2000 pieces. Dr. John Metschl, Editor, excerpts articles from the literature dealing with current developments in legal matters, industrial medical practice, skin diseases and burns, chemical hazards, industrial dusts, physical aspects of the environment, radioactivity and x-radiation, environmental measurements, community air hygiene, management aspects, and accidents and prevention. Members of the staff assist Dr. Metschl by alerting him to items of particular interest and Dr. deTreville provides reviews of outstanding books. The Digest also features news items, a calendar of coming events and Foundation Facts (brief report of IHF activities). Copies are available to industrial companies only through membership in the Foundation, but because of the demand for IHF publications from governmental agencies and educational institutions (who are not eligible for membership), subscriptions are permitted on a very limited basis to these agencies.



The Second Decennial Index, constituting an index of all abstracts appearing in the Digest over the ten-year period from 1955 through 1964, was distributed to members in January, 1966. Additional copies are available upon request.

Special bulletins are prepared periodically by the Foundation's various technical committees. Medical Series Bulletin No. 10, "Emphysema in Industry," has received very favorable reviews in current medical and technical journals. Annual Meeting Transactions representing a "yearbook" of environmental and occupational health are also published. These publications, taken together, provide a distinct service to member companies.

FUTURE PROGRAMS

New projects are being considered under the following headings and progress in these will be reported in the Industrial Hygiene Digest Foundation Facts, Quarterly Reports and other publications in 1967:

1. Central Data Repository for setting and validating threshold limits.
2. Chronic Disease Aggravation Study.
3. Evaluation of effectiveness of industrial health practices.
4. Industrial Hygiene Program Budget (see Transactions of 31st Annual Meeting).

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JM - 83

Industrial Hygiene Foundation of America, 1966 Annual Report (1966)
ACL Doc 24498 · Page 9 of 17
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COMMENTS FROM CHAIRMEN OF IHF TECHNICAL COMMITTEES

ENGINEERING

For the third successive year the Foundation has scheduled its Engineering Discussional. Attendance at these meetings is restricted to IHF members only to aid exchange of ideas and information on industrial hygiene and pollution control engineering problems, their measurement and solution. Subjects scheduled for the January 1967 Discussional included industrial hygiene aspects of confined space ventilation, heat stress, industrial waste disposal and legal aspects of air pollution.

An Engineering Bulletin on The Water Quality Act of 1965 was distributed. Also, a new service to engineers initiated in 1966, the Engineering Committee Information Exchange Capsule, has been favorably received and will be continued.

Lester V. Cralley, Ph.D.
Aluminum Company of America

CHEMICAL-TOXICOLOGICAL

As a result of Chemical-Toxicological Committee efforts, the American Conference of Governmental Industrial Hygienists' Threshold Limit Committee recognized IHF as an Anonymous Data Repository for data on industrial exposure experience. The second annual Chemical-Toxicological Workshop on Threshold Limit Values was scheduled.

During the year a Bulletin on the 1967 Statement of Intent was published and work was completed on a proposed Bulletin summarizing range-finding toxicity data from studies performed in the Foundation's research laboratory.

Joseph F. Treon, Ph.D.
Atlas Chemical Industries, Inc.

MEDICAL

Sick absence, group health insurance, data processing of industrial health information, epidemiological studies, improved small plant medical services (through a system of IHF consultants), and recruitment, training and placement of physician candidates for careers in occupational health in industry continue to be matters of active concern. Proceedings of the Foundation's Symposium on Emphysema were published as Medical Series Bulletin No. 10 during 1966.

Daniel C. Braun, M.D.
United States Steel Corporation

LEGAL

Liability from occupational and non-occupational claims concern the Foundation's Legal Committee. Special attention is given to potential problem areas such as noise, radiation, threshold standards and emphysema. Legislative developments are followed and reported to the members.

The Legal Committee's coordination was provided on several Foundation publications including Emphysema in Industry (IHF Medical Series Bulletin No. 10).

Andrew Kalmykow
American Insurance Association

Industrial Hygiene Foundation of America, 1966 Annual Report (1966)
ACL Doc 24498 · Page 10 of 17
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NURSING

During the Annual Meeting, members of this committee who visited the American Institutes for Research reviewed progress in IHF's Employee Mental Health and Industrial Nursing Practices Study and were briefed by Miss Grace Fivars of AIR on the Critical Incident Technique as applied to the Foundation's project. A Nursing Series Bulletin is in preparation on this subject. Miss Mary Louise Brown, R.N., Chief, Occupational Health Nursing, U. S. Public Health Service and speaker at the 31st Annual Meeting, was present.

Mrs. Adele Miller Brownlee, R.N.
General Electric Company

IHF SETS OCTOBER 10-11 ANNUAL MEETING DATES

The 32nd Annual Meeting of IHF will be held again at Chatham Center in downtown Pittsburgh. Facilities of the new center so ideally suited the Foundation's needs in 1966 that the Board of Trustees requested that we return in 1967. Previously, all meetings had been held at Mellon Institute.

Visits to the research facilities at Mellon Institute can be arranged upon request.



Discussing Nursing Committee activities at the 31st Annual Meeting are three members of the Committee: Mrs. Helen Kunzler, R.N. and Miss Alda Sica, R.N. of U. S. Steel Corporation and Miss Winifred McLanahan, R.N. of the University of Pittsburgh Graduate School of Public Health.

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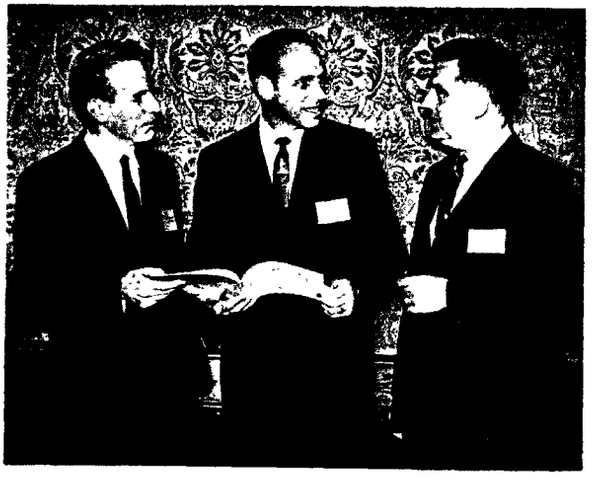


Signing in for the 31st Annual Meeting of the Industrial Hygiene Foundation held October 18-19 at Chatham Center.



Photographed at the traditional opening luncheon attended by almost 300 guests and members.

SPEAKERS—MEMBERS COME TO PITTSBURGH TO EXCHANGE OCCUPATIONAL—ENVIRONMENTAL HEALTH VIEWS



E.I. du Pont de Nemours & Co., Inc. representatives: G. J. Stopps, Chief, Physiology Section; J. W. Clayton, Assistant Director, Haskell Laboratory, and F. T. Bodurtha, Engineering Division.



Dr. R. Schneider, Medical Director, Standard Oil Co. of New Jersey and Dr. J. G. Keller, Toxicologist, a speaker at the meeting.

Industrial Hygiene Foundation of America, 1966 Annual Report (1966)
ACL Doc 24498 · Page 12 of 17
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OFFICERS AND MEMBERS OF THE BOARD OF TRUSTEES

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Vice Chairman: Dr. ANNA M. BAETJER
Vice Chairman: ANDREW KALMYKOW
Secretary: Dr. H. H. SCHRENK
Treasurer: THEODORE F. HATCH
Managing Director: Dr. R. T. P. deTREVILLE

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ELGIN D. SALLEE
American Can Company

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Standard Oil Company (New Jersey)

Dr. JOHN F. SHRONTS
General Mills, Inc.

Dr. G. R. SIMMONS
Western Electric Company, Inc.

Dr. KENNETH W. SMITH
Johns-Manville Corporation

Dr. HENRY F. SMYTH, Jr.
Mellon Institute (Union Carbide Fellowship)

DOUGLAS SOUTAR
American Smelting & Refining Co.

Dr. JAMES H. STERNER
Eastman Kodak Company

LEO TEPLOW
American Iron & Steel Institute

Dr. JOSEPH F. TREON
Atlas Chemical Industries, Inc.

Dr. G. ARTHUR WEBB
Mellon Institute

Dr. JOHN A. ZAPP, Jr.
E. I. du Pont de Nemours & Co.

Trustees Emeritus: Dr. Philip Drinker, Fitzwilliam, New Hampshire
Theodore C. Waters, Baltimore, Maryland

Industrial Hygiene Foundation of America, 1966 Annual Report (1966)
ACL Doc 24498 · Page 13 of 17
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FINANCIAL SUMMARY OF IHF OPERATIONS

I.	Income:	A. Dues	$ 88,000
		B. Laboratory	
		1. Projects handled for M.I. (NIH support)	33,000
		2. Short-Term Projects for Industry	13,800
		3. Emphysema Project (AISI, Auto. Mfg. Assoc., API, BCRI and MCA)	45,000
		4. Environmental & Health Studies (Field Work)	13,200
		5. Fibrous Glass & Asbestos Industries Projects	38,750
		C. Administrative	
		1. Nurses Continuing Education (NIMH)	5,000
		2. Coal Workers Health Study (NCA)	5,000
		3. Annual Meeting	3,471
		4. Engineering & Chem-Tox Conference	2,385
		5. Digest and Special Publications	6,893
		D. Interest on Savings	1,136
		TOTAL	$ 255,635
II.	Expenditures:		
		A. Mellon Institute Contract	$ 152,826
		B. Credit for Mellon Institute Contract Work	33,000
		C. Engineering & Chem-Tox Conferences	2,385
		TOTAL	$ 188,211
		EXCESS OF INCOME OVER EXPENDITURES*	$ 67,424

* Above income accounts include payments in 1966 for laboratory work to be completed in 1967.

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1966 PUBLICATIONS

Industrial Hygiene Digest (monthly)
Industrial Hygiene Digest Annual Index
Industrial Hygiene Digest Second Decennial Index 1955-1964
31st Annual Meeting Transactions (1966)
Engineering Committee Information Exchange Capsule

BULLETINS:

Chemical-Toxicological Series

No. 4 - Emergency Exposure Limits and Hygienic Guides—Sources of Information
No. 5 - Threshold Limit Values (Recommended Revisions and Additions for 1967)

Engineering Series

No. 5 - International Audiometric Zero
No. 6 - Water Quality Act of 1965

Legal Series

No. 5 - A Serious Threat to Workmen's Compensation
No. 6 - The Walsh-Healey Public Contracts Act
No. 7 - Rehabilitation

Medical Series

No. 10 - Emphysema in Industry
No. 11 - Asbestos Bioeffects Research for Industry

REPRINTS:

Aerosol Deposition, Clearance and Retention
Alveolar Clearance: Its Relation to Lesions of the Respiratory Bronchiole
Dust Particles in Lung Sections
Morphologic Changes Induced in the Lungs of Hamsters and Rats by External Radiation (X-rays). A Study in Experimental Carcinogenesis.
On the Theory of Silicosis
Opportunities for Research in Pulmonary Pathology
Silicotic Bronchiolitis Obliterans

Industrial Hygiene Foundation of America, 1966 Annual Report (1966)
ACL Doc 24498 · Page 15 of 17
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Abrasive Grain Association
Abrasive Products Company
Acme Abrasive Company
Air Preheater Company
Alcolac Chemical Corporation
Allegheny Ludlum Steel Corporation
Allegheny Pittsburgh Coal Company
Allied Chemical Corporation
Aluminum Company of America
American Abrasive Company
American Can Company
American Emery Wheel Works
*American Insurance Association
American Iron and Steel Institute
American Metal Climax, Inc.
American Mining Congress
*American Mutual Insurance Alliance
American Optical Company
American Potash & Chemical Corp.
American Smelting & Refining Co.
American Zinc Company
American Zinc Institute, Inc.
Anaconda Company
Armco Steel Corporation
Armstrong Paint & Varnish Works, Inc.
Asbestos Textile Institute
Atlas Chemical Industries, Inc.
Automobile Manufacturers Association, Inc.

Frank Bancroft Company, Inc.
Bartlett-Collins Company
Bay State Abrasive Products Company
Beryllium Corporation
Blanchard Machine Company
Boeing Company
Buckeye Abrasive, Inc.
George H. Bullard Company, Inc.
Bunker Hill Company
Butler County Mushroom Farm, Inc.

Can Manufacturers Institute, Inc.
Carborundum Company
Celanese Corporation
Central Silica Company
Chicago Wheel & Manufacturing Co.
Chrysler Corporation
Cincinnati Milling Machine Company
  Cincinnati Milling Products Division
Robert F. Coleman, Inc.
Colonial Abrasive Products Company
Comalco Aluminum (Bell Bay) Limited
Companhia Siderurgica Nacional
Consolidation Coal Company, Inc.
Continental Can Company, Inc.
Corn Products Company
Cortland Grinding Wheels Corporation
Creole Petroleum Corporation

A. P. deSanno & Son, Inc.
Diamond Alkali Company
Dow Chemical Company
Dravo Corporation
E. I. du Pont de Nemours & Company

Eastman Kodak Company
Edmar Abrasive Company
Electric Storage Battery Company
  Willson Products Division
Electro Refractories & Abrasives Corp.
Equitable Life Assurance Society of the U.S.
Ethyl Corporation
Exolon Company

Ferro Corporation
FMC Corporation
Foote Mineral Company
Ford Motor Company
Foundry Facings Manufacturers Assn.
Fuller Merriam Company

Gardner Machine Company
Geigy-Werke Schweizerhalle A.G.
General Abrasive Company, Inc.
General Electric Company
General Grinding Wheel Corporation
General Mills, Inc.
General Motors Corporation
Georgia Kaolin Company
Glenshaw Glass Company, Inc.
M. J. Gordon Company
Grinding Wheel Institute
Gulf Oil Corporation
Gypsum Association

Hall China Company
Hamilton Emery & Corundum Company
Hampden Grinding Wheel Company
Hanford Occupational Health Foundation
Hanson Company
Hazleton Laboratories
Hercules, Inc.
  Drakenfeld Division
Hughson Chemical Company

Inland Steel Company
International Business Machines Corp.
International Nickel Company
  Huntington Alloy Products Division

Johns-Manville Corporation
Jones & Laughlin Steel Corporation
Jowitt & Rodgers Company

Kaiser Aluminum & Chemical Corp.
  Kaiser Refractories Division

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* Multiple Membership

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Kennecott Copper Corporation
Keystone Brass Works, Inc.
Koppers Company, Inc.

Laundry & Cleaners Allied Trades Assn.
Laverack & Haines, Inc.
Lead Industries Association
London Transport Board

Macklin Company
Manufacturing Chemists Assn., Inc.
Marcona Mining Company
Maryland Self-Ins. & Empl. Comp. Assn.
J. S. McCormick Company
Merck and Company, Inc.
Metropolitan Life Insurance Company
Mid-West Abrasive Company
Miles Laboratories, Inc.
Mine Safety Appliances Company
Minnesota Mining & Manufacturing Co.
Mobil Oil Corporation
Jesse S. Morie & Son, Inc.

Nalco Chemical Company
  Freeport Division
National Coal Association
National Crushed Stone Association, Inc.
National Glass Sand Corporation
National Grinding Wheel Company, Inc.
National Industrial Sand Association
National Insulation Manufacturers Assn.
National Lead Company
National Sand & Gravel Association, Inc.
National Slag Association
Nederland du Pont de Nemours N. V.

Osborn Manufacturing Company
Ottawa Silica Company
Owens-Corning Fiberglas Corporation
Owens-Illinois Glass Company

Pacific Grinding Wheel Manufacturing Co.
G. H. Packwood Manufacturing Company
Pennsylvania Glass Sand Corporation
Pennsylvania Mfrs'. Assn. Ins. Co.
Perkin-Elmer Corporation
Petroleo Brasileiro S.A.
Philadelphia Quartz Company
Pittsburgh Activated Carbon Company
Pittsburgh Plate Glass Company
Pittsburgh Steel Company
H. K. Porter Company, Inc.
  Simonds Worden White Works
Portland Cement Association

Raybestos-Manhattan, Inc.
  Manhattan Rubber Division
Red Hill Grinding Wheel Corporation
Republic Steel Corporation
H. H. Robertson Company
Robertson Manufacturing Company

Safety First Supply Company
St. Joseph Lead Company
Sandia Corporation
Sauereisen Cements Company
Simonds Abrasive Company
Sinclair-Koppers Company
Soap and Detergent Association
Sperry Rand Corporation
  Louisiana Army Ammunition Plant
Standard Oil Company (New Jersey)
Stauffer Chemical Company
Sterling Grinding Wheel Company
Sturm, Ruger & Company, Inc.
Sugar Beet Products Company

Tata Services Limited
Tennessee Copper Company
Texas Gulf Sulphur Company
Thiokol Chemical Corporation
  Reaction Motors Division
Titan Abrasives Company
Toms River Chemical Corporation

Union Carbide Corporation
United States Potters Association
United States Steel Corporation

Valley Mould and Iron Corporation
Van Straaten Chemical Company
Vesuvius Crucible Company

Wakefield Corporation
  Peninsular Grinding Wheel Division
Waltham Grinding Wheel Company
Washington Mills Abrasive Company
Wedron Silica Company
Western Electric Company, Inc.
Westfield Grinding Wheel Company
Westinghouse Brake and Signal Company, Ltd.
Westinghouse Electric Corporation
West Virginia Pulp and Paper Company
  Bleached Board Division

Industrial Hygiene Foundation of America, 1966 Annual Report (1966)
ACL Doc 24498 · Page 17 of 17
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