LEAD INDUSTRIES ASSOCIATION
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METALLIC LEAD PRODUCTS DIVISION

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INTRODUCTION

In a letter to the Secretary of the Interior, the President of the United States said:

"The agencies of the Federal Government are being called upon to assist private, state and municipal interests in finding a solution of air pollution problems. During the past two months the interested Federal agencies have conferred informally on various aspects of this problem. It is my desire that these activities now be officially organized and that efforts be directed toward summarizing our present knowledge of this difficult subject."

Thereupon the Secretary formed an Interdepartmental Committee on Air Pollution which, in turn, organized the U. S. Technical Conference on Air Pollution held in Washington, D.C., on May 3, 4 and 5, 1950.

This conference was attended by staff members of the Lead Industries Association and the following is a list of those papers presented at the Conference which may be of particular interest to members of the Association. Names and addresses of authors are given along with abstracts of the more significant papers.

Summary reports by Dr. Louis C. McCabe, chairman of the Interdepartmental Committee on Air Pollution and Dr. J. O. Townsend, chairman of the Health Panel are being sent to members as Lead Hygiene and Safety Bulletin No. 75. Some extra copies are available and may be obtained upon request.

1. AGRICULTURE PANEL

SIMILARITIES BETWEEN DISEASE SYMPTOMS AND CHEMICALLY-INDUCED INJURY TO PLANTS, L. H. Massey, Cornell University, Ithaca, New York.

INDUSTRIAL CASES IN RELATION TO AGRICULTURE WITH SPECIAL REFERENCE TO HYDROFLUORIC ACID GAS, Vernon L. Miller, Western Washington Experiment Station, State College of Washington, Puyallup, Washington.

EFFECTS ON PLANTS OF IMPURITIES ASSOCIATED WITH AIR POLLUTION, Percy W. Zimmerman, Boyce Thompson Institute for Plant Research, Inc., Yonkers, N. Y.

2. ANALYTICAL METHODS AND PROPERTIES PANEL

PROPERTIES AND BEHAVIOR OF AIR CONTAMINANTS, H. F. Johnstone, University of Illinois, Urbana, Illinois.

MEASUREMENT OF CONCENTRATIONS AND CHARACTERISTICS OF ATMOSPHERIC CONTAMINANTS, Victor K. Lefler, Columbia University, New York, New York.

PHYSICAL PROPERTIES OF AEROSOLS, David Sinclair, Johns-Manville Research Center, Manville, New Jersey.

CHEMICAL ANALYSIS OF AIR POLLUTANTS, A. J. Haagen-Smit, California Institute of Technology, Pasadena, California.

METHODS FOR THE DIFFERENTIATION OF SULFUR-BEARING COMPONENTS OF AIR CONTAMINANTS, Morris B. Jacobs, Brooklyn, New York.

Although sulfur dioxide, sulfur trioxide, and hydrogen sulfide are in all probability the major sulfur-bearing air pollutants, other sulfur compounds may at times be present. Among these are carbon oxysulfide, peroxydisulfates many organic compounds such as the mercaptans and organic sulfides under special conditions carbon disulfide, and also free sulfur itself. Since the exact part that these compounds play, as well as other compounds, is not known, it is advantageous to have methods available which will differentiate these pollutants. Methods of sampling and analysis can be arranged for the separation of the various sulfur pollution components. Thus sulfur trioxide, sulfuric acid, the sulfates, and free sulfur may be trapped by an acid-free filter paper while sulfur dioxide, for instance, being a true gas, will pass through. The sulfur trioxide may then be estimated titrimetrically as sulfuric acid. Total sulfate can be determined with barium and after subtraction of the acid equivalent, the amount of sulfate can be ascertained. Free sulfur can be detected and estimated by a variation of the mercury doctor test. Sulfur dioxide may be estimated by a variety of methods which enable it to be distinguished from sulfur trioxide. A new method for its determination in air is detailed. Hydrogen sulfide may be estimated by the silver cyanide detector and by other methods. In an analogous way methods for other possible sulfur-bearing air contaminants are described.

3. EQUIPMENT PANEL

PROPERTIES OF AEROSOLS AS RELATED TO AIR CLEANING, T. H. Rodebush, University of Illinois, Urbana, Illinois.

DEVELOPMENT OF A DRY FIBROUS FILTER, Earl Stafford and Walter J. Smith, Arthur D. Little, Inc., Cambridge, Mass.

In recent years development work for the Atomic Energy Commission has led to the production of practical air filter units of extraordinarily high efficiency. These filters are made of a special asbestos-bearing paper arranged to get large surface in a small volume.

Normally occurring atmospheric dust particles in the size range of 0.2 to more than 1.0 microns [illegible] in millions of particles per cubic foot of air. [illegible] such as the new type filters show, by count, a collection [illegible] of 99.[illegible] or better. An effective method of measuring filter [illegible] against such small particles makes use of the high speed jet impactor.

Paper filters are more costly than the more usual ventilating type air filters and operate at a higher pressure drop. For most purposes a rough or dust removing device must be used ahead of the fine filter. This protects the clean-up filter against a high dust load, while the latter insures nearly complete removal of all particulate matter from the air stream.

CHARACTERISTICS OF FILTER BEDS, Leslie Silverman, Harvard School of Public Health, Harvard University, Boston, Mass.

SPRAY TOWERS, BUBBLE TOWERS AND PACKED TOWERS USING REACTIVE AND NON-REACTIVE LIQUIDS, J. Louis York, University of Michigan, Ann Arbor, Michigan.

Tower scrubbers are discussed as devices for removal of particulate matter and of vapors from industrial gases. Scrubbers are shown to be inefficient for particulate matter, but efficient for vapors. The desired properties of solvents, both reactive and non-reactive, are listed along with a discussion of the problems of disposal or regeneration.

The basic theory and operating principles of absorbers are outlined, with emphasis upon the important design factors of liquid-gas ratio, height, and diameter.

Different types of equipment are described and illustrated, with comments as to inadequacies and restrictions of design and structure.

Limitations, both technical and economic, of absorption systems for control of air pollution are discussed, with reference to other equipment where useful.

PEASE-ANTHONY CYCLONIC SPRAY SCRUBBERS, E. V. Kleinschmidt, Harvard University, Cambridge, Mass. and A. F. Anthony, Jr., Pease-Anthony Equipment Company, Newtonville, Mass.

The theory of operation is outlined briefly. High collection efficiencies are reported on aerosols down to about 1 micron, and excellent selective absorption of some acid gases and odors. Tabulated operating data, particle size information and pictures of installations where available, are shown for typical installations, including:

Dusts from rotary lime kilns
Lead oxide fumes from blast furnaces
Dusts of [illegible] gas
[illegible]
[illegible]
[illegible] pulverized coal
Absorption of sulfur oxides.

[illegible], W. P. [illegible], Chemical Construction Corp., New York, [illegible], and A. W. Ashbaugh, Jr., Peabody Engineering Equipment Company, Montonville, Mass.

Theories of operation are outlined briefly. High collection efficiencies are reported on acrosols down to about 0.2 micron, with good absorption of some acid gases and odors. The above operating data, particle size information and plots of installations where available, are shown for typical installations, including:

Salt cake fume from burning black liquor in the kraft pulp process
Iron oxide fume from use of oxygen lance in the steel open hearth
Mixed iron and zinc oxides from galvanized scrap in steel open hearth
Dusts of iron ore and coke from blast furnace gas
Secondary lead blast furnace on scrap battery plates
Secondary lead reverberatory furnace gas
Rotary kiln dryers on activated carbon
Sulfuric acid mists, from several sources
Phosphoric acid mist
Tar fog and acetic acid mist from distillation of wood
Mists of fluorine compounds from superphosphate "dens."

Several cases of enhanced performance are reported when the Venturi Scrubber was followed by the I-A Cyclonic Spray Scrubber.

PRINCIPLES OF DESIGN, APPLICATION AND PERFORMANCE OF DRY INERTIAL AND MOTOR POWERED DYNAMIC SEPARATION, Joseph Dalla Valle, Georgia Institute of Technology, Atlanta, Georgia.

THE PLACE OF HIGH STACKS IN AIR POLLUTION CONTROL, George R. Hill, American Smelting and Refining Co., Salt Lake City, Utah.

RAILROAD ACTIVITY IN REDUCING ATMOSPHERE POLLUTION, Earle C. Payne, Pittsburgh Consolidation Coal Co., Pittsburgh, Pa.

4. HEALTH PANEL

Single copies of the following papers presented at the Health Panel are available from the Association's office with the request that they be returned after they have served their purpose.

SHORT RANGE EXPOSURE TO HIGH CONCENTRATIONS BY AIR POLLUTANTS, J. G. Townsend, U. S. Public Health Service, Washington, D. C.

SKIN EFFECTS OF AIR POLLUTANTS, Marion Sulzberger, New York University, Post-graduate Medical School, New York, N. Y.

CHEMICALLY ACTIVE AIR POLLUTANTS, I. R. Tabershaw, Liberty Mutual Insurance Co., New York, N. Y.

EFFECTS OF [illegible] IN AIR POLLUTION, Arthur J. Vorwald, Stream Pollution Station, Sanitary Laboratory, Cornell Univ., New York.

STATISTICAL ASPECTS, Harold F. Dorn, National Cancer Institute, National Institute of Health, Bethesda, Maryland.

EXPERIMENTAL TOXIC ATMOSPHERIC EFFECTS FROM CHEMICAL AIR POLLUTION, F. W. Tittich, American College of Allergists, Minneapolis, Minnesota.

5. INSTRUMENTATION PANEL

INSTRUMENTS USED FOR THE MEASUREMENT OF ATMOSPHERIC POLLUTION IN GREAT BRITAIN, A. Parker and S. H. Richards, Fuel Research Station, Department of Scientific and Industrial Research, London, England.

The instruments most widely used for the measurement of atmospheric pollution in Great Britain are (1) the standard deposit gauge, which measures the total deposit in a given locality during one month, (2) the lead-peroxide instrument, for estimation of the comparative concentration of sulfur dioxide in the air over a period of one month, (3) the volumetric smoke apparatus and (4) the volumetric sulfur-dioxide apparatus, which measure over a 24-hour period the average concentrations in the air of smoke or other suspended impurity, and sulfur dioxide respectively. A description of these methods, which have been standardized for use by organisations co-operating in the investigation of atmospheric pollution, is given and their limitations are discussed.

Other instruments which have found application in Great Britain include the automatic recording air filter, the jet dust counter, and the thermal precipitator.

ATMOSPHERIC SAMPLING BY ELECTROSTATIC PRECIPITATION, F. C. Barnes, Westinghouse Electric Corporation, Pittsburgh, Pa.

AUTOMATIC APPARATUS FOR THE DETERMINATION OF SMALL CONCENTRATIONS OF SULFUR DIOXIDE AND OTHER CONTAMINANTS IN THE ATMOSPHERE, Moyer D. Thomas and James O. Ivie, American Smelting and Refining Co., Salt Lake City, Utah.

Two types of automatic analyzers to record the sulfur dioxide content of the atmosphere in the range from 0.01 p.p.m. to 1-10 p.p.m. or more are described. One machine draws an air stream at a definite rate for a fixed time, through a measured volume of water containing hydrogen peroxide. The latter converts the absorbed sulfur dioxide to sulfuric acid, the conductivity of which is recorded continuously giving both long and short time average concentration values. The other machine is a continuous countercurrent flow type which records the concentration "instantaneously," and also averages the data over definite periods of time.

Many modifications of the methods have been made for special purposes. The following gases have been determined [illegible] chiefly in the presence or absence of sulfur dioxide: [illegible] and phosphine [illegible] hydrogen fluoride in the presence of sulfur dioxide is under consideration.

THE POTENTIOMETRIC DETERMINATION OF ATMOSPHERIC SULFUR DIOXIDE BY IODATE SOLUTION, Morris Katz, Defence Research Chemical Laboratories, Ottawa, Canada.

THE CONTINUOUS MEASUREMENT OF SO_2 AND H_2S CONCENTRATIONS BY AUTOMATIC TITRATION, Harold W. Markburn and Robert R. Austin, Consolidated Engineering Corp., Pasadena, California.

NEW DEVELOPMENTS IN INSTRUMENTATION FOR AIR POLLUTION STUDIES, Cledo Brunetti, P. L. Magill, and F. G. Sawyer, Stanford Research Institute, Stanford, Calif.

6. LEGISLATION PANEL

STATUTORY REGULATION OF AIR POLLUTION: AN APPRAISAL OF EXISTING LAWS AND PROPOSALS FOR FUTURE LAWS, Richard P. Hansen, Legal Advisory Committee, Manufacturing Chemists Association, Inc., New York, New York.

Existing laws on air pollution are reviewed and a pattern for new legislation suggested. It is concluded that the solution to the problem of polluted air depends not on more legislation nor more stringent enforcement, but on more research.

Pending completion of essential research we should continue to reduce the quantities of foreign matter released to the air. But only when we have ascertained the relationship to health of various pollutants, alone and in combination, and found economical ways and means of reducing them, will we know how far we must and can go in clarifying the air. Until science has provided the answers to these questions, statutory regulations are bound to be abortive.

7. METEOROLOGY PANEL

METEOROLOGICAL ASPECTS OF ATMOSPHERIC POLLUTION, E. Wendell Hewson, Massachusetts Institute of Technology, Cambridge, Massachusetts.