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Industrial Hygiene Digest

INDUSTRIAL HEALTH NEWS

LITERATURE ABSTRACTS

MEDICAL

ENGINEERING

CHEMICAL

TOXICOLOGICAL

LEGAL . . . decisions and trends

APRIL, 1954
(Vol. 18, No. 4)

INDUSTRIAL HYGIENE FOUNDATION
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FOUNDATION FACTS

Foundation Facts is a monthly news-letter issued to industrial concerns holding membership in Industrial Hygiene Foundation. The Foundation is a nonprofit association of industries for the advancement of healthful working conditions.

Volume 16

April, 1954

No. 4

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DR. WALMER ON INTERNATIONAL PROGRAM

Dr. C. Richard Walmer, Managing Director of the Foundation, has been appointed a member of the Committee on Occupational Health Services, an advisory group to the Secretary General of the World Medical Association. The Committee will assist in drafting a program on international and occupational health. The specific aspect assigned to Dr. Walmer is Preventive Medicine, Environmental Hygiene.

FOUNDATION TRUSTEE AND COMMITTEEMAN HONORED

Dr. Anthony J. Lanza, a trustee of the Foundation, and Dr. Clarence D. Selby, a member of the Medical Committee, were presented citations for distinguished service in the field of industrial health by the American Medical Association. Dr. Lanza is director of the Institute of Industrial Medicine, New York University-Bellevue Medical Center. Dr. Selby is with the School of Public Health, University of Michigan. Both men have been outstanding leaders in the industrial health field and have done much to improve health conditions among workers.

FOUNDATION JOINT SPONSOR OF SEMINAR ON DUST DISEASES

A Seminar Series on Pulmonary Dust Diseases was held from March 1 through April 12 at the University of Pittsburgh Graduate School of Public Health, which jointly sponsored the lectures with Industrial Hygiene Foundation. Topics for the thirteen sessions were: Biologic Reaction to Dusts; Physics of Respirable Dusts; Dust as an Etiologic Agent; Permissible Dust--Review of Evidence; Sampling and Analysis; Histopathology of Lung Changes; Silicosis, the Clinical Entity; Siderosis; Coal Miners' Pneumoconiosis, English Studies (3 lectures); Definition of a Dust Disease Problem; Early Recognition and Control. The series was set up particularly for industrial physicians, radiologists and industrial hygienists and was well attended.

LEGAL COMMITTEE ENLARGED

The Legal Committee has added two new members to its roster. They are: Theodore Hetzler, Jr., of the National Association of Mutual Casualty Companies; and James J. Regan, of The Self-Insurers Association.

RESPIRABLE DUSTS CLASSIFICATION AVAILABLE

"A Classification of Respirable Dusts" prepared by Dr. O. A. Sander, Chairman of the Foundation's Medical Committee, has been reproduced as a membership service. Copies are available upon request.

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TABLE OF CONTENTS

	<u>Page</u>
Have You Read?	I
News Items	1
Occupational Disease Statistics	3
Legal Developments	4
Books, Pamphlets and Notices	5
Industrial Medical Practice	8
Skin Diseases and Burns	13
Chemical Hazards	17
Industrial Dusts	27
Physical Aspects of the Environment	30
Radioactivity and X-Radiation	36
Environmental Measurements	38
Preventive Engineering	40
Community Air Hygiene	41
Management Aspects	44
Accidents and Prevention	46
Miscellaneous	47
Index	48

HAVE YOU READ?

THE PROCEEDINGS OF THE FIFTH ANNUAL MEETING OF THE AMERICAN ACADEMY OF OCCUPATIONAL MEDICINE held in Rochester, N. Y., February 12-13, 1953. These proceedings include many excellent papers on the subject of experiences with numerous chemical compounds, dusts and fumes, others on industrial psychiatry, industrial noise, and the organization of medical service. Also included are discussions on a survey of 1100 individuals exposed to chlorinated solvents.

Four papers make up the symposium on The Translation of Experimental Toxicology Data into Practical Criteria for Plant Exposure. The first, by D. D. Irish, is on "Experience with Volatile Organic Compounds." Dr. Irish holds that the response of man to a toxic agent can be predicted with a high degree of probability by animal experimentation, in spite of the limited knowledge of animal work and its interpretation, provided the experiments are properly and thoroughly conducted. He describes some toxicological research dealing with the effects of chlorinated hydrocarbons. The results show some important differences between carbon tetrachloride, perchloroethylene, trichloroethylene, and methyl chloroform in their physiological action, especially in the difference between the concentration producing the slightest effect on brief exposure and the lethal concentration. The information points to methyl chloroform as a very interesting substance for practical use because an apparent lack of hazard. Similar but uncompleted work on several aromatic hydrocarbons is also described. Such animal investigations are essential in defining the proper use of substances and furnishing information for the clinic, the industrial hygienist, the consumer, and the legal department.

"Experience with Pharmaceuticals" by R. M. Watrous, is more cautious in tone. Without disparaging the value of toxicological research, he points out a number of limitations that apply especially in the pharmaceutical field. One is that the great variety of substances used in that field does not permit thorough research on each one. Moreover, factory experience often reveals an unexpected property which animal experimentation failed to show. As one example, in the manufacture of aminothiazole, symptoms of liver damage were evident in a number of workmen, although its concentration in the air was well below that established as safe by the toxicological tests. This experience and others that are reported show that more emphasis should be placed on the observation and reporting of occupational disease as it occurs clinically in factories.

The paper by D. W. Fassett deals with "Experience with Dermatitis Producing Chemicals." The problem is especially difficult in this field, but its solution is highly important because of the prevalence and cost of dermatitis and the difficulty of avoiding skin contact with chemicals. Wide experience over the years, however, has shown which animal species may act most like

the human, and has permitted interpretation of results with animals into information of practical use. In the author's experience results on a quantitative basis have been achieved for many substances. When patch tests with the same material have been used on both the guinea pig and man, good correlation has been found in the field of aromatic amines and phenolic materials. With proper performance of the animal tests it has rarely been necessary to conduct human patch tests. It is necessary to know the physical state, chemical and physical properties, and amount and character of use of the irritant, and to duplicate the conditions of practical use as nearly as possible in applying the patch tests. The methods used by the author and his associates are described, both in obtaining the toxicological data and in keeping close watch on workmen's exposure and its results. On at least two occasions it has been possible to vary the chemical structure of a compound to make it less allergenic.

H. C. Hodge's paper on "Experience with Uranium and Beryllium Dusts and Fumes" reviews the physiological action of uranium and describes the investigation which began in 1943 when the use of uranium suddenly expanded from a laboratory scale to tonnage production. Among the subjects discussed are the effects of soluble and insoluble uranium compounds, dusts and fumes, the role of particle size, and the effects due to radioactivity. The investigation resulted in the adoption of a workable MAC. Although the standard for uranium is not to be viewed as immutable, its use has been justified by the absence of chronic uranium poisoning cases in the handling of tons of uranium.

Another symposium dealt with A Survey of 1100 Individuals Exposed to Chlorinated Solvents. The survey was conducted in the Roll Coating Department of the Eastman Kodak plant, and the symposium was preceded by a tour through that department. In the opening paper J. L. Norris presents an outline of the investigation. H. A. Hanson summarizes the medical records and describes the few cases of acute poisoning that occurred, none of which had residual effects. E. C. Riley describes the method used for correlating the observations of a group of physicians studying the health of employees. The statistical studies of data obtained from punch cards by tabulating machinery are covered in a paper by E. L. Berry. The statistical studies are preliminary in nature but suggest areas for discovery of cause-and-effect relationships.

A third symposium conducted at this meeting is on the subject of The Role of Psychiatry in Industrial Training. The papers deal with the roles of industrial physicians, industrial nurses, management, and supervisors in psychiatry, and are summarized more fully in Abstract No. 375.

Two papers on industrial noise are also included, one briefly reviewing the subject (Abst. No. 428) and one on measurement of noise and of hearing loss. (Abst. No. 429).

The concluding paper by J. H. Sterner describes the organization of medical services at the Eastman Kodak plant.

INDUSTRIAL HYGIENE DIGEST
Literature and News

NEWS ITEMS

344 Air Pollution Control Association Meeting.

The tentative program for the 47th Annual Meeting of the Air Pollution Control Association has been issued. The meeting will be held May 3 to 6, at Hotel Patten, Chattanooga, Tennessee. The meeting will feature presentation of 35 technical papers on coal, incineration, petroleum, municipal problems, dust and fumes, steel, odors, measurements, and meteorology. The last day of the meeting will be set aside for plant inspection.

345 Air Pollution Control Association Establishes Award.

An award to recognize individual efforts to advance the technique, art, or science of air pollution control in this country has been established by the Air Pollution Control Association. It will be known as the Frank A. Chambers Award in honor of the early advocate of the "engineering approach" to air pollution control problems. Chambers was one of the first technical engineers employed as head of a smoke control bureau and served in this capacity for the City of Chicago for over 40 years. The award will be presented at the annual meeting of the association.

-- Chem. & Eng. News

346 Fluorides Symposium.

The Department of Preventive Medicine and Industrial Health at Kettering Laboratory, University of Cincinnati, will hold a symposium on fluorides May 10 to 12. The course will be open to physicians in industry and public health and to other professional persons interested in the fluorides problem. The objectives will be to bring together and to present accumulated information on this subject to workers in the field. For further information write to the Secretary, Institute of Industrial Health, Kettering Laboratory, Eden and Bethesda Aves., Cincinnati 19, Ohio.

-- Chem. & Eng. News

347 Institute on Alcoholism.

An Institute on Alcoholism for registered professional nurses will be held at Yale University July 29 to 31, 1954. The sessions are being planned to acquaint a limited number of nurses with the nature and extent of alcoholism, theories concerning its etiology, and effectiveness of various treatments. Particular emphasis will be given to the role of the nurse in interpreting to patients or to their families the nature of alcoholism and the necessity of securing specialized assistance following hospital treatment for acute intoxication. The course will consist of lectures and discussion sessions with a staff drawn from the faculties of Yale University and other institutions. This Institute is sponsored by the Yale University School of Nursing, the Summer School of Alcohol Studies, and the Connecticut League for Nursing. Information can be obtained from the Yale Center of Alcohol Studies, 52 Hillhouse Ave., Yale Station, New Haven, Conn.

348 Haskell Laboratory Dedicated.

The new home of the Haskell Laboratory for Toxicology and Industrial Medicine at Newark, Delaware, was dedicated by the DuPont Company March 29 before some 200 scientific and industrial leaders. The 2 million dollar structure provides enlarged facilities for the work of the Laboratory, heretofore located at the Experimental Station at Wilmington. Demonstrations of the research work being done by the organization was a feature of the program. Among the subjects being studied are the causes and effects of fatigue, basic factors that make clothing comfortable, and methods for the early determination of abnormal heart conditions, as well as investigations on the toxicity of chemicals made or used by the company. A feature of the laboratory consists of two all-weather rooms. In one of these rooms temperatures of -20° to 200° F can be maintained, with wind velocities up to 20 miles per hour and humidity control.

349 Philadelphia Air Pollution Control Ordinance.

Philadelphia now has an Air Pollution Control Ordinance that is being hailed as the most constructive and advanced in the nation. Mayor Clark signed the law March 9. The new ordinance makes specific definition of air pollution types and the air pollution nuisance and provides for the problem of controlling odors. In addition, it defines equipment covered by the ordinance, prescribes fees for permits, calls for an increase in penalties, and gives the Department of Health and the Air Pollution Board stronger enforcement and administrative powers. Prevention of violations rather than mere processing of complaints will be a main objective. S. Charles Rothmann has been appointed Director of the Air Pollution Control Division. He has had wide experience in the field. Industrial leaders have been very cooperative in the development of the new ordinance.

OCCUPATIONAL DISEASE STATISTICS

350 Occupational Disease Statistics.

	Conn. ¹ Mar. 1954	Ind. ¹ Mar. 1954	Total
Asbestosis (Dust--Asbestos)	1		1
Chemical pneumonitis and asthma (synthetic resins and chemicals)	1		1
Conjunctivitis (light intensities)	1		1
Dermatitis	57*	7**	64
Poisoning (lead and compounds)	1		1
Pulmonary granulomatosis and fibrosis (dust--metals and compounds)	1		1
Silicosis		2	2
Silicosis (dust-free silica)	1		1
(dust--inorganic)	1		1
Silico-tuberculosis		1	1
TOTALS	64	10	74

1. Occupational disease cases reported to the State Board of Health.

- * Dust--inorganic, dust--organic, foodstuffs, formaldehyde, medications, mechanical irritations, poisonous plants, rubber chemicals, and tar and allied substances caused one each; acids, alkalies, chloronaphthalene and chlorodiphenyl, chromium and compounds, oils and solvents (combination exposure), paints and lacquers, plating solutions (N.O.C.), and synthetic resins and chemicals caused two each; soap solutions, glue, etc. caused five; solvents (N.O.C.) caused six; and oils, fats, and waxes caused twenty-one.
- ** Cosmetic, enamel, petroleum oil, rubber, synthetic glues, and vitamin B₁₂ caused one each. The cause of one other was not stated.

LEGAL DEVELOPMENTS

51 Increases in Compensation.

In Colorado the compensation payable to injured employees in cases of permanent total disability has been increased from 50% to 66 2/3% of their average weekly wages. In New York on July 1 the maximum weekly compensation for any temporary or permanent disability due to industrial accident or occupational disease has been increased from \$32 to \$36, and the maximum monthly basic wage on which death benefits may be computed has been changed from \$227.50 to \$260. In Maryland the maximum weekly compensation allowable for any temporary total disability due to an industrial accident will be increased from \$32 to \$35, effective June 1. -- CCH

52 Petition for Writ of Mandamus to Compel Amendment of Award--Silicosis--Death Benefits--Amendment of Statute Prior to Death of Employee.

An employee who contracted silicosis in the course of his employment was awarded compensation for total and permanent disability. Subsequently, the employee died from the disease and his widow filed a claim for the difference between the maximum amount allowed for death benefits and the amount paid to the employee while he was alive. While the employee was alive, the statute providing for death benefits was amended to increase the maximum amount from \$7500 to \$9000. The Industrial Commission of Ohio granted the widow an award for \$9000 less amounts paid to the employee while he was alive. The employer filed a petition for a writ of mandamus to compel the commission to amend the award to the maximum amount payable under the statute at the time the employee received his injury. In denying the writ of mandamus, the court ruled that the statutes in effect at the time of decedent's death apply, and that his widow was entitled to the increases fixed by the amended statutes. Ohio, State of v. Dickerson. Ohio Supreme Court, No. 33386. November 18, 1953. -- CCH

53 Silicosis--Death Benefits--Commencement of Disability--Statute Construed.

The statute in effect prior to 1947 provided that there was to be no liability for disability or death resulting from silicosis unless the disability was total and commenced within one year after the last injurious exposure and that there was to be no liability for death unless the death occurred within five years after the commencement of the disability. Accordingly, an award was erroneously granted to the widow of an employee who died from silicosis and

who was subject to this statute where the record disclosed that his total disability did not commence until more than five years after his last injurious exposure. Reversed and claim dismissed. Kazia v. Woodcrest Construction Co. New York Supreme Court, Appellate Division, Third Judicial Department, No. 244-17. November 12, 1953. -- CCH

354 Silicosis--Coverage by Act--"Sixty-Day Exposure Provision" Construed.

A Compensation Board erroneously construed the 60-day exposure provision of the Compensation Act relating to silicosis to exclude an employee who quit his job, after 9 years with the same employer, 43 days after his employer accepted the provisions of the silicosis section of the Act. The court construed that the exposure provision was intended to fix liability between two or more employers in instances where the employee had been exposed to the hazards of the disease under more than one employer and not as a requirement that the claimant be employed at least 60 days after the employer elected to operate under the Act as was maintained by the employer. The court also rejected as unnecessary the highly technical requirements suggested by the Board in order to establish an exposure to the disease, such as showing that silica particles were less than 5 to 10 microns in size. Reversed and remanded. Jones v. Crummies Creek Coal Co. Kentucky Court of Appeals. December 11, 1953.

BOOKS, PAMPHLETS AND NOTICES

- 355 Pneumoconiosis Abstracts. Vol. 1. Reprinted from the Bulletin of Hygiene for the years 1926 to 1938 inclusive by permission of the Honorary Managing Committee of the Bureau of Hygiene and Tropical Diseases. E. L. Middleton, Editor. Pitman Publishing Corp., 2 West 45th St., New York 36, N. Y. 347 pp. (1953). Price \$12.50.

This volume reproduces the abstracts of papers on pneumoconiosis that appeared in the Bulletin of Hygiene in the years 1926 to 1938, inclusive. They are classified into 12 sections: general, silicosis, asbestosis, pneumoconiosis of coal workers, pneumoconiosis caused by other inorganic dusts and vegetable dusts, fumes causing respiratory disease, sampling and analysis of dusts, methods of suppression, periodical reports, legislation, and book reviews. The end of the period covered corresponds nearly to the beginning of publication of the Digest, but the collection is of more than historical interest because much fundamental work was accomplished in that period. -- FFR

- 356 Antiseptics, Disinfectants, Fungicides, and Chemical and Physical Sterilization. G. F. Reddish, Editor. Lea & Febiger, Washington Square, Philadelphia 6, Pa. 841 pp. (1954) \$15.00.

This book is the work of 30 contributors but represents the combined efforts of many more authorities who cover the most important facts relating to antimicrobial agents generally, exclusive of antibiotics and chemotherapeutic drugs. The first chapters after a historical review and definitions of terms deal with methods of testing antimicrobial agents. Laboratory and practical tests are detailed. The remainder of the book deals with particular antiseptics, disinfectants, fungistats, and fungicides. Although the materials are classified in those sharply defined groups, it is shown that their functions overlap; for instance, an antiseptic may be also a disinfectant or a fungicide. The discussion of each substance is thorough, and extensive lists of references are presented. The process of sterilization of foods and pharmaceuticals by ionizing radiations is explained in detail. Preservatives and pasteurization are discussed separately with stress on the importance of both procedures in public health activities. -- FFR

- 357 Food-Borne Infections and Intoxications, Second Edition. F. W. Tanner and Louise P. Tanner. Garrard Press, 119 West Park Ave., Champaign, Ill. 786 pp. (1953). \$12.00.

Since the publication of the first edition of this book about 20 years ago, so many additional findings have been made available that the new edition is more than twice the size of the first. Infection by the various organisms is by far the most frequent source of illness due to foods, and therefore most of the book is devoted to infections of plant and animal origin. Among the most important diseases incurred in that way are typhoid fever, dysenteries, streptococcus and staphylococcus poisoning, brucellosis, mycobacterium tuberculosis, botulism, salmonella poisoning, and virus-borne infections. Each of these forms of poisoning is discussed in a separate chapter. The final chapter deals with metals in foods and their possible relation to illness. It includes discussion of arsenic and other metals introduced by spraying fruits and vegetables. -- FFR

- 358 Flow and Fan. Principles of Moving Air through Ducts. C. H. Berry. The Industrial Press, 148 Lafayette St., New York 13, N. Y. 226 pp. (1954). \$4.00.

The title of this book is derived from the two major divisions of treatment: (1) the flow of gas through duct systems, and (2) fan performance and control. In the seven chapters on gas flow, basic data and methods for finding system resistance are presented, and the final six chapters are devoted to the practical task of selecting a fan for a given duty. The book is based on class lectures by the author, and was written to meet the needs of students interested in acquiring a working knowledge of ventilation and will also be useful to

practicing engineers. While some portions are at an elementary level for those who want an introduction to the subject, other portions dealing with new developments will be worthy of the attention of the most advanced. -- FFR

- 359 Insuring Special Class Risks. D. E. Yochem. Research and Review Service, Inc., 123 W. North St., Indianapolis 9, Ind. 77 pp. (1953). \$1.60 paper bound, \$2.25 hard-bound, discounts for quantities.

By the use of special ratings, insurance companies are now able to extend their services to many people previously considered uninsurable. The purpose of this book is to enable life insurance agents, medical examiners, underwriters and insurance executives to understand and to explain to applicants the need and principles of special ratings. In 1950, 600,000 extra risk policies were purchased, about one-third of which were rated because of occupational hazards. The first chapters deal with the selection of risks, preliminary appraisals of doubtful risks, medical and non-medical applications, and the contrasting viewpoints of clinical and life insurance medicine. The final and most extensive chapter considers the most common impairments and their effects upon ratings and insurability, in alphabetical order from albuminuria to visual impairment. -- FFR

- 360 The Nurse in the Public Health Program. Pearl P. Coulter. G. P. Putnam's Sons, 270 Madison Ave., New York 16, N. Y. 309 pp. (1954). \$4.75.

This book is planned first for the student of nursing, and second for the graduate nurse who seeks a fresh point of view that should become common in her daily assignments. In addition to the special attitudes and skills that must be incorporated in the educational program, the book explains the relationships a nurse must maintain with other members of the health team, the family, and the community. Emphasis is placed on team-work and on total patient care rather than on treatment of particular diseases. The work is illuminated by case studies to illustrate important principles. -- FFR

During the 1930's, total life insurance premiums ranged between 5% and 8% of the national income. Today, however, life insurance premiums represent only about 3% of national income. Furthermore, great as the aggregate of life insurance now is, it still averages only about one year's income per family. Until that ratio is bettered, there is much room for the expansion of life insurance programs.

-- Insurance Advocate

INDUSTRIAL MEDICAL PRACTICE

- 361 The "Full-Time" Physician in Industry. L. Wade. Med. Bull. (Stand. Oil N.J.) 14, 19-25 (Mar. 1954).

Too often, in the past, physicians have found their way into industry quite by accident. Often the interest in the job, if any, has been stimulated by purely negative rather than positive factors. Medicine in industry presents an excellent opportunity to well-qualified physicians with proper qualifications to contribute materially to the health potential of a large segment of the population. Some of the desirable qualifications for those interested in this type of medical practice are: (1) good general medical training; (2) training in preventive medicine; (3) training in psychosomatic medicine; (4) an appreciation of the quantitative method; (5) ability to write and talk effectively; (6) Intellectual honesty; (7) health and well-being; (8) an attractive personality; and (9) willingness to engage in team work. -- Author's summary

- 362 The Cost of Medical Services. L. Wade. Med. Bull. (Stand. Oil N.J.) 14, 40-45 (Mar. 1954).

The author points out difficulties in assessing costs and benefits of plant medical service. The average per capita cost, number of examinations, etc., have little meaning, because: (1) there are no accepted norms for the desirable volume of medical services; (2) the volume and quality of service may be and are often inversely related; and (3) services may be provided without reference to employee need. Sickness and absenteeism costs are not necessarily a measure of the efficiency of the medical service. Sometimes they are apparently increased after the introduction of medical service because they were inadequately recorded previously; sometimes the treatment of physical defects or disease uncovered by examination has necessitated further absence from work. Moreover, high absence rates may be due to excessive absenteeism on the part of a few workers. To attain the goals expected of a medical department, close cooperation of the medical department, management, the personnel office, supervisors, and employees is necessary.

- 363 Medical and Health Service. Anon. Natl. Safety News 69, 229-244 (Mar. 1954).

This section of the annual safety equipment issue of the above publication reviews the functions of an adequate plant medical service, under the headings of medical service, caring for the injured, resuscitation, surgical cleanliness, and rehabilitation.

- 364 Industrial Health Engineering. Anon. Natl. Safety News 69, 51-80 (Mar. 1954).

A section of the annual safety equipment issue discusses broadly the various aspects of industrial health engineering, including ventilation, skin infections, washrooms and lockers, food service, heat and humidity, noise and vibration, drinking water, and working women.

- 365 Morbidity Experience of Subscribers to a Prepaid Medical Care Plan. J. R. Smiley, C. W. Buck, O. W. Anderson, and G. E. Hobbs. Am. J. Public Health 44, 360-369 (Mar. 1954).

Statistics are compiled dealing with morbidity in relation to age, sex, and seasons of the year among industrial families in a Canadian city. Except for the influence of season, which has not been investigated extensively by others, the trends discovered conform to those derived from other studies. Mental, respiratory, digestive, and genitourinary diseases were found to have their highest incidence in winter, while allergic and endocrine and skin diseases and accidents are most prevalent in summer.

- 366 Second Progress Report, Nationwide Study of Prolonged Illness. Publication No. 98, Research Council for Economic Security, 111 W. Jackson Blvd., Chicago 4, Ill. 59 pp. (1954).

The survey described here is still in its early stages, and more participants are being sought, but this progress report describes the basis of the survey and gives some preliminary results. Part 1 deals with absenteeism during 1952 among 22,778 employees. Part 2 is concerned with the nature of illness and cost of 1212 prolonged absences in 1952 and 1953. Throughout the survey a prolonged absence is regarded as one that lasts over 4 weeks. An overall rate of 33 such absences per 1,000 person years was ascertained. This rate is in reasonable agreement with those established by several other surveys. A few of the points established tentatively are: (1) women have more absences than men; (2) production workers have more absences than office workers; (3) absences of over 4 weeks account for 25% of all absences of over 1 week, and for 62% of the time lost; and (4) absences are longest among lowest paid workers, men with the greatest seniority, men over 45 years, and women between 35 and 44 years. Hernia, appendicitis, stomach and duodenal ulcers, influenza, and pneumonia, rank highest among causes of absence. In Part 2, absences are classified by industry, nature of disease, sex, and occupational groups. Tables of cost distribution are given and benefit plans are classified. In addition to the full report in two parts, "Highlights, Second Progress Report" is issued by the same organization and may be obtained at the above address.

Attendance and Morale: Preliminary Study of Attendance at Work in Large and Small Units. Acton Society Trust, London, Eng. 44 pp. (1953). 3s. 6d.

Studies of absenteeism were made in three industries: the coal industry, a large industrial group, and a large retail organization. All three studies showed that, as a general rule, workers are absent more frequently in large concerns than in small ones. The trend is particularly noticeable in the coal industry, and fairly marked in the industrial sample. Absenteeism and accident rates were statistically correlated throughout the coal industry, and output per man-shift tended to be higher in small pits than in large ones under similar geological conditions. The study emphasizes the urgent need for detailed descriptive studies of individual organizations if the significance of size is to be understood fully. Distance of travel of the worker from his employment and complexity of the line of communication between the employee and the local manager are suggestive factors to be considered.

-- Cond. from Nature

Matching Job Requirements and Residual Physical Abilities. W. R. Thayer. Ind. Bull. (Stand. Oil N.J.) 14, 26-34 (Mar. 1954).

The author describes the method of matching job requirements and physical abilities now being developed in the Baton Rouge refinery of Esso Standard Oil Company after considerable experience with other methods. The matching is accomplished by comparing objective measures of intensity and duration of a large number of job factors. Two forms are described which make possible systematic recording of data and afford easy comparison of worker abilities with job requirements. The plant industrial hygienist was consulted as to the toxic and irritant exposures on each job. As a result of the system as tried in one department, 23 of the 63 physical handicap cases were reassigned, with an average increase of 50% in effectiveness as well as improvement in morale and reduction of time lost. The trial will be extended to other departments.

Diabetes--Its Relation to Industry. S. Soskin. Ind. Med. & Surg. 23, 107-110 (Mar. 1954).

The author discusses the problems connected with the employment of diabetics with regard to the following questions: (1) Do they make good employees from the standpoint of productivity, absenteeism, etc.? (2) If so, can they be employed in any capacity for which they are fitted by ability and training, with regard to the presence of diabetes? and (3) If not, what considerations determine the capacities in which they should be employed? The first question has been categorically answered in a statement by the Committee on Employment of the American Diabetes Association (see Digest, Apr. 1953, pp. I-III). With regard to the second question, mild or severe diabetes is not a handicap so long as the employee is cooperative and under regular medical management. The

jobs suitable for the diabetic should be selected with regard for safety to himself, safety to others, and conservation of the employer's property. The diabetic should not work on the "graveyard shift," should not be employed on delicate or hazardous machinery, high ladders or platforms, and should not be exposed to skin irritants, dusty air, or conditions leading to wet shoes or bruised feet. Operation of motor vehicles or other self-propelled machinery should be avoided. The American Diabetes Association has published a list of 450 jobs suitable for diabetics.

- 370 The Job, The Employee, -- and Peptic Ulcer. S. A. Portis. Ind. Med. & Surg. 23, 108-111 (Mar. 1954).

Statisticians estimate that 5 to 12% of our general population in the United States have ulcers. A typical medical history is presented. The psychogenic factors that led to the development of the ulcer are traced. The importance of blood sugar and the consequent need for frequent nourishment are discussed. The patient must understand the importance of psychological factors, and the industrial physician must be sympathetic with respect to so-called functional patterns.

- 371 Heart Disease and Employment. A Current Survey. E. M. Kline. Ind. Med. & Surg. 23, 126-127 (Mar. 1954).

A questionnaire was sent to 115 industrial physicians regarding employment of cardiacs. The information from the 101 replies is tabulated. The physical demands of the job on the worker were reported predominantly "moderate" in 63% of the replies. Cardiacs are hired regularly in 24% of the companies, occasionally in 50%, seldom in 16%, and never in 10%. Of 92 who reported reluctance in hiring cardiacs, 71% gave excessive physical demands of the work as the reason, 42% risk of monetary loss from compensation claims, 30% heavy burden on company-sponsored insurance programs, and only 11% feared that the workers would be insufficient or unsafe. In 88% of the companies workers who develop heart disease are always retained, in 11% occasionally retained, in 1% seldom retained. In no company were they never retained.

- 372 Rehabilitation Following the Cerebrovascular Accident. H. A. Rusk and M. Marks. Southern Med. J. 46, 1043-1051 (Nov. 1953).

Hemiplegia presents one of the most challenging problems in medicine today, both in total number of cases and therapeutic complexities. With a dynamic approach to the problem of the hemiplegic, using rehabilitation technics that have been developed to meet the total needs of the individual, much can be offered to these severely disabled patients, and most can be trained to lives of self-sufficiency and usefulness. Regardless of the extent

of the disability, the physician's responsibility to his hemiplegic patient cannot end when the acute phase of treatment has been cared for. It ends only when the physician has taken the responsibility to rehabilitate and retrain the patient to his maximal capabilities. -- Authors' summary

Occupations and Cigarette Smoking as Factors in Lung Cancer. L. Breslow, L. Hoaglin, Gladys Rasmussen, and H. K. Abrams. *Am. J. Public Health* 44, 171-181 (Feb. 1954).

An investigation of 518 lung cancer patients and an equal number of controls showed a higher percentage of the patients (93%) had smoked cigarettes than the controls (76%). Data are presented on the frequency of smoking, age distribution, and age when smoking began. Application of statistical methods indicated that for men aged 50 to 59 the prevalence of lung cancer is 4 to 11 times as great among smokers as among nonsmokers, and from 7 to 27 times as great among heavy smokers as among nonsmokers. These results tend to confirm those of other investigations. Significantly higher lung cancer rates were found among welders than among those in other occupations. The group of steam fitters, boilermakers, and asbestos workers lies on the borderland of statistical significance when the effect of cigarette smoking is controlled. No very definite conclusions on the effect of occupation can be established from the small number observed, but the data indicate that such occupations should be intensively studied in regard to lung cancer etiology.

One Hundred Years of Statistics on Pulmonary Cancer of the Pathologic Institute of Dresden-Friedrichstadt. H. Grosse. *Arch. Geschwulstforsch.* 5, 318-333 (1953). German.

During the period 1852-1951, 78,979 autopsies were performed on adults over 20 years of age. Of a total of 10,746 cancers found, 1,206 were pulmonary (1,030 in men and 176 in women). The incidence of cancer in general has increased during the period, largely as the result of the progressive increase in the older age groups. The pulmonary cancers have increased in men from 0.3 to 5.66% of all autopsies or from 6.6 to 35.5% of the total number of cancers. This increase was not merely due to the increase in the aged groups. Among women the statistics do not indicate a definite increase in pulmonary cancers. The sex ratio of pulmonary cancer shifted in the course of the century from 1:1 to 6.6:1. The pulmonary cancers diagnosed during life have increased since 1930 from 35.5 to 72.8%. Pulmonary cancer is found in all occupations, but there seems to be a slightly higher incidence in occupations involving exposure to dusts. -- Cond. from J. Am. Med. Assn.

- 375 Psychiatry in Industrial Training. Symposium. Am. Acad. Occ. Med., Proc. 5th Ann. Meeting, pp. 30-54 (Feb. 1953).

R. T. Collins, chairman of the symposium reviewed the history of industrial psychiatry, selecting several dates that marked significant accomplishments. Psychiatry and Its Relationship to the Industrial Physicians and the Industrial Nurses was the title of a paper by W. Woodward. A part of the task of the teacher of psychiatry is to convince students that there is no magic in it, and that just being sympathetic and understanding listeners is a very definite and effective medical treatment. The practicing psychiatrist has the same problem in getting people to understand psychiatry. Another point made is that the patient with personal troubles will confide much more in the nurse than in the doctor, and so nurses are the outposts of the medical department. In G. C. Taylor's brief paper on Psychiatry and Management, he discusses the relationship of the psychiatrist to top management, the industrial relations and safety departments, and the foreman. Human Relationship in Industry was discussed by N. D. Hubbell. In the discussion of the problem of worry, he points out that useful fear and useful worry are not occasions for shame or fear, and that they are useful to the individual for self-preservation and the necessary adjustments to life. They can become harmful when they get out of control. In dealing with fear and worry in the individual worker, the fear of fear and worry must be avoided. The place of the foreman in psychiatry is considered at length. The author's belief that the foreman should be able to administer "first aid" is the psychiatric sense, but beyond that should refer cases to the supervisor, the industrial relations department, or the medical department, according to the nature of the case.

SKIN DISEASES AND BURNS

- 376 Industrial Dermatologic Problems. Relationships between Physician, Patient, Employer, and Insurance Carrier. A. F. Hall. Calif. Med. 80, 29-31 (Jan. 1954).

A large part of the misunderstanding of industrial dermatitis arises from lack of knowledge of compensation insurance law by physicians, employee-patients, and many employers. Physicians dealing with industrial cases should not only familiarize themselves with compensation law and insurance practices, but should interpret them to their employee-patients, and, where necessary, to their patients' employers. They will thereby bring about mutual understanding of each other's position and of the provisions and limitations of the law.

- 377 Sensitization and Eczema. J. K. Morgan. Trans. Assn. Ind. Med. Officers 3, 274-78 (July-Oct. 1953).

The author presents a thorough discussion of sensitization in relation to eczema. Constitutional eczema is distinguished from exogenic eczema. In constitutional eczema the external factors are trivial in nature and can be ignored. In any discussion of sensitization and eczema the constitutional background of all cases of eczema requires to be emphasized. In exogenic eczema, the external factor is more precise and significant. The sensitizers are responsible for about 20% of the cases of exogenic eczema; the other 80% are caused by primary irritants. The mechanism of sensitization is most imperfectly understood at present, but it bears some relation to immunological mechanisms. It is firmly established that a specific sensitivity of the skin can be acquired as a result of contact with some chemical substance. Such a sensitivity must be highly specific, and of such degree that once established, the most trivial contact may produce the eczematous reaction. Cases of this sort occur most frequently in industrial processes. Sensitization may be easily established by a patch test. There are many complicating factors, however, each of which introduces a problem. They include: differences in "sensitizing index" between chemicals and therefore differences in time necessary to produce sensitization; differences in "sensitizing index" of persons; persistence of the eczema after withdrawal of the sensitizing agent; appearance of eczema at sites that are not in contact with the offending agent; and the effect of sensitivity to one substance on sensitivity to others. Each of these problems is discussed. Sensitization of the skin is seldom simple or straightforward. The constitutional factor must always be considered. The external factor should not be ignored, but the discovery and removal of an external agent is not the beginning and end of rational therapy of the condition.

- 378 Occupational Dermatitis. L. Schwartz. Modern Sanit. 6, 27-29 (Feb. 1954).

The author briefly discusses predisposing and actual causes of occupational dermatitis and methods of its control, including protective clothing, washing facilities, industrial skin cleansers, and especially protective ointments. Some ointments are water repellent and others are oil repellent. Attempts to produce an ointment that has both functions have not so far been successful. The Public Health Service method of testing protective ointments is described briefly. The essential requirements of a protective ointment are outlined: (1) maximum protection; (2) easy application; (3) persistence on the skin but easy removal by washing; (4) good cosmetic value; and (5) economy. The cost of protective ointments is estimated at between 2 and 3 cents a day per worker.

Studies during World War II showed that over one-third of all waste scrap was due to uncorrected vision defects.

-- Management Information

- 379 Irritating and Sensitizing Effects of Two Polymeric Plasticizers. Studies on Paraplex G-25 and Paraplex G-40 on the Skin of Human Subjects.
F. W. Sunderman and H. B. Haag. Arch. Ind. Hyg. & Occ. Med. 9, 210-211 (Mar. 1954).

Studies on humans with Paraplex G-25 revealed no evidence of primary skin irritation or sensitization when tested as a 25% ointment (25 subjects) or in undiluted form (25 subjects). Similarly no signs of primary skin irritation (50 subjects) or sensitization (25 subjects) were noted after testing with Paraplex G-40 applied as a 25% ointment. Paraplex G-25 and Paraplex G-40 have been manufactured in large quantities for 10 and 8 years, respectively. During these periods of time, no dermatitis that could be attributed to contact with these materials has been observed among the plant workmen. Furthermore, no dermatitis has been reported among workmen handling these materials for the fabrication of finished products. -- Authors' summary

- 380 The Use of Silicones to Protect the Skin. G. Morrow. Calif. Med. 80, 21-22 (Jan. 1954).

An ointment containing silicone fluid, which forms a protective coating on the skin, was used in the treatment of 107 patients with various dermatologic conditions. Cure or satisfactory control was obtained by 83 of the patients. Silicone ointment has no curative power. It simply protects the skin and permits healing to progress. It should not be applied to eyelids or to "weeping" areas of the skin. The protective ointment was particularly effective in control of diseases caused by water-soluble and oil-soluble irritants.

- 381 Industrial and Laboratory Evaluation of a Silicone Protective Cream.
R. R. Suskind. Arch. Ind. Hyg. & Occ. Med. 9, 101-112 (Feb. 1954).

The clinical effectiveness of a silicone-bentonite cream as a skin protectant, which has been in use in two industrial plants for several months, is described. The formulation under study appears to have considerable protective value clinically against light petroleum oils and irritants, insoluble cutting oils, soluble coolants, aqueous solutions of sulfuric acid, and metallic dusts. In vitro films appeared to be relatively stable when immersed in aqueous solutions of soap, ethyl alcohol, several commonly used irritant salts, slaked lime, ammonium hydroxide, formalin, and sulfuric acid. No clinical protection was observed with frequently repeated cutaneous contact with gasoline, naphtha, and similar materials, although relative protection was afforded when exposure was intermittent. No clinical protection was observed against the irritant effects of immersion in a sodium silicate solution.

-- Cond. from author's summary

Silicone Protective Creams. A Clinical Study. G. E. Morris.
Arch. Ind. Hyg. & Occ. Med. 9, 194-198 (Mar. 1954).

Two silicone protective creams were tested by applying to the right arms of patients. Patch tests were then made on both arms. Six tests were more positive on the silicone-protective arm than on the control arm; seven tests were more positive on the unprotected arm; five tests showed no difference, and two tests were entirely negative on retesting. Possible reasons for the discrepancies are considered. One was that the adhesive tape adhered better to the unprotected arm. Another was that the castor oil base in one of the creams and the bentonite base in the other could afford some protection in themselves. Three patients returned to work after using the silicone protective creams the required number of days and suffered immediate recurrence of their eruptions. This preliminary report makes it evident that much more study must be made as to the actual effectiveness of silicone protective creams before they can be recommended to industry as general protective agents. This study seems to point out that they afford very little protection.

-- Cond. from author's summary and conclusions

Occupational Melanosis. A. J. Reiche. Arch. Dermatol. Syphilol.
7, 616-621 (June 1953).

Four cases are reported, considered to resemble those described by Riehl, of an interesting pigmentary disturbance. It affects exposed parts, the forehead, sides of the face, backs of the hands, extensor surfaces of the forearms, axillary folds and the legs. It starts with pruritic erythema, followed by a light brown or chocolate pigmentation, with diffuse and follicular hyperkeratosis. The skin appears to have been dusted with fine flour. Cases have been reported from a number of countries, and ascribed to as many originating agents. The present cases are thought to be due to oil used on tinplate when stamping can tops. Two cases came under observation, and 2 others were found among a group of 16 women similarly employed. Only one could be examined by patch test, which was positive, with pruritus and erythema, followed by pigmentation. Other authors have found hydrocarbon fractions, oils, tars, or greases to be causative factors. The 4 cases are a fair sample of Riehl's occupational melanosis.

-- Bull. Hyg.

Dermatitis of the Hands Due to Household Cleaners. M. J. Brunner.
Am. Med. Assn. 154, 894-897 (Mar. 13, 1954).

Evidence can be accumulated that the so-called housewives' eczema is basically an external irritant dermatitis resulting from contact with cleansing agents used in housework. Studies suggest that some of the synthetic detergents used in housework may irritate; however, it cannot be assumed from this finding that such agents are the entire cause of clinical cases of dermatitis of the hands of housewives. Many other known irritants are also used, such as ammonia

water, hypochlorite bleaches, phosphates, abrasive powders, and organic solvents in waxes and polishes. All of these may contribute to the production of dermatitis in varying degrees in different instances. Not only these substances but also the exacerbating influences previously cited must be avoided if permanent cure is to be effected. A regimen of strict avoidance of external irritants, along with bland, nonirritating topical therapy is generally successful. Recurrences are not infrequent after reexposure to household irritants, however, and patients should be instructed to continue use of rubber gloves for dishes and laundry work as a permanent measure. Similar eruptions may also be seen in bartenders, soda jerks, and others in occupations involving "wet work"; the mechanisms of production of the dermatitis and methods of treatment are identical.

-- Author's summary and conclusions

CHEMICAL HAZARDS

- 385 Studies on Phosphorus Intoxication. II. Fate of Orally Administered Choline in Dogs with Damaged Liver. M. V. Sigal, Jr., Dorothy J. Buchanan, and C. S. Robinson. Arch. Ind. Hyg. & Occ. Med. 9, 142-146 (Feb. 1954).

When doses of choline were administered orally to a group of seven dogs, only a small part of the administered dose appeared in the urine unchanged. Considerable amounts of the administered choline were excreted in the form of total trimethylamine, most of which was in the oxidized state. The conversion of choline to total trimethylamine was found to be independent of the amount of choline administered. The fraction of the total trimethylamine occurring in the unoxidized form was found to increase as the total trimethylamine increased. Two dogs with liver injury due to phosphorus poisoning excreted somewhat larger than normal amounts of administered choline. No definite effect on the conversion of choline to total trimethylamine was found in these animals. Their ability to oxidize trimethylamine was somewhat reduced.

-- Authors' conclusions

- 386 Selenium Rectifiers Not Toxic. A. Schwencer. Bur. of Ships J. 2, 35-37 (Nov. 1953).

Contrary to many reports, there is found no danger of poisoning in handling good selenium rectifiers. Care should be taken to preserve the protective coating. In the event of a burnout, power should be removed from the rectifier and the area should be ventilated. Contact between the skin and rectifier residue should be avoided. The use of rubber gloves is recommended.

-- Cond. from Chem. Eng. News

- 387 Fatal Poisoning from Use of Hydrochloric Acid in a Confined Space.
E. Thiele. Zentralbl. Arbeitsmed. u. Arbeitsschutz 3, 146 (Sept. 1953)
German.

A suction pipe between the well and cooling system of a brewery was to be cleaned with 30% hydrochloric acid. The pipe had been filled with 350 liters of the fluid, and after 30 minutes it was withdrawn in buckets at the well end of the pipe by a man who stood on a ladder about 10 feet below the top of the well. The man ascended the ladder behind the bucket, which was drawn up by a cable drum. He collapsed and fell in while sitting at the edge of the well trying to get fresh air. His co-workers brought him up immediately and he regained consciousness. After a physician arrived about 2 hours later, he was at once taken to the hospital where he died shortly afterward. Necropsy revealed that death was due to massive pulmonary edema.

-- Cond. from J. Am. Med. Assn.

- 388 Toxicology of Hydrazine. A Review. S. Krop. Arch. Ind. Hyg. & Occ. Med. 9, 199-204 (Mar. 1954).

Hydrazine appears to be toxic to all forms of life. Among the higher animals there appears to be no marked species difference in sensitivity to its toxic action. Actions on the central nervous system, heart and circulation, gastrointestinal tract, liver, kidney, and metabolism are described. A summary of acute toxicity to animals shows considerable differences in LD50 according to method of administration. The lethal inhalation level varies from 100 to 576 mg. per cu. m. to rats. There is little information on human hazards in recent literature. Vapor inhalation and liquid eye and skin contacts are the major routes for injurious exposure, and effects may be local, systemic, or both. Dermatitis has been reported. The ammoniacal odor of hydrazine and effective ventilation should reduce the inhalation hazard, and prompt flushing of eye and skin with copious quantities of water should reduce contact hazards. Adequate respirators, goggles, rubber aprons, and gloves should be provided wherever there is risk of exposure. Suggestions are given for treatment of liver damage.

- 389 The Engineering and Medical Control of a Lead Hazard. A Plant Study.
C. C. Maloof, H. Bavley, and G. W. Boylen. Am. Ind. Hyg. Assn. Quart. 15, 64-68 (Mar. 1954).

A plant was suddenly confronted with three cases of lead poisoning among the workers because lead was handled and used without regard to its toxicity. By the installation of an adequate ventilating system, rotation of workers with high urinary lead and coproporphyrin values, institution of a good housekeeping program, and scrupulous follow-up of the other workers by medical screening tests, the situation was checked and progressively improved. The study again reveals the importance of urinary coproporphyrin tests as an aid in the early diagnosis and prevention of lead intoxication. -- Cond. from authors' discussion

- 390 Lead and Coproporphyrin Excretion of Patients Treated with EDTA.
B. P. Ruotolo and H. B. Elkins. Arch. Ind. Hyg. & Occ. Med. 9,
205-209 (Mar. 1954).

Average urinary lead in the 10 patients studied rose from 0.28 to 6.8 mg. per l. on the first day of treatment, 9.0 on the second day, and fell to 7.7 on the third day and 3.3 on the fourth and last. After cessation of treatment it fell to 0.78 on the second day and gradually to 0.22 on the fourth week. The coproporphyrin content, which averaged 3.7 mg. per l. before treatment, gradually fell to 0.7 during treatment and remained between 1.0 and 1.8 thereafter. The lead elimination in a few days, therefore, was as great as would have been normally eliminated in 100 to 150 days, but the rate of lead excretion after the EDTA has been eliminated is almost as great as would be expected if there had been no treatment. The results indicate that the lead is mobilized from relatively available storage depots, such as bone surface, but that considerable amounts are still present in or near these structures. Sodium citrate has a negligible effect on lead and corprophyrin excretion, while that of dimercaprol is somewhat less than that of EDTA. While the effects of EDTA are impressive, its usefulness should be evaluated by both clinical and laboratory findings.

- 391 Migration of Inorganic Salts in Bone as Measured by Radioactive Lead and by Alizarin. Regina McLean, J. A. Calhoun, and J. C. Aub. Arch. Ind. Hyg. & Occ. Med. 9, 113-121 (Feb. 1954).

Comparison of total lead in the humerus of dogs which received inert lead with one which received tagged lead shows no real difference in total lead stored. When compared with radioactivity measurements of tagged lead, it appears that lifetime dietary accumulation of total lead is a factor in the distribution ratios between trabeculae and cortex. The amount of tagged lead deposited in bone and dentin is roughly dependent on the total lead dosage. The concentration of tagged lead in the trabeculae of long bone is 5 to 16 times that in the cortex. Results with alizarin staining indicate exchange of calcium between trabeculae and circulating blood and its relative fixation in cortex after transport from trabeculae. Increase in tagged lead with time in both trabeculae and cortex in a given animal indicates continued transport of calcium from trabeculae to cortex and a sustained rate of deposition from the circulation to the trabeculae. -- Cond. from authors' summary

- 392 A Family Outbreak of Lead Poisoning from the Burning of Storage Battery Casings. J. Wyllie. Can. Med. Assn. J. 70, 287-290 (Mar. 1954).

A family outbreak of lead poisoning is described, due to inhalation of smoky fumes arising from discarded storage battery casings in an old cook stove in a slum dwelling. Three of the inmates--the father, a boy aged 14 and

a daughter aged 10, did not complain of subjective symptoms, but one boy aged 7 died from lead encephalopathy, another boy aged 11 had abdominal colic and the mother had paresis of the right wrist and a typical lead line in the gums. Although the mother stated she had carried on this practice for the previous three winters without untoward effects, it is believed that intensity rather than duration of exposure was responsible for the outcome. A slaty-gray deposit scraped from the interior of the battery casings yielded approximately 90% lead sulphate. The respiratory tract is the most important portal of entry for lead into the human body; signs of intoxication develop more quickly than when 10 times as much lead is ingested.

-- Author's summary

³³
Lead and Lead Poisoning in Early America. Clinical Lead Poisoning in the Colonies. C. P. McCord. Ind. Med. & Surg. 23, 120-125 (Mar. 1954).

Many quotations from the early colonial period reveal the presence of lead poisoning. Early in the 1800's physicians removed the indecision as to the cause of the far-flung malady. Although there is no full complement of figures revealing statistically the frequency of lead poisoning in early America, there is warrant to record that its prevalence was such as to be within the acquaintance of all physicians under some name whether "dry gripes," "dry belly-ache," "saturnism," "plumbism," "lead colic," "lead poisoning," or in modern terminology, "lead intoxication."

³⁴
The Mercury Hazard and Its Control in the Refinery Laboratories. C. M. Berry. Med. Bull. (Stand. Oil N. J.) 14, 76-80 (Mar. 1954).

In refineries metallic mercury is used primarily in the instrument shops and laboratories. The mercury consumption often exceeds 100 pounds per month. Since most of this mercury replaces that lost from equipment due to breakage, spillage, or blowing of seals, an industrial hygiene problem may result. Two cases of mercurialism have occurred in the author's plant. The following measures have been taken to limit exposure at refinery locations: (1) centralizing mercury handling activities; (2) keeping all mercury equipment covered; (3) controlling spillage; (4) collecting spillage; (5) controlling evaporation; (6) housekeeping of the highest order; (7) discouraging pedestrian traffic through mercury handling areas; (8) maintaining personal hygiene of workers; (9) additional ventilation in the workroom area; (10) using non-amalgamating metals or ceramic materials for sinks and traps; and (11) eternal vigilance.

There are now more than 13 million working couples in the nation.

-- The American Magazine, Oct., 1953

- 395 Distribution of Molybdenum Injected into Dogs. A. Bru and others.
Compt. rend. 237, 279-280 (1953). French.

Radioactive molybdenum (Mo^{99}) was administered in a single injection in the form of sodium or ammonium molybdate in quantities of 0.10-0.20 g. per kg. and 10 micrograms per kg. A subsequent autopsy showed that molybdenum was selectively concentrated in kidneys and liver. The endocrine glands, pancreas, pituitary, and particularly thyroid and adrenals attained high concentrations of molybdenum. Brain, white marrow, and adipose tissue contained negligible amounts. -- Chem. Absts.

- 396 Exposure to Methanol from Spirit Duplicating Machines. R. G. McAllister.
Am. Ind. Hyg. Assn. Quart. 15, 26-28 (Mar. 1954).

The type of duplicating machine under investigation is in common use in schools and business offices. An essential part of the method is the use of a roller kept wet with a mixture of methanol, ethanol, and cellosolve, varying from 40 to 100% methanol. Breathing zone concentrations of methanol in the small room ranged from 400 to 800 ppm. and general room air went as high as 1000 ppm.; the accepted standard is 200 ppm. Spirit duplicators should not be used in confined areas without exhaust ventilation. Air conditioning would be insufficient to dilute the vapors to safe levels. Suggestions are made for an exhaust system with a hood over the receiving basket for machines operated steadily in small rooms. Intermittent operation during 2 or 3 hours per day would need only general room ventilation.

- 397 Response of Rats to Repeated Inhalation of Ethylenediamine Vapors.
U. C. Pozzani and C. P. Carpenter. Arch. Ind. Hyg. & Occ. Med. 9, 223-226 (Mar. 1954).

No toxic effects on rats were detected from inhalation of ethylenediamine vapor at 132 ppm. over a period of 30 days, as judged by the usual criteria of response, although slight depilation occurred. Four persons were asked to sniff 100, 200, and 400 ppm. concentrations of the vapor for 5 to 10 seconds. The subjects agreed that 100 ppm. was inoffensive, 200 ppm. produced slight tingling sensations of the face and slight irritation of the nasal mucosa, and 400 ppm. caused intolerable irritation of the nasal mucosa. Such short-term tests serve only as rough guides to the concentration that is comfortable in protracted exposures. The clinical findings of Dernehl (IHF Abst. 47, Jan. 1952) on allergic response indicate that the estimation of a "safe" concentration may be impossible with ethylenediamine because of its sensitizing powers. -- Cond. from authors' conclusions

- 398 Carbon Tetrachloride Poisoning. R. S. McBirney. Monthly Rev. N. Y. State Dept. Labor 33, 1-4 (Jan. 1954).

The cases here presented demonstrate varied and serious effects from exposure to carbon tetrachloride, including (1) nausea, anorexia, and headache; (2) coma; (3) toxic hepatitis, lower nephron nephrosis, and hemorrhagic diathesis; and (4) toxic nephritis and psychosis. The need for exercising extreme caution in the use of carbon tetrachloride is stressed. Wherever feasible, a less toxic agent should be substituted.

- 399 Carbon Tetrachloride Poisoning. A Review. B. L. Hardin. Ind. Med. & Surg. 23, 93-103 (Mar. 1954).

The history of carbon tetrachloride as an anesthetic, analgesic, shampoo, and anthelmintic is presented. The industrial uses followed by injuries and threshold limits are described. The signs and symptoms of acute, subacute, and chronic poisoning are presented. For the most numerous and most dangerous type, subacute poisoning, 77 cases selected from American and English literature are analyzed. The various pathologic changes due to carbon tetrachloride poisoning which are reported in the literature are discussed. The mechanism of the lower nephron nephrotic syndrome is described as the stage of oliguria or anuria and the stage of diuresis. Treatment of any form of carbon tetrachloride poisoning consists of nothing specific. Treatment is really helping nature to tide the patient over until the regenerative power of the affected hepatic and renal cells build them back to normal again.

- 400 Studies in Fibrosis of the Liver Induced by Carbon Tetrachloride. I. Relation between Hepatocellular Injury and New Formation of Fibrous Tissue. K. Aterman. Arch. Pathol. 57, 1-11 (Jan. 1954).

The development of fibrosis of the liver has been studied in rats receiving small doses of carbon tetrachloride for prolonged periods. The association of the newly formed connective fiber tissues with preceding hepatocellular damage was so constant as to suggest their causal connection, thus supporting Moon's concept of hepatic fibrosis. The suggestion is advanced that the same vascular factors which determine the localization of the cellular lesions in acute damage by carbon tetrachloride continue to be operative throughout the stage of chronic poisoning.

-- Author's summary

- 401 Studies in Fibrosis of the Liver Induced by Carbon Tetrachloride. II. A Quantitative Study of the Effect of Cortisone on Fibrosis of the Liver in Rats. K. Aterman. Arch. Pathol. 57, 12-25 (Jan. 1954).

The collagen content has been estimated in the liver of normal rats and of rats treated with carbon tetrachloride for periods of 14 and 31 weeks. The

administration of cortisone to such animals led to a significant reduction of the amount of collagen present in the early stage of fibrosis but was without effect in the late stages. Cortisone significantly raised the fat content of the liver in the early but not in the late stage of fibrosis, when its administration was followed by a significant increase in the mortality of the animals. The part possibly played by the adrenal cortex in the development of experimental fibrosis of the liver has been discussed in the light of these findings.

-- Cond. from author's summary

- 402 Studies in Fibrosis of the Liver Induced by Carbon Tetrachloride.
III. Pantothenic Acid and Liver Fibrosis. K. Aterman. Arch. Pathol.
 57, 26-29 (Jan. 1954).

Rats which were treated with repeated injections of carbon tetrachloride were fed an excess of calcium pantothenate throughout the period of CCl_4 administration. Neither the histological examination nor the determination of the collagen content of the liver showed a significant difference by comparison with animals given carbon tetrachloride only.

-- Author's summary

- 403 Tetrachlorethylene Fatality. Case Report of a Patient with Infectious (Virus) Hepatitis and Hookworm Infestation. A. A. Goldbloom and L. J. Boyd.
 Ind. Med. & Surg. 23, 116-119 (Mar. 1954).

Tetrachlorethylene is the recent anthelmintic advocated for hookworm disease to replace the more toxic carbon tetrachloride. Tetrachlorethylene produced toxic manifestations of collapse, coma, and death from acute hemorrhagic enteritis in a patient suffering from infectious (virus) hepatitis and nonsymptomatic hookworm infestation. This case history is presented. The properties of tetrachlorethylene are discussed. It is used in the printing industry as a dry cleaning agent and as a constituent of solvent soaps. Before any of the hydrocarbons are administered, hepatic functional tests should be performed. Tetrachlorethylene, like carbon tetrachloride, should not be used in conditions such as alcoholism, hepatic disease, and toxic conditions.

- 404 Trichloroethylene Asphyxiation. S. Moskowitz. Monthly Rev. N. Y. State Dept. Labor 33, 5-6 (Feb. 1954).

An accident is reported in which three workmen were asphyxiated by exposure to trichloroethylene vapor. The trichloroethylene was used as a thinner for a corrosion resisting paint. Two employees were painting the inside of a metal tank about 9 feet in diameter and 12 feet deep, and open at the top. No mechanical ventilation or respiratory protection was considered necessary. They began near the top of the tank but climbed out of the tank for fresh air after 10 minutes. They returned to work 10 minutes later, but after

minutes more they became unconscious, collapsed, and spilled the remainder of their paint. Another employee who went to their rescue also collapsed. Other employees succeeded in getting the men out of the tank. They all recovered in two days after experiencing gastrointestinal disturbances. The paint contained 80% trichloroethylene. It was calculated that the trichloroethylene concentration could have approached saturation, that is, about 10,000 ppm. According to Henderson and Haggard, 37,000 ppm. kills animals in a short time, and other estimates are of the same order of magnitude. It is recommended that: (1) painters and others who work with solvents should be furnished with air-line respirators; (2) each worker should be attached to a life line held, outside the tank, by another worker strong enough to lift him out of the tank; a third worker should be within hailing distance; and (3) mechanical exhaust ventilation should be provided so as to remove the air from the bottom of the tank, to give an air movement past the worker of at least 100 feet per minute.

Absorption and Elimination of Carbon Disulfide. I. Retention of Inhaled Carbon Disulfide in the Rabbit. T. Toyama and H. Kusano. Igaku to Seibutsugaku (Med. & Biol.) 27, 83-85 (1953).

Inhalation by rabbits of air containing 20-150 ppm. carbon disulfide caused the partition coefficient (concentration ratio of CS_2 between blood and inhaled air) of 2.3 to 5.9; the time required to reach equilibrium state in the blood was 1.5 to 2.0 hours. After termination of the inhalation, 15 to 30% of CS_2 absorbed in the rabbit body was eliminated by respiration, trace to 0.09% in the urine, and none in the feces. Thus, 70 to 85% of absorbed CS_2 remained in the body.
-- Chem. Absts.

Absorption and Elimination of Carbon Disulfide. II. Distribution and Retention of Carbon Disulfide in the Tissues. T. Toyama and H. Kusano. Igaku to Seibutsugaku (Med. & Biol.) 27, 151-154 (1953).

When albino rats were allowed to inhale air containing 60-350 ppm. carbon disulfide for 2-3 hours, the retention of CS_2 was observed in the brain, kidney, and liver in decreasing order. After termination of the inhalation, CS_2 was eliminated from these organs rather rapidly in the first 6 to 8 hours, then the rate of elimination decreased, and some CS_2 was still detected in these organs even after 20 hours. When rabbits were allowed to inhale air containing 20-180 ppm. CS_2 , the amounts of CS_2 absorbed in the body that remain in some organs at 3 hours after termination of inhalation, when no CS_2 was observed in the blood, were larger for larger CS_2 contents in the inhaled air. The amount of CS_2 in the organs as compared with that absorbed in the body suggested the destruction of CS_2 in these organs.
-- Chem. Absts.

- 407 Toxicological Studies on p-Tertiary-Butyltoluene. C. H. Hine, H. Ungar, H. H. Anderson, J. K. Kodama, Joan K. Critchlow, and N. W. Jacobsen. Arch. Ind. Hyg. & Occ. Med. 9, 227-244 (Mar. 1954).

On the basis of our studies in rodents, we would classify TBT, following single exposures, as slightly toxic on ingestion, moderately toxic on inhalation, and practically nontoxic on skin exposures. TBT produces depression of the central nervous system and irritation of the pulmonary tract as its chief acute toxic effect in animals, while on repeated exposures liver and kidney changes are evident. The effects on the blood resemble those of benzene rather than of toluene; however, they are not as constant or as severe. Of considerable interest are the degenerative lesions in the spinal cord and brain, produced in experimental animals at relatively low concentrations. Sensory response studies on human volunteers indicate that the compound is readily recognized at concentrations as low as 5 ppm, but is not especially unpleasant at 80 ppm. A low-grade transient intoxication was noted in some men during pilot-scale production of TBT. Signs and symptoms were chiefly referable to the cardiovascular, hemopoietic, and central nervous systems. Present safe-handling procedures are described. We recommend a maximum allowable concentration of 10 ppm. for TBT.

-- Authors' conclusion

- 408 Naphthalene Poisoning from the Ingestion of Moth Balls. R. R. MacGregor. Can. Med. Assn. J. 70, 313-314 (Mar. 1954).

A case of naphthalene poisoning from the ingestion of moth balls is reported. Complete recovery took place following a period of marked systemic disturbance, which was characterized at the onset, by vomiting, prostration and pyrexia, later by rapidly developing hemolytic anemia, slight jaundice, leucocytosis and acute nephritis. Complete recovery ensued. Fatal cases have been reported in the literature. Differential diagnoses from Lederer's anemia, an acute hemolytic anemia of unknown origin, is difficult unless a history of ingestion of naphthalene is definitely known to have taken place.

-- Author's summary

- 409 Skin Penetration by Diamines of the Benzidine Group. J. W. Meigs, L. J. Scarini, and W. A. Van Sandt. Arch. Ind. Hyg. & Occ. Med. 9, 122-132 (Feb. 1954).

Studies were made of workers manufacturing benzidine, dichlorobenzidine, dianisidine, and o-tolidine through application of a microchemical screening technique applied to urine samples voided at the end of the work shift, through use of paper chromatography, and through study of air samples. Results showed that the skin was the principal portal of entry for these substances into the body under the conditions observed, that environmental conditions of high air temperature and high relative humidity were associated with

greater excretion of these diamines, and that reduction of contamination of skin and clothing by these diamines resulted in substantial reduction of urinary concentrations of these substances. -- Authors' summary.

Pesticide Research and Control. K. S. Chester. *Battelle Tech. Rev.* 3, 6-21 (Feb. 1954).

The author reviews progress in the development of pesticides as an aid in agriculture and considers problems in agriculture that are awaiting the invention of new pesticides. The cost of developing new chemicals is high, and there is danger that only the largest chemical manufacturers can afford development programs. In the long run, the cost will be brought down by basic research. The evaluation of human toxicity is an important phase of the research on new products. Two methods of reducing costs of toxicological research are suggested. The first is to use chemical analyses in certain cases, instead of animal experimentation. This applies especially to the problem of food contamination. The method will be practicable only when there are sufficient toxicological data on the particular substances tested. A second principle that deserves wider use is low-cost, preliminary screening of new materials for acute toxicity. Such preliminary screening might eliminate a high percentage of new compounds from any further consideration and reserve only those of lesser toxicity for more expensive advanced, quantitative studies.

Contamination of Nectar with the Systemic Insecticide "Schradan."
D. G. Jones and W. D. E. Thomas. *Nature* 171, 263 (1953).

Radioactive octamethylpyrophosphoramidate (schradan) was sprayed on the leaves of white mustard plants. The flowers that opened 3-12 days after spraying were used as the source of a bulk sample of nectar for schradan content. Radioassay indicated a concentration of 5 ppm. of unchanged insecticide in the nectar. -- Chem. Absts.

Experiments on the Possible Contamination of Honey with Schradan.
D. G. Jones and W. D. E. Thomas. *Ann. Appl. Biol.* 40, 546-555 (1953).

The low toxicity of schradan to honey bees led to the consideration of the possibility that it might be present in the nectar and subsequently appear in honey in unchanged form. With radioactive schradan labeled with P^{32} , spray application to mustard and forage plants resulted in contamination of nectar. A series of samples taken over a 4-week period following spraying showed on radioassay a progressive decrease in P^{32} content and also in the amount of schradan present in proportion to the decomposition products. The maximum schradan content of the nectar was 21 ppm. Tests of stability of schradan in contact with the honey stomach of the bee and also in contact with the enzyme invertase, in vitro, showed no appreciable breakdown. Schradan was stable in contact with honey over a period of 2.5 months. -- Chem. Absts.

- 413 The Electroencephalogram in Poisoning by Lacquer Thinner (Butyl Acetate and Toluene). P. Andersen and B. R. Kaada. *Acta Pharmacol. Toxicol.* 9, 125-130 (1953).

A patient who had been spray-painting in a small unventilated room showed afterward an electroencephalogram with abnormally slow (6 per second) discharges in all leads, lasting several months. Rabbits were exposed to the vaporized lacquer thinner (a mixture of butyl acetate, toluene, and ethanol) in acute experiments lasting from 15 to 120 minutes, and chronic experiments up to 12 days. Slight slowing of the normal waves was recorded from animals exposed to sublethal concentrations (4000-8000 ppm.), and was always preceded by other signs of intoxication. Normal human subjects and epileptics exposed to concentrations of 1000 to 5200 ppm. during 10 to 30 minutes showed no changes in the electroencephalogram.

-- Biol. Absts.

- 414 Appearance of Carcinoma Following Single Exposure to a Refrigeration Ammonia-Oil Mixture. Report of a Case and Discussion of the Role of Co-Carcinogenesis. M. B. Shimkin, A. A. de Lorimer, J. R. Mitchell, and T. P. Burroughs. *Arch. Ind. Hyg. & Occ. Med.* 9, 186-193 (Mar. 1954).

The clinical appearance of an epidermoid carcinoma of the nasal vestibule within six months following a single exposure of the area to a corrosive concentration of ammonia in oil in a 60-year-old refrigeration worker is presented. In our opinion, a causal connection can be reasonably postulated between the trauma and the exteriorization of a latent neoplasm as an example of a co-carcinogenic effect.

-- Authors' summary

INDUSTRIAL DUSTS

- 415 A Fungistatic Substance Extracted from Vitrain. N. C. Schenck and J. C. Carter. *Science* 119, 213-214 (Feb. 12, 1954).

In 1951 W. D. Evans (IHF Abst. 994, Sept. 1952) reported the presence of a bacteriostatic substance in English coals. He named it vitricin because of its occurrence in the vitrainous parts of coal seams. He demonstrated that it inhibited *Bacillus subtilis* and attributed differences in prevalence of pneumoconiosis among mine workers to differences in the amount of vitrain coal in different mines. The authors examined vitrains from Illinois and Wyoming coals by a chromatographic technique similar to that used by Evans and found that they all contained soluble fungistatic material. The methods of extraction and testing action on fungi are

described. The effect of the extract was fungicidal on two types of organisms but fungistatic on six others. The difference in effect may have been due to differences in the rate of spore germination and in rate of growth of hyphae. The fungi on which the tests were made include several that are highly detrimental to some types of vegetation.

- 16 A Bacteriostatic Substance Extracted from the Vitrain Ingredient of Coal.
R. M. Kosanke. *Science* 119, 214-217 (Feb. 12, 1954).

A bacteriostatic substance has been extracted from American coals using the method proposed by Evans (see preceding abstract) and by other methods and with other solvents. This substance has been extracted from lignite, subbituminous coal, and high volatile bituminous coal of C, B, and A rank, but the bacteriostatic action of extracts from volatile A (the most highly metamorphosed) rank is slight. A substance extracted from a Pleistocene wood and two modern woods prevents the growth of *B. subtilis*. Whether this substance is the same as that obtained from coal is not known. Evans had used only methanol in making the extractions. Acetone extracts gave comparable results, absolute ethanol somewhat less, and amyl alcohol only a trace of zone of inhibition in the bacteriostatic tests. Benzene, pyridine, butyl acetate, and ether did not extract a bacteriostatic substance. A more thorough method of extraction, which is described, produced extracts which prevented the growth of *B. subtilis* only slightly better than extracts obtained by Evans' method, but were vastly better for fungi which were tested by Schenck and Carter (preceding abstract). On concentrating the the extract, a milky-tan precipitate and a dark brown-red substance were produced. Both contained a bacteriostatic substance.

- 17 Pathological Anatomy of Simple Pneumoconiosis in Coal Workers.
A. G. Heppleston. *J. Pathol. Bacteriol.* 66, 235 (July 1953).

Simple pneumoconiosis in coal workers is characterized by numerous small, discrete aggregations of dust in which only a little fibrosis occurs and in association with which a focal type of emphysema frequently develops. In attempting to elucidate the causation of this peculiar type of emphysema, it became evident that the dust lesion is a more complex structure than at first appeared. The anatomy of the respiratory portion of the bronchial tree and the structure of the dust lesion which characterizes simple pneumoconiosis in coal workers were investigated by means of the serial-section technique. Studies were made on the lungs of 40 coal workers and on 14 persons who had had no industrial exposure to dust. It was found that the simple dust lesion of coal workers takes the form of a sheath of dust cells, enmeshed in fine fibrous tissue, surrounding the respiratory bronchioles. The proximal limit of this sheath is regularly in the region of the division of the terminal bronchioles, but distally the dust investment extends for a variable distance up to the division of the final order of respiratory bronchioles, depending on the

degree of dust accumulation. The early lesion of coal workers closely resembles the dust focus often found in normal lungs. In mature dust lesions the ensheathed bronchioles dilate, and this is known as focal emphysema. No evidence was found that focal emphysema results from a proximal obstruction of the air passages by dust fibrosis. On the contrary, simple narrowing of a terminal bronchiole induces neither dilatation nor collapse of distal segments of the airway. Generalized vesicular emphysema is distinct from focal emphysema. It is characterized by dilatation of alveolar ducts, atria, and alveolar sacs. Rupture of alveolar walls does not occur, but in the formation of bullae localized areas of lung tissue are destroyed. The focal and the generalized varieties of emphysema may coexist. Small tension cysts of the lung, unlike focal emphysema, result from a valvular type of obstruction to expiration. The anatomical findings show that dyspnea in simple pneumoconiosis is due to an increase of the dead space in the dilated respiratory bronchioles. There is thus a functional obstruction to gaseous exchange but no anatomical obstruction in the air passages.

-- Arch. Ind. Hyg. & Occ. Med.

- 418 Pneumoconiosis in Gasworkers. F. H. Tryer, J. Gregory, and M. B. Carson. *Trans. Assn. Ind. Med. Officers* 3, 246-249 (Jul.-Oct. 1953)..

A radiographic survey of the chests of eighty-six men employed in gas works retort houses and coke screening plants for upwards of ten years, and of 104 gasfitters and meter inspectors, is described. Dust counts were carried out at selected points in a retort house and a coke screening plant; samples taken from the retort house showed 25-75 particles between 1 and 5 microns per cc. of air, and from the coke screening plant 600-1,300 particles per cc. of air. 90% of the particles in a sample taken from the coke screens were less than 1.6 microns in diameter. Other samples of this dust contained 0.70% and 0.80% of free silica, and in the fractions of these samples below 10 microns in diameter the figures were 0.64% and 0.72% respectively. Three cases of pneumoconiosis were found among the nine coke screen attendants examined, and none among the other occupational groups.

-- Authors' summary

- 419 Electrophoretic Study of Serum Proteins in Silicosis and Silicotuberculosis, together with Various Serum Lability Tests. H. Beckmann, H. Antweiler, and A. Hilgers. *Beitr. Silikose-Forsch.* No. 20, 1-21 (1953). German.

The authors examined 537 miners in the Ruhr area; 211 suffered from pure silicosis and 73 from silicosis plus tuberculosis. The serum proteins were examined by filter-paper electrophoresis, and lability tests were made. The total serum protein level was determined by the copper sulfate specific gravity method. There was in all cases a fall in the albumin level with a corresponding rise in the gamma-globulin percentage. The total serum protein remained within normal limits. There was no

difference between silicosis and silicotuberculosis in these tests, but the more severe the disease the more pronounced was the change in the serum-protein composition. The erythrocyte sedimentation rate and changes in lability shown by the Weltmann band and the Takata test increased generally with the rise in gamma-globulin but there was no constant correlation. There was even less correlation between gamma-globulin level and the results of the thymol turbidity test, cadmium sulfate precipitation, and cephalin-cholesterol flocculation. -- Cond. from Bull. Hyg.

²⁰ Investigation of Cotton Industry Workers with Special Reference to Lung Injuries. T. Dalhamn and L. Friberg. Nord. Hyg. Tidskr. No. 7/8 141-147 (1953). Danish with English summary.

A clinical investigation was conducted on 40 male workers in the bale working, picking, carding, and spinning operations in four cotton industries. Four of the workers had symptoms of "mill fever," with probable emphysema in three; but on the whole both the lung function and physical working capacity were normal. There is no evidence of relation between exposure to cotton dust and the rather exceptional occurrence of impaired lung function. The highest dust concentration occurred in the carding rooms, about 150 particles per cc. of air, after installation of good technical protective devices. Cotton of a high degree of purity was used. The results do not afford a sufficient basis for the establishment of a general MAC value for cotton dust. Where cotton of the degree of purity in question is used, however, a concentration of 150 particles per cc. (4.2 mppcf) and probably considerably higher concentrations, may scarcely be presumed to give rise to lasting lung injuries even in case of prolonged exposure.

-- Cond. from English summary. (Bull. Hyg.)

PHYSICAL ASPECTS OF THE ENVIRONMENT

⁴²¹ Conference on Factory Noise. Sponsored by the Associated Industries of New York State, Schenectady, N. Y., Oct. 29, 1953. Am. Ind. Hyg. Assn. Quart. 15, 29-63 (Mar. 1954).

Following are abstracts of the papers presented:

The Noise Problem. J. H. Sterner. An introduction to the series of papers in which the author summarizes the present situation in the field of industrial noise.

Noise Can Be Controlled. C. R. Williams. The basic approaches to noise control are described. General control methods such as changes in

process and equipment, isolation maintenance, use of vibration mounting and resilient materials, and proper designing are discussed. Particular attention is given to control of noise from drop hammers, jets, and exhausts.

Noise Control Demonstration. F. A. Patty. An effective noise control demonstration is described. The effects of mufflers and various types of enclosures on the noise from a Dumore air pump are presented. Octave band analyses show that substantial reductions can be attained by using a double enclosure with an intervening air space.

Controlling the Noise from Punch Press Areas. H. W. Crouch. An enclosure of 3/8 inch plywood lined with sound-absorbing tile is used to reduce the noise of a punch press. An overall reduction of 12 db. was obtained, but in the range above 1000 cycles per second the reduction was from 15 to 21 db. A partial enclosure produced only 2 db. overall reduction with a 5 or 6 db. reduction in the two high frequency bands. The use of sound absorbing baffles is discussed. The largest reduction in any octave band was 11 db. in the 4800 to 9600 cycles band.

Noise Reduction by Enclosing Jordan Shredding Machines. H. W. Crouch. Water in a paper mill complicated the problem of enclosing a Jordan shredding machine. A hood of 14 gauge steel with a 3-inch blanket of flexible Fibreglas produced an average reduction of 7 db. in the Jordan area.

Enclosure for a Can Divider. J. R. Cox. A partial enclosure of plywood lined with acoustic tile is built for a divider which splits a conveyor line of cans into two lines. Octave band measurements demonstrate the noise reduction achieved. These measurements also indicate the effects of openings in partial enclosures and consequently the necessity of making noise measurements at several locations.

Noise Control for a Strand Cutter. J. R. Cox. The step-by-step reduction of the noise from a rotary cutter which is cutting plastic strands about 1/8 inch in diameter is described. The noise reduction achieved is demonstrated by spectra showing the original level, and the effects of changing the cutter adding a partial enclosure, and finally enclosing completely.

Reducing Noise of Glass Grinding. C. L. Raymond. The noise from a beveling operation on glass is reduced by placing one surface of the glass in a stationary tray full of water. A spectrum of the reduction is given. The overall sound level reduction is 7 db. with a maximum reduction of 13 db. in the two highest octave bands.

Personal Protection. H. E. Von Gierke. Ear plugs and ear muffs, and combinations of these two devices are discussed. For ear plugs alone, a theoretical curve for the maximum protection is extrapolated from the low frequency limits established by the skin elasticity and the high frequency limits established by bone conduction. Under 100 cycles per second this maximum attenuation is about 28 db., and it increases to somewhat more than 45 db. with higher frequencies. Ear plugs and muffs used in combination produced about 5 or 6 db. greater attenuation than ear plugs alone. Over a period of time this reduction is demonstrated to be worth while. The relation between the percentage word articulation and the speech level with and without ear plugs is discussed. There is improved intelligibility in the presence of intense noise if plugs are worn.

Substitute Equipment. H. W. Gutekunst. A reduction of 18 db. was obtained by replacing an air hammer and backing plate operation by a squeeze tool. A reduction of 8 db. was obtained by substituting a rotary tab cutter for an air chisel.

Liners. H. W. Gutekunst. The use of plastic and rubber to line tumblers and chutes is discussed briefly.

Mufflers. H. W. Gutekunst. Several mufflers designed to reduce the noise level created by the release of compressed air are described.

Enclosures. H. W. Gutekunst. Enclosures for an axle housing, a cold header, a Verson Press, and a gasoline engine are described. Pictures are included.

Compressed Air Exhaust Muffler. J. H. Botsford. A muffler designed to reduce the noise caused by the exhaust jets of pneumatic presses is described. The muffler reduced the levels in the three highest octaves by 11, 13, and 22 db. respectively. The exhaust noise has been concentrated in these bands.

Vibration Damping for a Saw Sharpening Operation. J. H. Botsford. A glass fiber pad was used to cover most of the vibrating surface of a large circular saw which was being sharpened. Depending on the percentage area covered by the damper, the reduction in the octave bands above 1200 cycles per second varied from 6 to 10 db.

Enclosures for Noise Reduction in the Factory. R. J. Wells. An enclosure for a pneumatic fatigue testing device and a partial enclosure for an alternator are described. Spectra showing the noise level in a jet engine test cell with engine operating and the noise level in the control room separated by a one foot concrete wall are given. The principles of noise reduction by means of solid partitions are discussed. A chart for computing sound attenuation offered by a barrier and a nomogram for computing loss in wall attenuation due to an opening on a thin section is presented.

Summary of Proceedings. A. D. Brandt.

Noise Measurement and Analysis. V. H. Pomper. Safety Maint. and Prod. 107, 54-56, 59-62 (Mar. 1954).

The various types of noises are discussed and some properties of the ear are presented. A history of the development of noise instruments and some of their properties and uses are described. The sound level meter and the octave band analyzer are given particular attention. The use of the sones unit to describe loudness is illustrated. There is an example of how two sounds with the same overall sound pressure level will differ in loudness both according to the ear and according to the number of sones. Various types of calibration of the instruments are evaluated.

A Technique and a Scale for Loudness Measurement. W. R. Garner. J. Acoust. Soc. Am. 26, 73-88 (Jan. 1954).

A method of loudness scaling is presented for obtaining a true ratio scale of loudness. Two separate loudness functions are required, one based

on equisection judgments and the other based on fractionation judgments. Interrelation of these two scales allows determination of all constants necessary for a ratio scale. The method provides validation of the assumptions underlying its use. Experimental data are also presented which show that the method is valid for individual observers, differences between loudness scales of different observers are considerably reduced with the method, and the loudness function obtained with this method is much flatter than the standard scale now used. It is then shown that this new loudness scale is in better agreement with other data on equal loudness intervals than the standard scale. It is also shown that this scale is in agreement with monaural-binaural loudness data and data on loudness of multicomponent tones.

- 424 Occupational Loss of Hearing. A report of the Committee of Consultants as presented to the Workmen's Compensation Board of the State of New York. Ind. Med. & Surg. 23, 128-130 (Mar. 1954).

In an effort to find standards by which evidence in loss of hearing cases ought to be evaluated, the Workmen's Compensation Board of New York constituted a committee of technical experts as consultants in the problems of industrial noise and hearing loss due to work in noisy environments. The Committee of Consultants was asked a series of questions dealing with all phases of the industrial noise problem, including which noises cause hearing losses, how to evaluate these losses, how to establish permanency of hearing loss, etc. The Committee reached unanimous agreement in answering these questions, and their complete report is presented.

- 425 The Hearing Loss Program. Part II. M. S. Fox. Occ. Hazards 16, 45-47, 66-68 (Feb. 1954).

A questionnaire has been sent to the workmen's compensation boards or industrial commissions in each state. The questions concerned methods of evaluating hearing loss, compensation of occupational deafness, intent of the compensation laws, and distinction between sudden and gradual loss of hearing. The results are presented in a table. In addition, there is a summary of the answers which the Committee of Consultants prepared for the questions raised by the New York State Compensation Board in regard to the industrial noise problem.

- 426 Evaluation of Hearing Loss in Drop Forge Workers. M. S. Fox. Laryngoscope 63, 960-971 (Oct. 1953).

The author examined 64 drop forge workers who had filed claims for alleged loss of hearing resulting from their work. Otologic, audiometric, and ear, nose, and throat studies were made. Medical consultation was requested when indicated. One worker was malingering, and another had

psychogenic deafness. The hearing losses in the other 62 were proportional to the length of employment. The ability to hear conversational voice, on the average, followed the audiometrically determined hearing losses. Intensive noise levels were present in the forge plants. There were few records pertaining to preemployment hearing, and it was necessary to rely on applicants for their history. Some had trouble with only high frequency sounds, while others had difficulty in hearing speech. The study shows the need for basic investigations in the forge plants. The hearing status of the worker will have to be studied at the beginning of employment and periodically thereafter. Functional relationships between exposure factors will have to be determined as well as the effectiveness of methods used for noise control. Presently used formulas and methods of evaluating industrial hearing will have to be revised.

-- Cond. from J. Am. Med. Assn.

- 427 Ear Protection by "Glass-Fiber Down." S. Quist-Hansen and G. Ek. Tidsskr. Norske Laegeforen. 73, 84 (1953). Norwegian.

The protective effect of the Swedish-produced "glass-fiber down" was tested and was found to give reasonably good ear protection in the case of noise up to a 110 to 115 decibel strength, especially high-frequency noise.

-- Arch. Ind. Hyg. & Occ. Med.

- 428 Noise in Industry. H. W. Crouch. Am. Acad. Occ. Med., Proc. 5th Annual Meeting. pp. 67-68 (Feb. 1953).

The subject is reviewed briefly, including definitions of terms pertaining to sound, a table of sound levels, methods of measurement, and some suggestions on noise reduction.

- 29 Measuring Industrial Noise to Hearing Loss. C. I. Miller. Am. Acad. Occ. Med., Proc. 5th Annual Meeting. pp. 70-73 (Feb. 1953).

The hearing program in effect at Eastman Kodak is described. Pre-placement tests are made in the Medical Department. Despite a noise level of 62 decibels in the test room, normal audiograms are obtained by using the standard ear muff type of headphone on the audiometer. A second part of the program involves making hearing tests in the plant. Since a location, which was quiet enough to allow normal audiograms, was not available, an inexpensive booth was built. The overall noise level in the booth was 64 decibels, but the peak was below 75 cycles per second and accurate audiograms could be obtained. It is estimated that by using the booth to take "on the job" audiograms, twenty-five minutes working time was saved on each test. The results of 3360 pre-placement examinations are tabulated by age and sex. The percentage of failures increases with age, for each sex, but the males have a larger percentage of failures than the females.

- 430 Ultraviolet Emission during Inert-Arc Welding. J. J. Ferry. Am. Ind. Hyg. Assn. Quart. 15, 73-77 (Mar. 1954).

Comparative measurements have been made of the ultraviolet emission during inert-gas metal-arc welding and during metal-arc welding with heavily coated electrodes. Results show that, for the most part, the intensities produced by the inert-gas metal-arc process were far higher--frequently 10 to 20 times higher--than those produced during metal-arc welding with heavily coated electrodes. This was particularly true in the lower wave length range, 2537 A, when the consumable electrode was used with the inert-gas metal-arc process. The physiological effects of ultraviolet on skin and eyes have been discussed.

-- Author's summary

- 431 Work in Hot Environments. D. Van Zuilen. Ingenieur 64, 69-75 (Jul. 1952). Dutch.

A survey is given of laboratory experiments and field tests on the upper limits of environmental heat tolerated by workers. The survey is based on information gathered from current literature. The situation in environments with and without elevated mean radiant temperatures is discussed. When there is no difference between the air temperature and the mean radiant temperature, the effective temperature can be used to describe the environmental condition. With radiant heat the mean radiant temperature should also be taken into account. A table summarizes the tolerated effective or corrected effective temperatures and the safe exposure times for light work and heavy work.

-- English summary

- 432 Blood Volume and Total Amount of Hemoglobin in "Heatworkers." A. Lindholm. Arbeitsphysiol. 15, 99 (1953). German.

It is known that exposure to a hot environment produces a rise in blood volume. During the first few days the blood volume increases only by dilution and later by an increase in the plasma protein. There has been some discussion as to whether the total hemoglobin is also increased. Studies were made on 40 workmen in 3 groups with different degrees of heat exposure. There were no statistically significant differences in the total amount of hemoglobin or blood volume per kilogram of body weight among the three groups. These results confirm those established by other investigators.

-- Cond. from Arch. Ind. Hyg. & Occ. Med.

- 433 Physiological Basis of Rest Pauses in Heavy Work. E. A. Muller. Quart. J. Exptl. Physiol. 38, 205 (1953).

The author points out that in muscular work contraction is always followed by relaxation. He explains the physiological meaning of this alteration and shows that the greater the blood flow through a muscle during

contraction and relaxation, the better recovery can follow fatigue. In automatic action such as breathing and in natural activity such as walking, an equilibrium between fatigue and recovery can be easily established. In industrial work, however, it is necessary to assure that recovery keeps pace with fatigue. If more energy than 4 kg. -Cal. per minute is continuously spent, it is necessary to draw on reserve energy. This endurance limit amounts to 2000 kg. -Cal. in an 8-hour shift. About one workman in 25 performs work that expends that much energy. The author discusses two approaches to the problem of finding the right length and number of pauses in heavy work. One method, rough and reliable only in rather heavy work, is to take 4 kg. -Cal. per minute as an over-all limit of working capacity and to give enough pauses to keep the average energy expenditure of the whole shift on that level. The other method takes the pulse rate as an index of blood supply to all muscles, and a sufficient blood supply to the working muscles is the principle necessity in avoiding fatigue. This method aims at keeping the pulse rate during the shift at a constant level and at preventing any kind of pulse debt. The second method has proved useful in arranging pauses so as to allow a man to work within his endurance limit.

-- Cond. from Arch. Ind. Hyg. & Occ. Med.

RADIOACTIVITY AND X-RADIATION

Precautions in the Use of Ionizing Radiations in Industry.

(Great Britain) Ministry of Labour and National Service: Factory Dept. Factory Form 324. 18 pp. Obtainable from British Information Service, 30 Rockefeller Plaza, New York 20, N. Y. (1953). Price about 50 cents.

Recognition of the wide spread use of x-rays and radioactive substances in industry in Britain for the examination, testing and improvement of products and processes requires that the industrial worker be warned of the dangers and apprised of the precautions. Numerous applications of the use of this radiation are outlined. No industrial processes have as yet been reported in which neutrons, protons and deuterons are used. Immunity from harmful effects depends on knowledge of the properties of various radiations, their potential damaging effects on the body, and vigilant attention to necessary precautions. Recommended maximum permissible dosage rates based on internationally agreed values are quoted and explained. A comprehensive bibliography of published memoranda is included.

-- Cond. from Nature

- 435 Public Health Aspects of Atomic Power Development. S. Warren.
Arch. Ind. Hyg. & Occ. Med. 9, 183-185 (Mar. 1954).

The atomic energy projects have maintained a remarkable safety record for their workers, and standards for exposure have been set and maintained. The problem of environmental health still has to be weighed, however. Failure in an atomic energy installation might lead to a disastrous explosion leaving difficult problems for industry in public liability. The release of radioisotopes to water or air must be controlled, especially since future installations may be in heavily populated areas. In addition to personal damage, additional problems may arise from the standpoint of genetics. The frequency of the occurrence of mutations is enhanced by ionizing radiation. When large populations are concerned the present permissible levels should be lowered by a factor of 5 or possibly more. Therefore the permissible dose levels should be kept flexible.

- 436 Radium in the Healing Arts and in Industry. J. G. Terrill, Jr.,
S. C. Ingraham II, and D. W. Moeller. Public Health Repts. 69, 255-262
(Mar. 1954).

The numerous uses of radium in medicine and industry bring many persons into the range of potential exposure. Radium can be purchased on the open market, without formal application or special facilities. Currently, a total of about 1,000 curies are in medical and industrial use in the United States. Sound radiological practice suggests that official health agencies should learn where radium sources are used in their communities and should assure themselves that proper precautionary measures are maintained.

-- Cond. from authors' summary

- 437 Recommendations for the Disposal of Carbon-14 Wastes. National Bureau of Standards, Handbook 53. 14 pp. (Oct. 1953). For sale by Supt. of Documents, U. S. Govt. Printing Office, Washington 25, D.C. 15 cents.

The recommended methods include isotopic dilution, discharge into sewers, incineration, atmospheric dilution, disposal as garbage, and burial. Limits are set for the concentration of C^{14} or its ratio to other materials for each form of disposal. The long half-life and wide occurrence of C^{14} introduce considerations in its disposal that differ from those applying to other isotopes.

- 438 Effect of Whole Body X-irradiation of Blood Constituents. W. E. Cornatzer,
O. Engelstad, and J. P. Davison. Am. J. Physiol. 175, 153-156 (1953).

A statistically significant rise in plasma cholesterol and uric acid, and a decrease in albumin/globulin ratio and percentage of cholesterol ester occurs in the dog after 500 r. whole body x-irradiation. -- Chem. Absts.

- 439 Terminal Phenomena Associated with Massive Doses of X-rays. H. L. Andrews and K. C. Brace. *Am. J. Physiol.* 175, 138-140 (1953).

A series of 22 guinea pigs were exposed to 25,000 r. of x-rays over the whole body or with various areas shielded. All animals showed a striking drop in the heart rate and body temperature, and slow waves appeared in the electroencephalogram. Clinical signs of central nervous system dysfunction appeared after a few thousand r. had been delivered and these persisted until death.

-- Chem. Absts.

- 440 Polonium in Urine of Miners Exposed to Radon. Mary Sultzer and J. B. Hursh. *Arch. Ind. Hyg. & Occ. Med.* 9, 89-100 (Feb. 1954).

Concentrations of polonium 210, varying from about 2 to 38 micro-microcuries per liter have been measured in the urine of miners working in the mines of the Colorado Plateau. No urinary polonium could be detected in laboratory personnel. The polonium is believed to come from lead 210 stored in the bone, which, in turn, is derived about equally from radon daughter products deposited in the lung and radon accumulations in body fat. It is suggested that urinary polonium measurement may prove to be a method of estimating the integrated exposure of the lungs to radon and its daughters. It is demonstrated that, even though body burdens of radium equal to the maximal permissible level are accumulated by radium miners, this amount of radium would contribute a negligible amount of polonium in the urine. The observed polonium output agrees with theoretical values.

-- Cond. from authors' summary

ENVIRONMENTAL MEASUREMENTS

- 441 Simultaneous Determination of Small Quantities of Hydrogen Sulfide and of Carbon Disulfide in the Atmosphere. W. Sonnenschein and K. Schafer. *Z. anal. Chem.* 140, 15-25 (1953). German.

Improvements in known methods permit the determination of 0.1 mg. of hydrogen sulfide per cu. m. and 0.6 mg. of carbon disulfide per cu. m. air. In preparing the standard curve for H_2S , a colloidal solution of zinc sulfide is used instead of the less stable and much stronger sodium sulfide solution, and the volumes of the solutions used in the test are smaller. The H_2S determination is based on its conversion to methylene blue, and the most sensitive test with sodium diethyldithiocarbamate is used for determining CS_2 . The apparatus recommended is pictured and explained fully.

-- Chem. Absts.

- 442 Analyses of Biological Materials as Indices of Exposure to Organic Solvents. H. B. Elkins. Arch. Ind. Hyg. & Occ. Med. 9, 212-222 (Mar. 1954).

Determination of urine sulfate ratios is a proved method of evaluating exposure to benzene vapor. Analysis of urine for the proper solvent or metabolite is certainly helpful in estimating exposures to methanol, methyl acetate, toluene, trichloroethylene, and aniline. Determination of blood bromide is useful in connection with exposures to methyl bromide, methylene chlorobromide, and probably other organic bromides. The author believes that measurements of urinary bromides and of urinary carbon disulfide can also be of value. There is even hope that a urinalysis method can be developed for carbon tetrachloride. In analysis of biological specimens for solvents, however, it appears that each solvent represents a different problem, and some knowledge of the peculiarities of the metabolism and excretion of each is necessary; without it one may be led astray in the interpretation of results.

-- Cond. from author's summary

- 443 Errors Due to Anisokinetic Sampling of Aerosols. H. H. Watson. Am. Ind. Hyg. Assn. Quart. 15, 21-25 (Mar. 1954).

Isokinetic flow conditions at a sampling orifice are necessary for quantitative sampling of an aerosol from a moving air-stream. Never, however, are such conditions completely achieved, often not even approximately. Hence it becomes necessary to investigate the errors involved and to design sampling equipment so that the errors thereby introduced are minimized. The author briefly reviews the available data on the effects of anisokinetic conditions and presents a semi-empirical theory developed from some experimental results.

- 444 New Design of Filter Holder for Dust Sampling. K. E. Lauterbach. Am. Ind. Hyg. Assn. Quart. 15, 78 (Mar. 1954).

A new filter holder for sampling of airborne dusts with molecular filter discs is described. It is designed especially for easy handling within the confines of a dry box used for experimentation with radioactive aerosols. It has also been used satisfactorily with other filtration media.

- 445 Properties of Various Filtering Media for Atmospheric Dust Sampling. W. J. Smith and N. F. Suprenant. Atomic Energy Comm. Publication NP-5007, 25 pp. (July 1953).

A group of atmospheric dust sample media has been studied for performance characteristics. The media were selected to represent those in use in a number of laboratories. Test methods used were di-octyl phthalate (DOP) smoke penetration, atmospheric dust penetration, efficiency by particle size, and plugging rate on atmospheric dust. A wide range of properties were shown.

The filtering properties have been discussed, and the suitability of the media for various applications has been indicated. It has been demonstrated that efficiency measurements by the DOP smoke test follow very closely the results given by atmospheric dust counts. This suggests that the fast DOP method can be used to rate any filter medium on per cent of atmospheric dust penetration by particle count.

-- Nuclear Sci. Absts.

- 446 Determination of Silica in Blood and Organs Photocolorimetrically.
L. V. Afanas'eva. *Biokhimiya* 18, 319-323 (1953). Russian.

A colorimetric method depending on the silica-molybdenum complex is described. Working details are given in *Chem. Absts.* 48, 1460 (Feb. 10, 1954).

PREVENTIVE ENGINEERING

- 447 Some Tests on a High Efficiency Air Cleaner. D. R. Whittet. Atomic Energy Comm. Publication NGTE-R-139. 40 pp. (July 1953).

Performance tests were conducted on a special form of Cottrell precipitator in which a moving film of water forms the receiving electrode. The tests were conducted mainly on three different lengths of 3-inch tube with length-to-diameter ratios ranging from 3 to 10 feet per second. Blackness test efficiencies as high as 99.99% were recorded in the laboratory when using air polluted with carbon smoke as a test atmosphere, and up to 99.94% when cleaning a typical industrial atmosphere. The performance of the cleaner at differing conditions of air velocity, applied voltage, wire diameter, tube diameter, and tube length is examined, and a comparison is made between the actual test results and those forecast by application of certain commonly used expressions for efficiency and field strength. An examination is also made of the power requirements of this type of cleaner, and recommendations are made concerning the most economical form of construction and the choice of tube dimensions.

-- Author's summary (Nuclear Sci. Absts.)

- 448 Continuous Disposal of Fluorine. Reaction with Superheated Steam.
S. H. Smiley and C. R. Schmitt. *Ind. Eng. Chem.* 46, 244-247 (Feb. 1954).

A variety of methods for disposal of waste fluorine have been investigated, including atmospheric dilution, reaction with water or steam, reaction with caustic soda solutions, combustion with hydrocarbon fuels, reaction with carbon

or sulfur, absorption by lime or limestone, absorption by inorganic fluorides of lower valence, and reaction with hydrogen. Atmospheric dilution is obviously objectionable, and the other methods generally involve difficulties and exposure. The authors describe a method in which the fluorine reacts with steam and which has been found successful in pilot plant investigations. The method and apparatus are described. Monel metal is a suitable construction material for the reactor. The difficulties involved are discussed and the reaction products and their identification are considered briefly.

COMMUNITY AIR HYGIENE

- 449 Management's Responsibility in Air Pollution. W. L. Stewart, Jr.
Presented before the Sixth Industrial Health Conference, Houston, Texas.
8 pp. (Oct. 1953).

Industrial management should consider polluted air as one of its top-priority problems. Air pollution will be corrected through the cooperative efforts of industrial management, research, and an informed public. It is mandatory that management see to it that industry clearly demonstrates its position and its community interest by assuming leadership in fighting air pollution. Experience in Los Angeles has demonstrated that neither demagoguery, emotion or hysteria, name calling, nor laws alone will cure air pollution; but cooperation has been and will be effective.

- 450 Public Health Aspects of Atmospheric Pollution. F. Princi.
Am. J. Public Health 44, 206-210 (Feb. 1954).

A critical examination of the investigations made in connection with the heavy smog occurrences shows that neither the postulate of synergistic activity nor the theory of pulmonary irritation has been as yet demonstrated to provide help in the study of future incidents. The possible effects of inhaled pollutants on other organs than the lungs have not been sufficiently considered. It is necessary to consider not only the environment but also man's ability to live in the environment. More adequate air pollution studies can be carried out during the next episode, and such studies may lead to prevention of such occurrences. The problem of long-continued exposure to smaller amounts of contaminants is even more difficult. Studies now in progress may lead to at least a partial solution. One method of possible progress lies in using the same methods of investigation in the atmosphere as in the industrial plant. The public health aspects of air pollution must include community education to describe honestly and fairly actual and impending

dangers without producing alarm and hysteria. Further educational effort is required to inform industry concerning its responsibilities and the avoidance of hazards to the public.

451 Report of Pittsburgh Department of Public Health, Bureau of Smoke Prevention, Year 1953. S. B. Ely, Superintendent. 19 pp. (1954).

The history of air pollution regulation in Pittsburgh is reviewed, and a digest of the smoke ordinance is presented. The records of the U. S. Weather Bureau show an additional reduction of smoke since 1952. Dustfall can records are given in detail. The improvement as judged by those records is not so definite, since miscellaneous dust largely arising from sources outside the city is a large factor. A summary of inspectors' reports shows a decrease in complaints about smoke and more attention to disagreeable odors and noxious gases and fumes. The use of small domestic incinerators is increasing. The railroads were dieselized to the extent of 85% by the last months of the year, and smoke violations have decreased to less than 0.5%.

452 Methodology of a Comprehensive Air Pollution Investigation. G. D. Clayton. *Am. Ind. Hyg. Assn. Quart.* 15, 69-72 (Mar. 1954).

The investigation in the Detroit-Windsor area under the sponsorship of the International Joint Commission is a good example of a long-term comprehensive air pollution study. Its history is related and its objectives are described. Those objectives include the determination of the following factors: (1) source, nature, and amounts of atmospheric contaminants resulting from combustion of fuels; (2) similarly from industrial processes; (3) effects of meteorological factors on dissemination and diffusion of contaminants; (4) the effect of the contaminants upon health, vegetation, safety, and economy; and (5) cost of necessary controls and responsibility for the cost. Four cardinal considerations are necessary for a successful investigation: (1) definition of objectives; (2) adequacy of funds; (3) cooperation between agencies; and (4) public relations.

453 Aromatic Hydrocarbons. I. Presence in the Los Angeles Atmosphere and the Carcinogenicity of Atmospheric Extracts. P. Kotin, H. L. Falk, P. Mader, and Marilyn Thomas. *Arch. Ind. Hyg. & Occ. Med.* 9, 153-163 (Feb. 1954).

The atmosphere of a large, urban, primarily petroleum-polluted community has been analyzed, and carcinogenic hydrocarbons have been demonstrated as part of the over-all picture of air pollutants. Extracts of atmospheric samples have been successfully used to produce skin papillomas and skin cancers on C57 black mice. The presence of aliphatic hydrocarbons and their oxidation products in the atmosphere is offered as being of significance in the pathogenesis of lung cancer, first, by providing an eluent for the

separation of adsorbed carcinogenic hydrocarbon from soot particles in the air and, second, by the formation of various chemical compounds from unsaturated hydrocarbons, including theoretically the formation of diepoxides whose experimental carcinogenicity has been reported. -- Authors' summary

- 454 Aromatic Hydrocarbons. II. Presence in the Particulate Phase of Gasoline-Engine Exhausts and the Carcinogenicity of Exhaust Extracts. P. Kotin, H. L. Falk, and Marilyn Thomas. Arch. Ind. Hyg. & Occ. Med. 9, 164-177 (Feb. 1954).

Gasoline-engine exhaust products have been analyzed, and carcinogenic hydrocarbons have been demonstrated as being among the emission products. Their production under varying conditions of engine operation has been determined, and extrapolation to city traffic conditions has been attempted. Benzene extracts of the particulate phase of the exhaust products have been successfully used in painting experiments to produce skin papillomas and skin cancers in C57 black mice. The presence of carcinogenic hydrocarbons in the atmosphere of urban areas indicates the need for their study to assess their possible role in the observed increasing frequency of human lung cancer. The parallel between this increase and the urbanization and industrialization of our society is positive. The introduction of the gasoline engine as the most prominent source of motive power is one of the chief characteristics of this industrialization, and, in consequence, petroleum combustion and oxidation products have become one of the main air-pollutant materials. The experimental carcinogenicity of certain of these products has been established, and suspicion must be directed to them in relation to the lung cancer increase. -- Authors' summary

- 455 Investigations of Atmospheric Carbon Monoxide at the Jungfrauoch. W. Benesch, M. Migeotte, and L. Neven. J. Opt. Soc. Amer. 43, 1110-1123 (1953).

Analysis of high-resolution solar spectra taken at the Jungfrauoch in Switzerland indicates that the terrestrial atmospheric carbon monoxide content may vary by a factor of 5 in extreme cases and is, furthermore, subject to surprisingly large fluctuations within the period of one hour. These variations are apparently unrelated to the more readily available data on general meteorological conditions, but a mechanism is suggested wherein the fluctuations of the carbon monoxide may depend upon atmospheric irregularities of a more finely detailed nature than those which come into consideration in meteorological investigations.

- 456 Industrial Odor Control. S. Thornblad. Modern Sanit. 6, 26-27 (Mar. 1954).

Odor control research has produced much information, which, though far from complete, is of tremendous interest to industrial leaders. One firm

is reported to have made capital expenditures of nearly a million dollars and incurred operating costs of some \$400,000 per year to improve community living conditions. Public pressure enforces the solution of many odor problems, including odors in the general atmosphere and odors of products in the factory and in the consumer's home. Animal experiments agree with human experience in demonstrating that reaction to odors is largely psychological. An odor that is associated with an unpleasant experience or a mental conflict produces the same reactions when unaccompanied by the original experience. It has been shown that many odors can be neutralized by other odors, and much of the present research is being conducted along that line.

57 Smog Scramble Spans Nation. Anon. Chem. Eng. News 32, 1108-1113 (Mar. 22, 1954).

The air pollution problems of the various sections of the United States are discussed and the progress made by the states, cities, and industrial companies is described.

MANAGEMENT ASPECTS

58 Industrial Relations as a Modern Challenge to Management's Capacity for Salesmanship. W. L. McGrath. Advanced Mgmt. 19, 5-8 (Feb. 1954).

Few executives have spent a day with their executive staffs considering how they can sell their employees on the fact that the executives are honest men, that the company does not make inordinate profits at the expense of the employees, and that competition is very real in the industry. The same executives spend day after day in conferences on selling more products. Both jobs in reality are sales jobs. A four-point program for labor relations is suggested and has been practiced by the author's company: (1) every foreman is kept thoroughly informed on the financial situation of the company and his particular department; (2) every employee is given an annual report on the financial operations of the company; (3) the author (as an executive) talks personally to all employees at least once a year and invites questions; and (4) he explains the philosophy of American competition as he sees it. America's finest product is individual freedom, and that is best attained among employees by giving them economic facts.

- 459 Executive Health Examinations. J. P. Barker, H. C. Ballou, W. T. Hall, W. E. Lemon, and E. J. Morhous. *Southern Med. J.* 46, 984-988 (Oct. 1953).

The authors present the results of health examinations of about 1,350 persons, a large proportion of whom could be classed as executives. Tables are given showing the number who were overweight, and who had anemia and hypertensive vascular and cardiovascular disease. Suggestions are given for more uniform systems of examinations.

- 460 Executive Health Programs. G. M. Saunders. *Arch. Ind. Hyg. & Occ. Med.* 9, 133-141 (Feb. 1954).

The health of America's business executives is one of the country's greatest assets. During the past several decades programs for protecting and promoting executive health have been developed. Although these differ considerably in their manner of application, nearly all are based upon periodic medical examinations. Results indicate that about 60% of executives have one or more significant abnormalities, many of them correctible. The value of health programs to the individuals and to business is unquestioned. Better health means better morale, greater efficiency, and a longer useful life.

-- Author's conclusions

- 461 Fortieth Annual Report, New York Compensation Insurance Rating Board. H. D. Sayer, Gen. Manager. 31 pp. (Jan. 28, 1954).

This report reviews the history and operation of insurance rating in New York State, including a new policy form now under consideration for approval and a general rate revision adopted July 1, 1953. Statistics are presented dealing with inspections, indemnity and medical losses, experience ratings, and payroll premiums.

- 462 Jurisdictional Variations in Permanent Disability Award. Report of Medical Committee of the International Association of Industrial Accident Boards and Commissions at the 1953 Convention. *Ind. Med. & Surg.* 23, 32-34 (Jan. 1954).

Despite the progress in many fields of labor relations since 1940, there has been little, if any, change in workmen's compensation law and administrations, particularly in the field of permanent disability evaluation. A questionnaire sent to all states and Canadian provinces, describing a hypothetical case of amputation and subsequent employment, yielded a large variation of replies concerning the award that would be made. The results are tabulated, as are also the ratios of various degrees of permanent disability to all compensation cases. These also display a wide range of differences. The Committee outlines a few generalities in respect to disability rating and

evaluation and consideration, including: (1) recognition of rehabilitation as a necessary prerequisite of disability rating; (2) continuation of benefits until the condition becomes static or the claimant can resume full or modified employment; (3) recognition that permanent disability is a clinical rather than a legal problem; (4) recognition that pensions for permanent disability should be calculated and awarded on a lifetime basis; (5) recognition that disability awards should be subject to review during the lifetime of the patient; (6) recognition that our present system of compensating for permanent disabilities has not kept pace with advances in industrial and sociological thinking; and (7) recognition of a need for a complete scientific study of all aspects of disability ratings on both a state and national level.

63 How to Get the Most of Color in Your Plant. F. Birren. *Factory Mgmt. & Maint.* 112, 110-112 (Feb. 1954).

The benefits of color in the plant are unquestionable, but there is a right way and a wrong way to use it. Too many plants are painted a hodgepodge of colors. They are often the wrong colors, and often painted in the wrong places. Color that merely decorates and does not show improvement in worker attitudes or performance is a luxury and a vain expense. Color should be used where people are to look for specific things, such as hazardous objects and fire extinguishers. Also, the psychological effect of temperature can be counteracted by the use of suitable colors, yellows for cool surroundings and greens or blues for high temperatures. Overheads and ceilings should be white. A proper color scheme reduces the cost of lighting. A successful machine painting program can be put over by enlisting cooperation of workers, but it should be supervised. One of the several standard codes for use of colors should be followed. The author recommends the code of the U. S. Navy and Coast Guard, which has been substantially accepted by the American Standards Association.

ACCIDENTS AND PREVENTION

64 The Ignition Hazard from Magnesium-Base Alloys. S. N. A. Margerson, H. Robinson, and H. A. Wilkins. (Great Britain) Ministry of Fuel and Power, Safety in Mines Research Estab. Research Rept. No. 75, 16 pp. (1953).

Experimental evidence indicates that the ignition of firedamp at Hawkins Colliery was caused by sparks struck by the impact of a magnesium alloy casing of a drilling machine on a steel bar. The application of protective surface coatings, such as Araldite and (or) polythene, did not reduce the sparking hazard appreciably under service conditions. -- Chem. Absts.

- 465 The Safety Engineer's "Occupational Disease." E. W. Martin. *Safety Maint. & Prod.* 107, 22-23 (Mar. 1954).

Safety engineers are subject to an occupational disease characterized by a feeling of inferiority, lack of creative outlook, sublimation in hobbies, over-caution, and frustration due to the times. Unlike other engineers, the more successful they are, the less noticeable are the results; hence the feeling of inferiority. It can be cured by a broader outlook, careful attention to safety problems, mingling with the other professions, and faith in the safety engineer's work. They can cure the next two symptoms by speaking, writing, and being creative with their hands. Over-caution can be corrected by remembering that life is not all safety. Risk taking cannot be avoided, and the object of caution is freedom to engage in the adventure of life. The answer to frustration is work in the many fields open to an individual. A basic creed embodying these principles is presented.

MISCELLANEOUS

- 466 Bacterial Air Contamination. F. Thompson. *Heating & Air Treatment Engr.* 16, 305-307 (Nov. 1953).

The methods employed at present for air sterilization are: (1) the use of ultraviolet rays, (2) the use of chemicals, and (3) the use of floor oils. The methods are described briefly. Methods of estimating bacterial contamination are also described. A number of industries are now contamination conscious but many aspects are still neglected. It would be advisable for people concerned in the designing and manufacturing of air treatment apparatus to visit a bacteriological laboratory to see the types, and more particularly the size of bacteria they are trying to arrest.

- 467 Handbook on Sanitation of Airlines. Public Health Service Publication No. 308. U. S. Public Health Service, Division of Sanitation. 31 pp. (1953). For sale by Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. 20 cents.

The growth of the airline industry has necessitated the publication of principles of sanitation which all airlines can follow to prevent the spread of communicable disease across state lines. This booklet presents standards written specifically to conform to the intent of applicable regulations. The subjects included are: construction plans with references to sanitation; catering-point sanitation; aircraft sanitation; control of drinking water; and handling and disposal of wastes from aircraft. The most extensive chapter is on catering-point sanitation.

INDEX

<u>Absenteeism</u>		<u>Compensation</u>	
and plant		permanent disability	
size	367	variations	462
statistics	366	rating	
<u>Aerosol sampling</u>		report	461
errors	443	<u>Cotton industry</u>	
<u>Air flow</u>		dust hazard	420
principles	358	<u>Dermatitis</u>	
<u>Air pollution</u>		from household cleaners	384
control		occupational	378
progress	457	<u>Dermatologic problems</u>	376
investigation		<u>Diabetes in industry</u>	369
methodology	452	<u>Diamines</u>	
management responsibility	449	skin penetration	409
public health aspects	450	<u>Dust sampling filtering media</u>	445
<u>Air sterilization</u>	466	<u>Ear protection</u>	
<u>Airlines</u>		by "glass-fiber down"	427
sanitation		<u>Electrostatic precipitator</u>	447
handbook	467	<u>Ethylenediamine</u>	
<u>Antiseptics, disinfectants,</u>		inhalation effects	397
fungicides, and sterilization	356	<u>Executive health examinations</u>	459
<u>Atomic power</u>		<u>Executive health programs</u>	460
public health aspects	435	<u>Exhaust gases</u>	
<u>Butyltoluene</u>		carcinogenicity	454
p-tertiary		<u>Filter holder</u>	
toxicity	407	for dust sampling	444
<u>Cancer</u>		<u>Flow and fan</u>	358
from ammonia-oil mixture	414	<u>Fluorine</u>	
<u>Carbon-14 wastes</u>		continuous disposal	448
disposal	437	<u>Food-borne infections</u>	
<u>Carbon disulfide</u>		and intoxications	357
absorption and elimination	405, 406	<u>Handicapped, placement</u>	368
determination in air	441	<u>Hearing loss</u>	
<u>Carbon monoxide</u>		in drop forge workers	426
in atmosphere	455	occupational	424
<u>Carbon tetrachloride</u>		program	425
liver effects	400, 401, 402	<u>Heart disease and employment</u>	371
poisoning		<u>Heat effects on blood</u>	432
cases	398	<u>Hot environments and work</u>	431
review	399	<u>Hydrazine, toxicology</u>	388
<u>Coal</u>		<u>Hydrocarbons in air</u>	
bacteriostatic substance in	416	carcinogenicity	453, 454
fungistatic substance in	415	<u>Hydrochloric acid</u>	
<u>Color in plant</u>		poisoning	
proper use	463	fatal	387

<u>Hydrogen sulfide</u>		<u>Pneumoconiosis</u>	
determination in air	441	abstracts	355
<u>Industrial health engineering</u>	364	coal workers	
<u>Industrial physician qualifications</u>	361	pathology	417
<u>Industrial relations selling</u>	458	in gasworkers	418
<u>Insuring special class risks</u>	359	<u>Prolonged illness, report</u>	366
<u>Lacquer thinner poisoning</u>		<u>Psychiatry in industrial training</u>	
electroencephalogram	413	symposium	375
<u>Lead</u>		<u>Radioactive material</u>	
and coproporphyrin		precautions	434
excretion, with EDTA	390	<u>Radium in medicine & industry</u>	436
deposition in bone	391	<u>Radon exposure</u>	
hazard, control	389	and urinary polonium	440
poisoning		<u>Rehabilitation of hemiplegics</u>	372
burning battery casings	392	<u>Rest pauses</u>	
<u>Lung cancer</u>		physiological basis	433
cigarettes and occupation	373	<u>Safety engineer's "occupational</u>	
statistics	374	disease"	465
<u>Magnesium-base alloys</u>		<u>Salts</u>	
ignition hazard	464	migration in bone	391
<u>Medical and health service</u>	363	<u>Schradan</u>	
<u>Medical services, cost</u>	362	honey contamination	411, 412
<u>Melanosis</u>		<u>Selenium rectifiers not toxic</u>	386
occupational	383	<u>Sensitization and eczema</u>	377
<u>Mercury hazard</u>		<u>Silica</u>	
in refinery laboratories	394	determination	
<u>Methanol</u>		in blood and organs	446
exposure		<u>Silicone</u>	
from duplicating machines	396	protective creams	380, 381, 382
<u>Molybdenum</u>		<u>Silicosis</u>	
distribution in body	395	silicotuberculosis and	
<u>Morbidity statistics</u>	365	blood proteins	419
<u>Naphthalene poisoning by ingestion</u>	408	<u>Smoke prevention</u>	
<u>Noise</u>		in Pittsburgh, 1953	451
and hearing loss	429	<u>Solvents</u>	
in industry	428	biological analysis and	
industrial conference	421	exposure	442
loudness measurement	423	chlorinated, exposure	P. II
measurement and analysis	422	<u>Tetrachloroethylene</u>	
<u>Nurse in the public health program</u>	360	poisoning, case	403
<u>Odor control</u>	456	<u>Toxicology data and</u>	
<u>Peptic ulcer in industry</u>	370	plant exposure	P. I
<u>Pesticide research and control</u>	410	<u>Trichloroethylene</u>	
<u>Phosphorus</u>		poisoning, case	404
poisoning	385	<u>Ultraviolet emission</u>	
<u>Plasticizers</u>		during welding	430
paraplex		<u>Uranium dusts and fumes</u>	P. II
skin effects	379	<u>X-ray exposure, effects</u>	438, 439