



Industrial Hygiene Digest

INDUSTRIAL HEALTH NEWS

LITERATURE ABSTRACTS

MEDICAL

ENGINEERING

CHEMICAL

TOXICOLOGICAL

LEGAL ... decisions and trends

FEBRUARY, 1956

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INDUSTRIAL HYGIENE FOUNDATION

MELLON INSTITUTE

4400 FIFTH AVENUE -- PITTSBURGH 13, PA.

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IN RE: ALBRAMS
November 1992



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 18

February, 1956

No. 2

TWO NEW EXECUTIVE STAFF MEMBERS OF MELLON INSTITUTE

General Matthew B. Ridgway, Chairman of Mellon Institute's Board of Trustees and the Chief Administrative Officer, has announced the appointment of Dr. H. L. Anthony III as a Director of Research and of Dr. G. A. Webb as a Director of Engineering. Both appointees, who took office on February 1, have served on Fellowships of the Institute and are familiar with the operating principles of the organization.

Dr. Anthony, a member of Mellon Institute since 1939, is well known professionally for his achievements in and management of metallurgical research and engineering. He is an authority in metalworking, particularly in pressure vessel technology, including drawing operations, brazing, welding, and galvanizing.

Dr. Webb returns to Mellon Institute from the post of manager, planning section, chemical division of Koppers Company. He had formerly served on Fellowships at Mellon Institute during the years 1937-1940 and 1941-1943. Dr. Webb has had a successful career as a researchist and executive in the development of chemical engineering processes in the synthetic organic chemical industry, particularly catalytic operations involving dehydrogenation, chlorination, and polymerization.

DR. SCHRENK LECTURER FOR INDUSTRIAL HEALTH TRAINING COURSE

Dr. H. H. Schrenk gave two lectures on "Industrial Health Hazards and Control" as part of a Training Course in Fundamentals of Industrial Safety sponsored by the Western Pennsylvania Chapter of the American Society of Safety Engineers, and the Western Pennsylvania Safety Council. The special week-long course was held at the University of Pittsburgh from January 30 through February 4.

ANNUAL INDEX FOR 1955

Accompanying this issue of the Digest is the annual index to the material abstracted in the publication in 1955.

REPRINTS OF INDUSTRIAL HYGIENE COLUMN

Copies of the Industrial Hygiene Columns by Dr. H. H. Schrenk, Research Director of the Foundation, which appeared in the August, October and December 1955 issues of Industrial and Engineering Chemistry are available. Subjects are:

"Some Aerosols Affect Response to Irritant Gases; CaEDTA Effective in Metal Poisoning," August 1955.

"Basic Considerations in Evaluating Health Hazards of Food-Packaging Materials and Insect Repellents," October 1955.

"Decomposition Products Introduce Hazards to Health," December 1955.

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INDUSTRIAL HYGIENE DIGEST
Literature and News

NEWS ITEMS

166 Industrial Health Conference.

The preliminary program of the 1956 Industrial Health Conference has been issued. The Conference will be held at Convention Hall, Philadelphia, Pa., April 21-27. The organizations participating include the Industrial Medical Association, the American Conference of Governmental Industrial Hygienists, the American Industrial Hygiene Association, the American Association of Industrial Dentists, the American Association of Industrial Nurses, and Occupational Health Institute. A large number of papers covering a wide range of subjects of interest in the field of industrial medicine will be presented. Programs may be obtained from Industrial Health Conference, 28 East Jackson Blvd., Chicago 4, Ill.

167 Commonwealth Fund and Ford Foundation Support Medical Education.

Ten university medical schools have received grants totaling \$7,150,000 for medical education from the Commonwealth Fund. The Ford Foundation will grant 90 million dollars to privately supported medical schools as endowment to help strengthen their instruction, although the exact allocation to the individual schools has not yet been determined. These grants will aid in meeting some of the needs that have existed during recent years, but they have not closed the gap that has been represented as being equivalent to approximately 10 million dollars annually for all needs. There is need of more general appreciation of the fact that the present-day medical school is no longer simply an educational institution devoted solely to the undergraduate training of physicians. Today's medical schools are complex centers of medical science, concerned also with graduate and postgraduate training and research. Every possible effort should be made to obtain the additional financial backing necessary to maintain and further develop the needs of our medical schools. The Commonwealth Fund and the Ford Foundation have given a vital "shot in the arm" in support of these needs, and should serve as a stimulus to other foundations, to industry in general, and to all members of the profession to redouble efforts to achieve the over-all financial needs of our medical schools, so that their continued progress may be assured. -- From editorial, J. Am. Med. Assn.

168 Mental Illness Support.

Now that the U. S. Public Health Service has made the initial grant of \$250,000 for a three-year national survey of mental illness, the way has been cleared for the Joint Commission on Mental Illness and Health to solicit additional contributions from philanthropic groups. Additional funds from the Government will be available in the future. The American Medical Association, the American Psychiatric Association, and 18 other groups formed the Joint Commission last year. The first grant will be used to initiate the study, including the recruiting of staff, the appointment of an advisory committee, and the setting up of task forces to look into the various phases of mental illness.

-- From Washington News, J. Am. Med. Assn.

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169 Health Bills.

Among the health and medical areas touched on by the President in his State of the Union Message are: military medical care; careers in military medicine; funds for medical research; aid to medical schools; health insurance; social security; and child welfare.

-- From Washington News, J. Am. Med. Assn.

COMING EVENTS

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|----------------|---|
| 170 Mar. 18-21 | American Society of Mechanical Engineers, Spring Meeting, Portland, Ore. |
| Mar. 19-20 | Steel Founders' Society, annual meeting, Chicago, Ill. |
| Mar. 21-22 | National Health Forum, New York, N. Y. |
| Mar. 26-27 | American Society of Mechanical Engineers, Instruments and Regulators Conference, Princeton, N. J. |
| Mar. 26-30 | American Trudeau Society, Postgraduate Course on Pulmonary Function, Boston City Hospital, Boston, Mass. |
| Mar. 29-31 | Annual Symposium on Fundamental Cancer Research, Houston, Tex. |
| Apr. 4-7 | International Congress of Medical Radiography, Paris, France |
| Apr. 5-7 | Forest Products Safety Conference, Klamath Falls, Ore. |
| Apr. 5-7 | Optical Society of America, Philadelphia, Pa. |
| Apr. 8-13 | American Chemical Society, Dallas, Tex. |
| Apr. 8-13 | American Pharmaceutical Association, Detroit, Mich. |
| Apr. 9-10 | Industrial Accident Preventions Association, Annual Conference, Toronto, Ont. |
| Apr. 15-20 | American Society for Pharmacological and Experimental Therapeutics, Atlantic City, N. J. |
| Apr. 15-21 | American Institute of Nutrition, American Physiological Society, American Society for Experimental Pathology, and Federation of American Societies for Experimental Biology, Atlantic City, N. J. |
| Apr. 18-19 | National Industrial Research Conference, Chicago, Ill. |
| Apr. 21-27 | Industrial Health Conference, Philadelphia, Pa. (see news item) |
| May 3-9 | American Foundrymen's Society, annual convention and exhibition, Atlantic City, N. J. |
| May 7-9 | Air Conditioning and Refrigeration Institute, annual meeting, Hot Springs, Va. |
| May 8-11 | American Welding Society, spring meeting and fourth welding and allied industry exposition, Buffalo, N. Y. |
| May 14-16 | President's Conference on Occupational Safety, Washington, D. C. |
| May 21-24 | American Trudeau Society, annual meeting, New York, N. Y. |

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OCCUPATIONAL DISEASE STATISTICS

171 Occupational Disease Statistics.

	Conn. ¹ Dec. 1955	Ind. ¹ Dec. 1955	Ind. ¹ Jan. 1956	Wisc. May-Dec. 1955	Total
Allergy				14	14
Aplastic Anemia	1				1
(Fumigants, insecticides, disinfectants)					
Brucellosis			1	2	3
Carbon Monoxide Poisoning				3	3
Dermatitis	37*		5**	230	272
Ear Infection				1	1
Eczema				3	3
Eye Infection				2	2
Eye Irritation				8	8
Fumes				1	1
Hepatitis				1	1
Infectious Hepatitis				1	1
Insecticide Poisoning				1	1
Lead Absorption				6	6
Lead Poisoning				3	3
Mercury Poisoning		15			15
Methyl Chloride Poisoning				1	1
New Castle Disease				1	1
Parathion Poisoning				4	4
Pneumoconiosis (Dust, Free Silica)	1				1
Pneumonia				1	1
Poisoning (Lead and Compounds)	1				1
Poliomyelitis				1	1
Pulmonary Fibrosis				1	1
Respiratory Irritation				3	3
Silicosis		1	2	4	7
(fatal)				2	2
Silico-Tuberculosis			1	3	4
(Dust, Free Silica)	2				2
Skin Infection				70	70
Skin Irritation				38	38
Solvent Illness				4	4
Trichloroethylene Poisoning				1	1
Undulant Fever				6	6
Upper Respiratory Irritation				16	16
Total	42	16	9	432	499

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

* Chlorinated hydrocarbons, foodstuffs, infections, ketones, lead and compounds, (N. O. C.) undetermined, rubber chemicals, soap solutions, glue, etc., and synthetic resins and chemicals caused one each; nitro and amino compounds caused two; alkalies caused three; solvents (N. O. C.) caused five; and oils, fats and waxes caused eighteen.

** Cement and solvents caused one each, and the cause of three other cases was not stated.

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LEGAL DEVELOPMENTS

172 Heat Exhaustion—Exposure Considered Accidental Injury.

In reversing two prior holdings that a heat stroke produced by the natural heat of the day was not a traumatic injury, but rather a disease and not compensable under the statute, the court affirmed the lower court's holding that shock, overexertion and exposure were personal injuries within the scope of the statute. The court further held that heat strokes were due to exposure to excessive heat. Affirmed. Central Lumber Co. v. Wood, Kentucky Court of Appeals, December 2, 1955. -- Commerce Clearing House

173 Arising Out of Employment—Injury in Company-Sponsored Baseball League—Employer's Control over League's Activities.

An employee was properly compensated for injuries sustained in a company inter-departmental baseball league where the lower court found that: (1) the activities were on the premises of the employer; (2) the employer gave substantial financial support; (3) the employer could halt the program at any time. The court ruled that these facts indicated that the employer had ultimate control over the league activities. Affirmed. Sorino v. Remington Rand, Inc. New York Supreme Court, Appellate Division, Third Judicial Department. No. 350-27. December 23, 1955. -- CCH

174 Wilful Misconduct and Violation of Safety Rule—Electric Shock—Power Lineman—Burden of Proof.

A power lineman for a utility company was properly denied compensation for burns sustained when he came into contact with an energized primary wire where the employer sustained the burden of proving that the injured employee's failure to wear rubber gloves in violation of a company safety rule constituted wilful misconduct precluding him from recovery under the compensation act. Claimant contended that he was not guilty of wilful misconduct and if so, the evidence was not sufficient to establish that his misconduct proximately caused his injury. The evidence showed that one of the gloves claimant was wearing showed evidence of a burn which indicated that the claimant touched the live wire with his hand. The court ruled that if a safety rule is reasonable and is known to the employee and is for his benefit, and yet he intentionally does the forbidden act, then he is guilty of wilful misconduct within the meaning of the statute. Affirmed. Mills v. Virginia Electric and Power Co. Virginia Supreme Court of Appeals. No. 4411. November 28, 1955. -- CCH

175 Death Benefits—Causal Connection Between Coronary Insufficiency and Myocardial Infarction.

The dependent wife of a rubber company employee was properly awarded death benefits for the death of her husband where the evidence was sufficient to sustain the finding that there was a causal connection between a coronary insufficiency and his death due to a myocardial infarction three years later. The employer contended that the board's finding was based on a contradictory premise; that the original injury in the nature of coronary insufficiency cannot be reconciled with the finding that the medical testimony to the effect that the first attack resulted in a pathological change in the heart muscles which was directly responsible for his death three years later was supported by the evidence. Affirmed. Parker v. United States Rubber Reclaiming Co. New York Supreme Court, Appellate Division, Third Judicial Department. No. 248-16. October 6, 1955. -- CCH

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BOOKS, PAMPHLETS AND NOTICES

- 176 Handbook of Toxicology. Vol. 1. Acute Toxicities. William S. Spector, editor.
W. B. Saunders Co., West Washington Square, Philadelphia 5, Pa. 408 pp. (1956). \$7.00.

This book was prepared under the direction of the Committee on the Handbook of Biological Data, Division of Biology and Agriculture, The National Academy of Sciences and The National Research Council. W. F. von Oettingen is the principal contributor but a number of others assisted in the preparation of the volume. The material is presented in two extensive tables. Table 1 gives information on lethal doses of 2120 solid and liquid compounds to laboratory animals. Under the heading of each substance, listed alphabetically, are separate entries for each species, route of administration, method of estimating toxicity (LD_{50} , MLD etc.) and literature reference from which additional information can be obtained. Table 2 lists lethal concentrations of 243 gases, vapors, and fumes in respired air for laboratory animals. Each entry includes: animal, method of estimating toxicity, lethal concentration in mg. per liter and parts per million, exposure time, and time of death, when given, and reference. It is emphasized that the values presented in these tables are not absolute, and should be interpreted only as a "yardstick" of toxicity for the compounds listed. An index is provided so that materials having more than one name can be easily located. This volume is limited to acute toxicities. At least four more volumes, giving fuller coverage of particular classes of materials and including chronic toxicities, will appear later. The scope of this publication and the thoroughness with which the data have been assembled will make it a valuable reference work for the toxicologist and others concerned. -- FFR

- 177 Organic Insecticides: Their Chemistry and Mode of Action. Robert L. Metcalf.
Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. 392 pp. (1955). \$8.50.

Despite the amazing growth of the manufacture and use of insecticides, much remains to be learned regarding their chemistry and mode of action, their metabolism in plants and animals, and their toxic hazards to higher animals. This book summarizes most of the available information on these topics into a coherent pattern dealing with the organic insecticides. Both the older and newer insecticides are included, as indicated in the list of chapters: nicotine, nor nicotine, and anabasine; rotenoids; pyrethroids; organic thiocyanates; dinitrophenols; DDT; acaricides; benzene hexachloride; cyclodiene insecticides; organic phosphorus insecticides; carbamates; and miscellaneous. The chapter on each of these materials includes information on chemistry, relation of structure to activity, mode of action, and mammalian toxicology the last of which is important in the industrial hygiene field. Two other chapters deal respectively with joint action of insecticides and insecticide resistance. -- FFR

- 178 Particle Size Determination. R. D. Cadle. Interscience Manual No. 7.
Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. 303 pp. (1955). \$5.50.

There are many methods for determining particle size, and there is a wealth of literature on those methods. This manual has been written primarily as a guide for a scientist or engineer who is faced with the task of particle size determination in a particular problem or field and is confused by the multitudes of methods. Considerable emphasis is placed on the criteria for choosing a method. The theoretical basis of each method is described, and basic equations are included. The theoretical and practical limitations of the methods are indicated. In the introduction, specific applications are discussed, including the industrial hygiene field. The topics of the chapters include: sampling methods; choice of technique for particle size determination; sieve analysis; sedimentation and elutriation; optical microscopy; electron microscopy; surface area measurements; optical methods for particles in suspension; miscellaneous methods; and treatment of data. The attention to the various types of electron microscopes, and to electronic scanning and other recent developments

shows that the material has been brought up to date. Details of experimental procedures for only a relatively small number of methods can be included, but copious references are given for the study of additional details. -- FFR

- 179 Economic Needs of Older People. John J. Corson and John W. McConnell.
The Twentieth Century Fund, Inc., 330 West 42nd St., New York 36, N. Y. 533 pp. (1956) \$4.50.

The magnitude of the problem of meeting the economic needs of older people has been increasing steadily, and the welfare of the aged has become a matter of major concern to legislators, public officials, employers, union leaders, and Americans generally. This volume presents a comprehensive analysis of the status of the older population in the United States and of public and private means of meeting their economic needs. It gives an integrated picture of the whole network of provisions that have been established to aid those who have retired, including social security and all forms of public and private pension plans and old-age assistance, and examines the adequacy with which these provisions meet the needs of those people who because of age are no longer able to maintain themselves. The focus of the book is on the central need of older persons—the need for a continuing income, although the importance of some of the broader personal, social and psychological problems of adjusting to retirement have not been minimized. The authors have assembled figures on the number of persons over 65; where they live; how many are at work; how much and what kinds of income they have; their state of health; their family patterns and other pertinent facts. The survey, undertaken by the Twentieth Century Fund, offers a full and factual analysis of the place of older persons in our economic and social system. Included is a report of the Twentieth Century Fund's Committee appointed to study the research findings, and to formulate a program of action to deal with the problems disclosed by the research. -- VMC

- 180 Radioisotopes in Biology and Agriculture. Principles and Practice. C. L. Comar.
McGraw-Hill Book Co., 330 West 42nd St., New York 36, N. Y. 481 pp. (1955) \$9.00.

This volume is intended to bring to the student and investigator in the biological and agricultural fields an appreciation and understanding of how radioisotopes can fit into his program, and to show how the experimental work can be undertaken. First, basic principles are presented with a minimum of nuclear physics and without experimental details. These principles are illustrated by examples drawn from physiology, nutrition, entomology, and soils and fertilizers. The remaining chapters give details of experimentation, including: certain difficulties inherent in tracer studies and suggestions for their solution or avoidance; practical problems of health physics, and units and physical concepts that are necessary; facilities required and procedures suitable for studies with plants, laboratory animals, and domestic animals, both from the standpoint of general usage and in relation to specific radioisotopes. The presentation is based on the premise that in biological research using isotopes, the most important factor is that the work be planned and interpreted by an investigator familiar with the biological field. Furthermore, it is felt that the radioisotopes procedures have been developed to the point where any biologist with some background in quantitative chemistry can apply them and use them successfully.

The various techniques and information required for the biological applications of radioisotopes are included. Among these techniques are: handling of radioisotopes with animals and plants; general procedures for radioassay; properties and procedures for individual isotopes, including those of rare elements in addition to the more common ones; autoradiography; paper chromatography; ion exchange; and radioactivation analysis. An extensive glossary is appended, and copious references are given at the end of each chapter. -- FFR

- 181 The Physician and the Law. Rowland H. Long. Foreword by Milton Helpert.
Appleton-Century-Crofts, Inc., 35 West 32nd St., New York 1, N. Y. 284 pp. (1955). \$5.75.

This book is written primarily for the practicing physician, but it is suitable also for medical students. A number of aspects of the legal rights and responsibilities are treated extensively: malpractice and the physician's defense; responsibility of the physician in cases of violent or unexpected death; the physician and the criminal law; and expert testimony. Other subjects are considered more briefly, such as the relation between the physician and patient, autopsy, the mentally ill, blood tests and transfusions, adoption, licensure, workmen's compensation law, and insurance for physicians. The book is not intended as a legal treatise or as a textbook on industrial medicine, but is valuable as one of the few books dealing with the legal aspects of medicine. -- FFR

- 182 Annual Report of the Chief Inspector of Factories for the Year 1953. G. P. Barnett. Great Britain, Ministry of Labor and National Service. 257 pp. (1954). Obtainable from British Information Service, 30 Rockefeller Plaza, New York 20, N. Y. \$1.17.

The subjects discussed in this report include: precautions in the industrial use of x-rays; improvements in radioactive static eliminators; prevention of eye accidents; sickness records; importance of suitable ventilation, heating, cleanliness, and lighting; statistics on industrial poisoning and pneumoconiosis; and special regulations for mule spinning and for promoting safety and health in iron and steel foundries.

-- Cond. from extensive review in Bull. Hyg.

INDUSTRIAL MEDICAL PRACTICE

- 183 Occupational Health Problems in an Industrial Society. S. L. Warren. J. Am. Med. Assn. 159, 1581-1585 (Dec. 24, 1955).

The author presents a general discussion of occupational health problems. The industrial physician should be aware of the special problems in his industry, but the public health physician also has a new role, in that of investigation of occupational hazards. Various problems are considered, including adequate conduction and interpretation of animal experiments, and assessment and elimination of air pollution hazards. There is much to be done in these fields and others, and there is great need for more medical scientists. The subject is broad and important enough to warrant setting up a joint commission at the national level to consider both technical problems and social consequences.

- 184 Part-Time Medical Service. R. T. Ragatz. What's New in Ind. Nursing (Apr. 1955); Ind. Med. & Surg. 24, 557-559 (Dec. 1955).

Reasons why industries should employ medical directors are given. The other subjects discussed are: (1) pay; (2) choosing the man; (3) professional relations; (4) referrals in case of injury; and (5) insistence on written orders. The difficulty of securing adequate service, especially for part-time work, is discussed, and suggestions are given for obtaining such service.

- 185 Guiding Principles and Procedures for Industrial Nurses. American Medical Association, Council on Industrial Health. J. Am. Med. Assn. 159, 1028-1033 (Nov. 5, 1955); Ind. Med. & Surg. 25, 40-46 (Jan. 1956).

This report is a revision of the Council's previous publication titled "Standing Orders for Nurses in Industry". The functions, relationships, and responsibilities of the industrial nurse are defined. "Standard procedures" has been adopted as a better term than "standing orders" because it eliminates confusion between its use in industry and in hospitals. To facilitate adoption of standard procedures, a number of basic suggestions are offered as a guide for the physician in the preparation of directives for specific situations, to be modified or extended according to the desires of the physician in charge. The procedures are classified under the following general headings: emergency procedures, nursing management of injuries, and management of minor illnesses and symptoms.

- 186 Teaching Legal Medicine in the Undergraduate Medical Curriculum. S. A. Levinson. J. Am. Med. Assn. 159, 1718-1721 (Dec. 31, 1955).

In European universities legal medicine has been included in the curriculum for more than a century, but in the United States only 12 medical schools give required courses in legal medicine. Every patient under study by a physician may be a potential medicolegal

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problem. Any accident, industrial or otherwise, or inhalation of noxious agents, may result in disability or death. All cases of homicide or suicide require not only medical knowledge but also interpretation of the findings and the physician's assistance in the administration of justice. Therefore every medical student and physician should receive information on the various phases of legal medicine. This can be accomplished by teaching legal medicine to undergraduate students and to physicians at the graduate and postgraduate levels.

- 187 The Evaluation of Claims for Workmen's Compensation in Cardiac Disability and Death. L. H. Sigler. *Ind. Med. & Surg.* 25, 10-16 (Jan. 1956).

The author discusses the controversial question whether cardiac disability and death may be caused by strain and trauma. Case reports are cited illustrating various phases of the question. Myocardial ischemia, ischemia neurosis and infarction, which are the underlying causes of the clinical manifestations of the acute phase of coronary artery disease, are not due solely to coronary thrombosis. Among the potent factors are emotional and physical strain. Criteria are suggested for establishing causal relationship between physical or emotional strain and resulting cardiac disability or death. In these criteria the severity of the strain, the time of appearance of the symptoms, presence of pre-existing heart disease, and other factors are fully considered.

- 188 Physical Standards for Vehicle Operators: An Aid to Accident Prevention. H. Brandaleone and G. J. Friedman. *Ind. Med. & Surg.* 25, 17-22 (Jan. 1956).

A list of medical standards used in the qualification of motor vehicle operators in transportation is presented as a guide in the establishment of standards for all drivers, as an aid to accident prevention. -- Cond. from authors' summary

SKIN DISEASES AND BURNS

- 189 Skin Testing of Industrial Compounds. Development of Polyvalent Sensitivity. E. Von Haam and F. S. Mallette. *Am. Ind. Hyg. Assn. Quart.* 16, 324-329 (Dec. 1955).

Divergent results of patch tests with two well-known plasticizers obtained by the authors and by others led to an investigation which revealed the cause of the discrepancy. The authors' previous results were obtained with test subjects who had been similarly tested many times before and some of whom experienced an increase in skin irritability. Six compounds, none of which had been tested on these subjects before, and none of which were considered sensitizing, were used in patch tests on these subjects and on others who had not been previously tested. A definite difference was established between the two groups. Moreover, it was demonstrated that the skin irritability could be increased comparatively quickly in a group of new subjects by subjecting them to repeated patch tests over a short period of time. This altered skin irritability was shown to be non-specific. The development of this non-specific irritability has not been recognized properly in the literature and constitutes a serious source of error in prophetic patch test procedures. Testing each compound on a new group of subjects would be impracticable. The method which the authors have adopted is to continue the tests as before but to retest all compounds which give positive reactions, using a new group of subjects before accepting the results as final. Ninety compounds which proved to be irritating in various degrees in earlier tests are being retested on new groups of subjects. -- Cond. from authors' conclusions

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- 190 Sensitization of the Skin to Topical Remedies. V. Pirila and O. Kilpio. Duodecim 70, 802-807 (1954).

The authors report 68 cases of dermatitis aggravated by sensitization to various topical agents used in the treatment of previous dermatoses. The most important sensitizers were antihistamines, mercuric compounds, and dioxanthogen. -- Chem. Absts.

- 191 Effect of Terpenes and Their Oxidation Products on the Skin. G. Lejihancova and M. Sevcik. Pracovní Lékarství 7, 285-289 (1955). Bohemian.

Out of nine distillation fractions of turpentine oil, mainly delta ³-carene and limonene were responsible for dermatitis. Addition of compounds inhibiting the autooxidation of turpentine oil produced a mitigation of the effects on the skin; however, the volatility of the oil was lowered. -- Chem. Absts.

- 192 Epoxy Resins. L. B. Bourne. Med. lavoro 46, 191-193 (1955). Italian.

The recent development of epoxy resins introduces an industrial hazard which may become widespread. Contact with triethylenetetramine used as a polymerizing agent will give rise to an erythema of the face and arms. In one case of a worker exposed to the resin-amine complex an acute erythema resulted followed by the formation of vesicles on one arm with the formation of scars on healing. It is essential that efficient ventilating systems be installed in work areas where fumes are present. -- Chem. Absts.

- 193 Waterless Skin Cleansers. W. J. Beach. Safety Maint. & Prod. 110, 50, 51 (Dec. 1955).

The earliest waterless skin cleanser in general use was kerosene, alone or emulsified with ammonia soaps. Subsequently odorless spirits and alkanolamines were used and now there are a variety of materials for the purpose. Requirements include: safety to the hands, effectiveness, complete elimination of undesirable odor, pleasant appearance and after-feel, suitable consistency for dispensing, rapid break when on the hands, and good stability to heat, cold, and shelf life. The most thorough method of determining the safety of a cleanser is to subject it to analysis, including refractive index and ultraviolet and infrared spectroscopy. This procedure, however, is time-consuming and requires an expert. Closed patch testing can only serve to screen out the most dangerous products, but may be unreliable because the effect is greatly exaggerated. Perhaps the quickest and safest way to obtain a safe product is to select one that has an established reputation for safety. An occasional case of allergy is not significant.

CHEMICAL HAZARDS

- 194 Comparative Toxicity of Boranes. G. J. Levinskas. Am. Ind. Hyg. Assn. Quart. 16, 280-282 (Dec. 1955).

The acute toxicities of dimethylamine-borane, pyridine-borane, and trimethylamine-borane are reported. On a weight basis, their relative toxicities were found to be in that order. However, when expressed in terms of mg. boron per kg., the LD₅₀ values form two distinct groups; trimethylamine-borane is several times more toxic than the other two. Recalculation of available toxicity data for other boranes enables them to be classified in the same system.

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- 195 Effects of Acute Industrial Poisoning with Carbon Monoxide. M. Navratil and J. Weigner. Pracovni Lekarstvi 7, 268-273 (1955). Bohemian.

Of 59 persons recovered from carbon monoxide poisoning 32 showed positive findings: extra-pyramidal symptomatology, vegetative stigmatization, lesions of the pyramidal system, and cerebellar symptoms. -- Chem. Absts.

- 196 A Roentgenologic Study of a Human Population Exposed to High-Fluoride Domestic Water: A 10-Year Study. N. C. Leone, C. A. Stevenson, T. F. Hilbish, and M. C. Sosman. Am. J. Roentgenol. 74, 874-885 (Nov. 1955).

Roentgenograms were made and repeated with matching views ten years later in 237 persons, 116 of whom were residing in a high-fluoride area in Texas with 8 ppm of fluoride in drinking water, and the other 121 in a control area where the water contained 0.4 ppm of fluoride. Bone changes are described in detail. The data suggest that excessive fluorides may produce roentgenographic evidence of bone changes, but the observable changes occur in only 10 to 15% of those exposed. They are slight, often difficult to recognize, and in most cases equivocal in degree. The only other physical findings are dental mottling in persons who resided in the high-fluoride area during the tooth formative period. These bone changes cannot be definitely ascribed to excessive fluorides, even though the fluoride content of the bones may be six times that of normal bone. The increased fluoride may on occasion have a beneficial effect in the adult bone.

- 197 Nitrogen Oxide Impurities in Ozone. B. E. Saltzman, D. H. Byers, and Frances L. Hyslop. Ind. Eng. Chem. 48, 115-118 (Jan. 1956).

The extent of production of nitrogen oxides by an ozonizer with a phenol-formaldehyde resin dielectric was studied. Under normal operating conditions the nitrogen oxides produced were less than 5% of the ozone concentration; under the most adverse conditions of air flow and voltage the value was 8.5%. This result agrees with those of previous studies. A study of the kinetic and equilibrium data in the literature showed that of all the oxides of nitrogen and related compounds, only nitrogen dioxide, nitrogen pentoxide, and nitric acid vapor required consideration as impurities in ozone. The nitrogen dioxide was determined to be only a small portion of the total impurity. When ozone was present in large excess, the oxidation of nitrogen dioxide was nearly complete. Some data indicated that nitrogen pentoxide was hydrated with extreme rapidity to nitric acid vapor, which is thermodynamically stable. The chemical studies were valuable for interpreting the toxicologic results, which indicate that the nitrogen dioxide impurities in ozone as ordinarily produced are not an important factor in the toxicity of ozone. These results also have a bearing on the toxicity of ozone as an atmospheric pollutant. -- Cond. from authors' conclusions

- 198 Effect of Cadmium on Blood Pressure and Respiration and the Use of Dimercaptol (BAL) as Antidote. T. Dalhamn and L. Friberg. Acta Pharmacol. et Toxicol. 10, 199-203 (1954).

In cats and rabbits the intravenous injection of 0.3-0.5 mg. per kg. of cadmium (as sulfate) caused a rapid, moderate fall in blood pressure but had no consistent effect on respiration. Previous intramuscular injection of BAL or intravenous injection of BAL-glucoside prevented the effect. -- Chem. Absts.

- 199 Experiments Bearing upon the Idea that Gastric Ulcer is Frequent among Chromium Workers. M. Mosinger and H. Fiorentini. Arch. maladies profess. 16, 378-380 (1955). French.

A number of references have appeared in literature relating to the occurrence of gastric ulcer in persons working with chromium compounds. A series of experiments is described in which various animals were given neutral potassium chromate, orally, intravenously, subcutaneously, intraperitoneally, percutaneously, or by inhalation of an aerosol. Administration continued over varying periods up to one year. In the 66 animals no case of a true gastric ulcer was seen, although some cases of gastritis, esophagitis, and interstitial enteritis were found. Chronic ulcers did not occur, even by ingestion of neutral potassium chromate over long periods. The suggestion is therefore advanced that other factors must be present when gastro-duodenal ulcers have been observed among chromium workers.

-- Cond. from Bull. Hyg.

03120168

- 200 The Hazard of Lead Poisoning in Drawing and Lead Patenting Operations. L. Parmeggiani and N. Zurlo. *Med. lavoro* 46, 176-184 (Mar. 1955). Italian.

A lead hazard occurs in cold drawing and lead patenting (tempering wire in molten lead). The main source of contamination was found to be the lead dust formed on the surface of the wire immediately after lead coating. The same hazard is produced by dye-dressing of rubber tubes with lead coating and by all operations involving the cold working of lead in which dust particles from surface cracks are profusely dispersed. Lead poisoning occurred in a number of workers in wire drawing plants. Six cases of lead colic, five cases of anemia, and one case of wrist-drop are described. The importance of the hazard of lead poisoning from these operations is emphasized. -- Cond. from English summary (Bull. Hyg.)

- 201 The Prevention of Lead Poisoning. A Study of the Importance of Contact. J. Lecocq and J. deLay. *Arch. maladies profess.* 16, 378-380 (1955). French.

A study was made in a large factory where alloys containing 0.75 to 95% of lead were manipulated. Much dust fell on the floor and on the hands and clothing of workers. The workers took no precautions against lead poisoning. Notwithstanding plentiful opportunity for lead as such to gain access to the body, very few indications of lead absorption appeared. The absence of lead poisoning is attributed to the insolubility of metallic lead bound up with the other metals in the alloys. -- Cond. from Bull. Hyg.

- 202 A Note on the Treatment of Lead Colic with Chlorpromazine (Largactil). L. Pollet, M. Gaultier, J. Moreau, and J. Valtz. *Arch. maladies profess.* 16, 247-248 (1955). French.

The authors had under their care in hospital eight cases of definite lead poisoning with sharp colic. The cases presented all the classical signs of lead poisoning. The first five were treated in the usual way with atropine, two injections daily of 0.25 mgm. The colic continued without intermission for two or three days, only abating by the fifth day. Then for two cases chlorpromazine was given as well as the atropine. The pain rapidly gave way, and the last patient was therefore given only the chlorpromazine without any atropine. The colic was just as quickly assuaged. The drug was administered intramuscularly in two injections of 50 mgm. daily. -- Bull. Hyg.

- 203 Appearance, Evolution, and Treatment of Anemia in 103 Cases of Lead Poisoning Hospitalized at the Clinica del Lavoro from 1948 to June 1954. G. Saita and E. Arrigoni-Martelli. *Med. lavoro* 46, 199-210 (Mar. 1955). Italian.

The appearance and evolution of anemia were studied in 103 cases of lead poisoning. The average value of the anemia in 66 cases of lead colic was: Hb 62, red cells 3,200,000. In 37 cases of chronic lead poisoning the figures were: Hb 67, red cells 3,500,000. The drop in anemia was never below 2 millions of red cells. Stippled cells are always present in cases of colic. Reticulocytes and stipples are more abundant in cases of colic than in cases of chronic lead poisoning. On the average their increase is proportional to the severity of the anemia, but in individual cases the stippled cell values are widely scattered. Anemia occurred in as early as a few months in several cases, and in one case a few days after exposure. Anemia improved in most of the cases during hospitalization of four to six weeks, but only 18% reached normal values. Another 18% remained stationary, and a slight decrease was sometimes noted. Stippled cells decreased with the improvement of the anemia, but rarely disappeared completely during hospitalization. Without further exposure, blood levels reached normal after an average of 16 months. The stippled cells disappeared after one to 14 months following the acute episode. Colic was treated with calcium, or BAL, or hormones (cortisone and ACTH). Hormones had a favorable effect on colic, but were less efficient on anemia. In the treatment of chronic poisoning, liver extracts had a better effect on the blood level than sodium citrate.

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

03120169

- 204 Urinary Lead Excretion Following Treatment with Sodium Calcium Ethylenediaminetetraacetate. M. Salvini and U. Vidali. *Folia Med.* 38, 579-592 (1955). Italian.

In persons with lead poisoning and treated with disodium calcium EDTA, free lead appears immediately after cessation of treatment while the excretion of the lead chelate continues for some days. The excretion of lead chelate lasts in man and in the rabbit longer than the excretion of calcium chelate.

-- Chem. Absts.

- 205 Manganese. *Occ. Health Bull.* (New Jersey State Dept. Health, Bur. of Adult and Occ. Health), 4, No. 3, 5 pp. (1955).

The uses and compounds of manganese are briefly discussed. Manganese poisoning is comparatively rare, but serious and even fatal poisonings have occurred, mostly from inhalation or swallowing of the dust or fumes of its compounds. Symptoms of poisoning usually are not present until after three months' exposure to heavy concentrations. Symptoms are described, mostly involving the nervous system. The incidence of pneumonia has been reported to be high in manganese workers. A medical control program is described. Directions are given for the determination of manganese in air. Seven suggestions are given for prophylaxis, including removal of the dust, approved respirators only when other measures are impractical, periodic testing of the air, and sanitary measures. The official threshold limit is 6 mg. per cu. m. for eight hours' daily exposure.

- 206 Ethylenediaminetetraacetic Acid in Manganese Poisoning of Rats. A Preliminary Study. Mary F. Kosai and A. J. Boyle. *Ind. Med. & Surg.* 25, 1-3 (Jan. 1956).

An experimental cage arrangement has been devised which satisfactorily eliminates contamination of urine by food and feces for manganese poisoning studies. Calcium EDTA when injected subcutaneously in rats given manganese previously increases markedly the manganese content of urine, but does not extract manganese from the intestinal contents. Manganese EDTA complex may be injected subcutaneously in rats without producing skin lesions. Approximately 64% of the manganese in the above form is excreted in the urine within 24 hours following subcutaneous injection. Evidence tends to show that subcutaneously injected calcium EDTA lowers the concentration of manganese in the liver and brain tissues of rats poisoned with this metal. Some evidence is presented which indicates that manganese is redistributed in liver and bone following cessation of subcutaneous calcium EDTA injection.

-- Cond. from authors' summary

- 207 Industrial Thallium Poisoning. J. Glomme and B. Sjoström. *Svenska Lakartidn.* 52, 1436-1441 (June 3, 1955). Swedish with English summary.

Four cases of occupational thallium poisoning were investigated. The patients were engaged in the manufacture of rodenticides at four different workshops. Thallium sulfate was used in the dry state and in solution. The patients had been careless in handling the powder and did not suspect poisoning. Sensory changes in the distal parts of the limbs were accompanied by only minor and uncertain signs of polyneuritis. In only one case was alopecia definitely demonstrable. One patient's symptoms had varied from time to time with the degree of exposure to thallium over a period of four years. It should be comparatively easy to prevent thallium poisoning by taking simple precautions in handling. In Sweden thallium-containing rodenticides are made in small factories, and as the symptoms are general and non-specific, history taking by the physician will be helpful.

-- Cond. from Bull. Hyg.

- 208 Study of the Health of Workers Employed in Mining and Processing of Vanadium Ore. F. J. Vintinner and others. *Arch. Ind. Health* 12, 635-642 (Dec. 1955).

Environmental and medical studies were made of 78 workers engaged in the processing of vanadium-bearing ore and 37 workers who were employed by the same company in occupations where there was no exposure to vanadium from the various processing operations. Of the 78 workers exposed to vanadium, 39 workers were exposed to dust from the ore before roasting (inactive ore) in concentrations ranging from 0.004 to 2.116 mg. of vanadium per cubic meter of air, and 39 workers were exposed to vanadium after roasting (active ore) and

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to the final product, vanadium pentoxide, in concentrations ranging from 0.018 to 58.82 mg. of vanadium per cubic meter of air. Evidence is presented showing an abnormally high prevalence of signs and symptoms indicative of irritation to the upper respiratory tract and to the eyes among workers exposed to vanadium-bearing dusts as compared with workers not exposed to such dust. No evidence was found to suggest that vanadium, in concentrations as found in this study, causes systemic poisoning, neurological abnormalities, cardiovascular condition, or pulmonary pathology, such as pneumonitis and reticulation.

-- Authors' summary

- 209 Residual Blood Nitrogen in Dioxane-Treated Rabbits. P. A. Rozenberg. Farmakol. i Toksikol. 18, No. 3, 45-50 (1955). Russian.

After ingesting dioxane once (dose 2.5 mg. per kg.), rabbits soon showed toxic effects on the central nervous system. After two to four days residual nitrogen rose rapidly to 300 mg. % or higher, while oliguria and anuria became evident. Unlike ethylene glycol, dioxane does not lower a previously high level of residual blood nitrogen. A few rabbits were exceptionally resistant to dioxane poisoning, surviving repeated and increasing doses.

-- Chem. Absts.

- 210 Several Cases of Poisoning with Commercial Ethylene Glycol. I. Morini. Minerva med. 1, 72-77 (1954). Italian.

There are three stages of poisoning by ethylene glycol: (1) a stage resembling ordinary drunkenness with ethyl alcohol; (2) a second period showing residual symptoms of drunkenness with the beginning of symptoms of oxalic acid poisoning; and (3) with the symptoms purely of oxalic acid poisoning. The greater the amount of glycol ingested, the closer are these stages run together. In fatal cases death was caused by renal block. There is no way of distinguishing the early stages of ethylene glycol poisoning from ordinary drunkenness. In the third stage there is loss of control of the sphincters, marked psychological disturbance with the patient alternating between depression and hyperactivity, and marked cyanosis. The toxic dose is not greater than 100 g. per person. The fatal dose is very close to the toxic dose.

-- Chem. Absts.

- 211 Acute Methyl Alcohol Poisoning in 49 Naval Ratings. D. J. Topping, D. W. Brooks, and C. M. Harlow. Can. Med. Assn. J. 74, 20-27 (Jan. 1956).

A series of 49 cases of acute methyl alcohol poisoning with recovery is reported (no demonstrable eye lesion after five months). Gastric lavage was not used in any case, because it is of questionable value when poisoning has occurred. Plasma extenders were found valuable in combating vascular failure. Frequent drainage of the cerebrospinal fluid does not appear essential. The occurrence of hypopotassemia during management was definitely established. This situation, a complication of therapy, can and should be prevented, or if established, corrected.

-- Authors' summary

- 212 Studies on the Toxicology of N-Nitrosodimethylamine Vapor. K. H. Jacobson, H. J. Wheelwright, Jr., J. H. Clem, and R. N. Shannon. Arch. Ind. Health 12, 617-622 (Dec. 1955).

Exposure of dogs, rats, and mice to nitrosodimethylamine vapor caused malaise, polydipsia, anorexia, ascites, liver damage, and bleeding. Clinical, laboratory, and pathologic observations of exposed dogs revealed elevated rectal temperatures, an immediate transient leucopenia, disruption of the blood coagulation mechanism with bleeding, and severe liver cell damage. This liver damage is most responsible in the production of a diseased state. Correlation of data from this report with a few reports of human morbidity on exposure to the compound reveals that this vapor is highly toxic. Adequate precautions should be taken to prevent human exposure.

-- Authors' summary

- 213 Toxicity of Adipic Nitrile. 1. Acute Poisoning and Mechanism of Action. L. Ghiringhelli. Med. lavoro 46, 221-228 (1955). Italian.

Adipic nitrile poisoning is described in humans as deep asthenia, vertigo, vomiting, inability to stand, cyanosis of the skin, tachypnea, and tachycardia which disappear on administering sodium thiosulfate (15 cc. 25% solution) and glucose (20 cc. 40% solution). On administering 50 mg. adipic nitrile per kg. of weight of guinea pig, lethal toxicity is obtained owing to hydrolysis of adipic nitrile to hydrocyanic acid in the blood system. Sodium thiocyanate is found in the urine of surviving animals. Sodium thiosulfate (25% solution, 2.5 cc. per kg.) has greater effect against poisoning than sodium nitrite (25% solution, 2.5 cc. per kg.). -- Chem. Absts.

- 214 Toxicity of Adipic Nitrile. 2. Study of Influence Exercised on Blood Constituents by Continuous Supply and Possibility of Absorption through the Skin. L. Ghiringhelli. Med. lavoro 46, 229-235 (1955). Italian.

Guinea pigs injected with aqueous solution of adipic nitrile in doses from 3 to 30 mg. per kg. were studied for blood constituents, concentration of thiocyanate in blood, and their elimination in urine. Blood constituents remain the same, blood thiocyanate is proportional to dose administered, and adipic nitrile is eliminated in urine as thiocyanate. Urine elimination of thiocyanate was measured in guinea pigs treated with aqueous and alcoholic solutions of adipic nitrile on depilated or worn skin. Its action is proportional to the dose applied on the skin and is independent of type and concentration of the solvent. -- Chem. Absts.

- 215 Fatal Poisoning with Sodium Fluoracetate. Report of a Case. J. L. Brockmann, A. V. McDowell, and W. G. Leeds. J. Am. Med. Assn. 159, 1529-1532 (Dec. 17, 1955).

A case of poisoning by the rodenticide sodium fluoracetate is described. Certain drugs can be used in such cases: (1) procainamide (Pronestyl) hydrochloride for cardiac arrhythmias; (2) intravenously used alcohol for central nervous system irritability; and (3) vasodepressor drugs such as mephentermine (Wyamine) sulfate to maintain blood pressure. These drugs prolonged the life of the patient and may save lives in similar cases.

-- Cond. from authors' summary

- 216 Vestibular Disturbances in Methyl Chloride Poisonings. B. Chalupa, A. Karen, and M. Sevcik. Pracovní Lékarství 7, 278-281 (1955). Bohemian.

Out of 28 workers handling methyl chloride for 6.8 years on the average, 27.8% showed pathological changes of the labyrinth caused mostly by acute but also by chronic poisonings. The disturbances were more frequent in the summer than in the winter.

-- Chem. Absts.

- 217 Determination of Perchloroethylene in Fruit Treated with this Hydrocarbon. J. Deshusses and P. Desbaumes. Mitt. Lebensm. Hyg. 46, 233-237 (1955). German.

A method for the determination of perchloroethylene (tetrachloroethylene) in fruit is described. Perchloroethylene was removed by an air current, decomposed at a high temperature, and the resulting hydrochloric acid was titrated with mercurous nitrate. The retention of perchloroethylene fumes in grapes, tangerines, and dried fruit was examined; commercial fresh and dried fruit tested did not contain any volatile chlorinated hydrocarbons.

-- Chem. Absts.

- 218 Massive Necrosis of the Liver Due to Trichloroethylene. G. E. Joron, D. G. Cameron, and G. W. Halpenny. Can. Med. Assn. J. 73, 890, 891 (Dec. 1, 1955).

A case of massive necrosis of the liver following industrial exposure to trichloroethylene is presented. Attention is drawn to the fact that trichloroethylene may cause liver damage, notwithstanding the generally accepted view that it is non-toxic to the liver.

-- Authors' summary

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- 219 Determination of Trichloroethanol in the Urine. J. Teisinger, V. Styblova, and V. Vlachova. *Pracovni Lekarstvi* 7, 258-260 (1955). Bohemian.

Internal and neurological examination of 41 persons working in an atmosphere containing 0.080-0.370 mg. trichloroethylene per liter did not reveal any definite relation between the amount of excreted trichloroacetic acid and the clinical picture. Most of the workers (33) excreted 1.5 to 7.5 times more trichloroethanol than trichloroacetic acid.

-- Chem. Absts.

- 220 Neurological Examination of Workers Handling Trichloroethylene. V. Styblova. *Pracovni Lekarstvi* 7, 260-263 (1955). Bohemian.

Examinations of 118 workers failed to detect a direct relation between the amount of trichloroacetic acid in the urine and the degree of health damage; however, the direct dependence of the neurological picture on the length of exposure to trichloroethylene was evident.

-- Chem. Absts.

- 221 Biochemical Explanation of Intolerance to Alcohol in Trichloroethylene Intoxication. Z. Bardodej, Marie Krivucova, and F. Pokorny. *Pracovni Lekarstvi* 7, 263-267 (1955). Bohemian.

The abnormal response to ethyl alcohol in workers handling trichloroethylene, manifested by peripheral dilatation, fall of blood pressure, tachycardia, tachypnea, and dyspnea, is caused by the inhibition of the oxidation mechanisms of the organism by the metabolism of trichloroethylene. Its course closely resembles that of acetylcholine reaction. Persons exposed to vapors of trichloroethylene showed increased acetaldehydemia in the blood following administration of alcohol, thus revealing an analogous reaction with the intolerance phenomenon after tetraethylthiuram disulfide. A similar picture was produced by alcohol in combination with chloral hydrate. It is presumed that the oxidation both of chloral hydrate and trichloroethylene, and the metabolism of trichloroethylene leading to the formation of chloral hydrate as an intermediary product, inhibits the liver aldehyde dehydrogenase. Tetraethylthiuram disulfide increases the toxic manifestations in dogs inhaling trichloroethylene, while in rabbits the difference is hardly perceivable. The alcohol test is recommended as a means of controlling the physical fitness of workers handling trichloroethylene.

-- Chem. Absts.

- 222 Antidote Effects against Experimental Carbon Disulfide Poisoning. A. L. Yudeles and R. V. Bessarabova. *Farmakol. i Toksikol.* 18, No. 3, 50-52 (1955). Russian.

In mice, given carbon disulfide in sunflower-seed oil subcutaneously, LD₁₀₀ is about 0.1 ml. Survival time rises from one to three hours when 0.008 mg. procaine is injected 30 minutes before the carbon disulfide. When either sodium bromide (1.2 mg.) or caffeine (0.2 mg.) was given in advance, 2/3 of the mice survived the otherwise fatal dose. The antidote effect is evidently exerted via the cerebral cortex and may be applicable to other industrial poisons of the cortical narcotic type.

-- Chem. Absts.

- 223 The Toxicity of Certain Aromatic Phosphate Esters. J. F. Treon, F. P. Cleveland, and J. Cappel. Wright Air Development Center Tech. Rept. 54-345. 69 pp. (1955).

Animal experiments with seven commercial grades of tritolyl phosphate showed them to be moderately toxic, but less so than pure tri-o-tolyl phosphate when administered by stomach tube. The commercial tritolyl phosphates readily penetrate the skin of rabbits, causing death when sufficient quantities are applied. All of these phosphates yielded cumulative effects when applied in spaced multiple doses. Differences between individual grades are discussed. Xylenol phosphates are somewhat less toxic than tritolyl phosphate. The saturation of air with the vapor of commercial tritolyl phosphates at ordinary temperatures is not likely to result in hazard. Respiratory exposure to a mist or spray of these materials, on the other hand, may well be highly hazardous under suitable conditions. Toxic concentrations of vapor may be reached when the compounds are subjected to elevated temperatures. The compounds decompose at temperatures above 566° and the toxicity of the resultant mixture of the materials in the atmosphere depends largely on the extent to which the original

tritolyl phosphate has been decomposed. The toxicity of these decomposition products is of about the same order as that resulting from the decomposition of a typical paraffinic lubricating oil at the same temperature. Precautions should be taken to prevent prolonged contact of the commercial tritolyl phosphates with the skin, and if such contact occurs, the skin should be flushed generously with water.

-- Cond. from Chem. Absts.

- 224 Comparative Value of Estimation of Sulfates and Phenol in Urine for Determining the Concentration of Benzene in Air. J. Teisinger and V. Fiserova-Bergerova. Arch. maladies profess. 16, 221-232 (1955). French.

The question under investigation is whether estimation of the organic sulfates and phenol excreted in the urine may not be a better indication of harmful exposure to benzene than direct calculation of the amount in the air. Normally the urine contains from 80 to 95% of inorganic sulfates. The disintegration of benzene may lower the percentage of inorganic sulfates to 70 or even to 50 when benzene is present. Phenol is another product of the transformation of benzene. Considerable individual variations have been found in the capacity to absorb and metabolize benzene. Comparison of urine analyses with calculated benzene absorbed during work and with observations on 26 persons exposed to known concentrations of benzene are exhibited in a series of graphs. The sulfates test remained within normal limits until the concentrations of benzene inhaled reached 35 ppm. This test should be regarded as a collective test on a group of persons. It indicates with considerable probability that exposure at work has exceeded 35 ppm. The estimation of phenol is easier than that of sulfates. In an individual test, the finding of 40 mg. phenol in a 24-hour sample of urine indicates with high probability that the person is exposed to benzene less than the permissible limit, but 100 mg. indicates exposure near the permissible limit. -- Cond. from Bull. Hyg.

- 225 Toxicological Investigations into Solvents for Replacing Benzene. 3. A Study of Isopropylbenzene or Cumene. R. Fabre, R. Truhaut, J. Bernuchon, and F. Loissillier. Arch. maladies profess. 16, 285-299 (1955). French.

(This paper is apparently a revision of one published earlier, IHF Abst. 711, Jul. 1953). The chemical and physical properties of isopropylbenzene are described. In rats and rabbits exposed to the vapor for varying periods, no alterations were found in the blood picture, except that in the rat the red cells tended to increase. The bone marrow was unaffected. The coagulability of the blood remained the same. No lesions were found in any bodily organ, but slight passive congestion was found in some organs. The solvent, like benzene and toluene, was found to select certain organs, especially the endocrine glands, the nervous centers, and the bone marrow. The study suggests that isopropylbenzene, unless used at much higher concentrations than are likely to be encountered industrially, is less toxic than benzene, particularly with respect to the hemopoietic tissues, if man reacts in the same way as the animals. Some evidence indicated that isopropylbenzene is metabolized in the body and excreted as phenolic compounds in the urine.

-- Cond. from Bull. Hyg.

- 226 Occupational Hazard from Toluene: Environmental Investigations and Clinical Researches in Chronic Poisoning. L. Parmeggiani and C. Sassi. Med. lavoro 45, 574-583 (Nov. 1954). Italian with English summary.

This report deals with 24 workmen who showed symptoms or signs of occupational poisoning. Some were exposed to toluene at concentrations of 200 to 800 ppm, and others to both toluene and butyl acetate at similar concentrations. The butyl acetate added little to the symptomatology of the cases, only accentuating the irritation of mucous membranes and increasing nervous excitability. Of those exposed to toluene, only 9% showed pharyngitis and conjunctivitis and 53% showed signs of nervous excitability. Nearly all of those exposed also to butyl acetate showed these manifestations. Subjective symptoms disappear when the subjects are away from work. Unlike benzene, occupational toluene poisoning does not affect the bone marrow or other blood-forming organs. The authors think that the tolerance limit of 200 ppm for toluene might be somewhat raised, in the light of the experience reported.

-- Cond. from Bull. Hyg.

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IN RE: ALBERTA MRS. NOVEMBER 1955

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- 227 Investigations into the Toxicity of Solvents for Replacing Benzene. 2. A Study of Toluene. R. Fabre, R. Truhaut, S. Laham, and M. Peron. *Arch. maladies profess* 16, 197-215 (1955). French.

The general conclusion that the acute and chronic toxicity of toluene is lower than that of benzene has been doubted by some observers. The reason for contradictory reports is probably that commercial toluene contains high percentages of benzene. In the experiments described, rats, rabbits, and dogs were exposed to varying concentrations of pure toluene vapor for periods over seven weeks. No changes in the blood picture or in general health were found. Findings with animals must be used for human beings with reserve, but they seem to indicate the value of substituting toluene for benzene as a solvent, subject to the reservations regarding impurities. -- Cond. from Bull. Hyg.

- 228 Minimum Aniline Concentration Affecting the Central Nervous System in Rabbits. M. S. Zakabunina. *Farmakol. i Toksikol.* 18, No. 3, 51-54 (1955). Russian.

The lowest concentrations of aniline vapor affecting rabbit nerve centers were 0.02-0.04 mg. per l. in 40-minute exposures, and 0.004-0.006 mg. per l. in 8-hour exposures. In these periods no formation of methemoglobin was observed even at somewhat higher aniline concentrations. The principal effect was on the central nervous system.

-- Chem. Absts.

- 229 The Acute Toxicity of the Vapors of Some Methylated Hydrazine Derivatives. K. H. Jacobson, J. H. Clem, H. J. Wheelwright, Jr., W. E. Rinehart, and N. Mayes. *Arch. Ind. Health* 12, 609-616 (Dec. 1955).

Methylhydrazine, asym-dimethylhydrazine, and sym-dimethylhydrazine vapors are similar to hydrazine in that they are respiratory irritants and convulsants on acute exposure. In addition to causing respiratory distress and convulsions, methylhydrazine vapor was found to produce hemolysis and elevated temperatures in exposed dogs. Methylhydrazine was the most toxic of the vapors tested, and hydrazine the least toxic. The higher volatility of asym-dimethylhydrazine indicates that the hazard of this vapor is similar to methylhydrazine. However, the hemolytic properties of methylhydrazine indicate that this vapor has a greater sublethal hazard. Preliminary data on sym-dimethylhydrazine suggest that this vapor has a toxicity and vapor hazard that is less than methylhydrazine and asym-dimethylhydrazine but greater than hydrazine. The odors of hydrazine, methylhydrazine, and asym-dimethylhydrazine were usually described by human subjects as ammoniacal, fishy, or amine-like. The odor of these vapors appears to offer adequate warning of acute exposure to dangerous concentrations.

-- Authors' summary

- 230 Hazards in Pest Control Operations. W. A. Cook. *Modern Sanit.* 7, 22, 42-47 (Dec. 1955); 8, 24, 41-46 (Jan. 1956).

This discussion of hazards and precautions is designed to assist the sanitarian and pest control operator, rather than to be a complete toxicological dissertation on all the pesticides or a manual on step-by-step precautionary measures. Therefore the coverage is broad rather than detailed. Three areas of exposure are considered: (1) the formulation of insecticide preparations; (2) the application of these materials; and (3) hazards to the occupants of a structure after a pesticide has been applied. The materials considered include: chlorinated hydrocarbons, including DDT and similar insecticides; organic phosphates; other organic compounds and botanicals; inorganic insecticides; rodenticides, including phosphorus, thallium sulfate, sodium fluoracetate, and warfarin; and fumigants, including hydrogen cyanide and methyl bromide. In conclusion, the author stresses that the essential element in practical precautionary measures for successful handling of pest control operations is the use of common-sense procedures based on a knowledge of the materials being used. The sanitation manager should be alert to the hazards, must see that employees are well informed and follow proper procedures, and should secure the cooperation of trained industrial hygiene personnel.

- 231 Removal of Toxaphene and Parathion Residues from Tomatoes, Green Beans, Celery, and Mustard with Detergent Washings. B. D. Thompson and C. H. Van Middeltem.
Proc. Am. Soc. Hort. Sci. 65, 357-364 (1955).

Data are given on the amounts of those insecticides present on various vegetables after application, and the extent to which they can be removed by water and detergents.

-- Cond. from Chem. Absts.

- 232 Residues of Toxaphene, Chlordan, Parathion, Malathion, and Demeton on Several Fresh Vegetables. C. H. Van Middeltem and R. E. Waites.
Proc. Am. Soc. Hort. Sci. 65, 365-370 (1955).

The amounts of insecticide residues on certain vegetables at various time intervals after application are reported.

-- Cond. from Chem. Absts.

- 233 Aerosol Safety Factors. A. H. Gee and G. W. Fiero.
Soap and Chem. Specialties 31, 172-175 (May 1955).

Aerosols and pressure-packed products are increasing in numbers and uses, of which a few are insecticides, deodorant mixtures, hair lacquers, and paint and plastic sprays. Their components include propellents, solvents, active materials, and perfumes. The possible toxicities of various components are discussed. In formulating a new aerosol product, it is usually advisable to limit the choice of components to the known safe propellents, to solvents with low toxicity, and to active ingredients on which toxicity information is available. This can be accomplished most easily by using minor variations of established formulas. For special applications, however, there may be no existing prototype, in which event sufficient toxicity testing should be undertaken to assure comparative safety of the formula, and to draft any caution or warning statements that may be indicated or required by law.

- 234 Toleration of Small Doses of Lindane (BHC) by Warm-Blooded Animals. 1. The Effect of Proportions of 2, 3, 4, 5, and 10 Parts per Million in the Diet of Albino Rats. R. Melis.
Nuovi Ann. d'Igiene e Microbiol. 6, 90-104 (Mar.-Apr. 1955). Italian.

By feeding 60 albino rats for 12 months with a standard diet containing 2, 3, 4, 5, and 10 ppm of lindane, the general objective behavior of the animals, their body weight, histological findings, and post-mortem examination have shown that by employing these concentrations of the product no disturbances may be provoked at all. From this fact and according to many other factors which reduce remarkably the already small quantities of lindane used in practice, one may draw the conclusion that this insecticide can surely be employed for killing the entomoparasites of foods.

-- English summary (Bull. Hyg.)

- 235 Toleration of Small Doses of Lindane (BHC) by Warm-Blooded Animals. 2. The Effect of a Proportion of 5 Parts per Million in Diet of Albino Rats Subjected to Conditions Reducing Bodily Resistance. R. Melis. Nuovi Ann. d'Igiene e Microbiol. 6, 105-115 (Mar.-Apr. 1955). Italian.

By subjecting rats fed with the McCollum diet containing 5 ppm to the action of debilitating factors (cold, underfeeding) in order to observe their resistance against these agents in comparison with rats fed with the same diet without lindane, the author has observed that the general behavior, the body weight, histological findings, and post-mortem examination did not evidence a decrease of the resistance of the animals in question to the stress above named, at least by using the tested lindane concentration.

-- English summary (Bull. Hyg.)

- 236 The Industrial Hazards of the Organic Phosphates. W. E. B. Hall.
Postgraduate Med. 18, A34-A44 (Nov. 1955).

With the exception of malathion, the organic phosphates, including parathion, are highly toxic agricultural insecticides, related to and acting like the nerve gas poisons which have been developed as agents for chemical warfare. These substances neutralize the body

cholinesterase, causing toxic accumulations of acetylcholine, with effects resembling muscarine and nicotine poisoning. Intoxication is identified in the living patient by a characteristic chain of signs and symptoms, including fixed, contracted pupils. Laboratory tests show solely a depression of the cholinesterase levels, and this is also the sole diagnostic sign at autopsy. The industrial worker, the physician, and the forensic investigator should all be conversant with the prevention, recognition, and treatment of intoxications from these valuable but potent agricultural chemical weapons.

-- Author's conclusion

- 237 The Vapor Toxicity of a Composite Solvent and Its Principal Compounds. C. W. LaBelle and H. Brieger. Arch. Ind. Health 12, 623-627 (Dec. 1955).

The literature on the toxicity of mixed solvents is reviewed. The solvent investigated consisted of methylethylketone (55.7%), propylene formal, 1,3-amylen oxide, tetrahydrofuran, dimethyl acetal, 1,3-butylene oxide, propylene acetal, and acetone. The toxicity of the mixed solvent was compared with that of each of the principal constituents (omitting the last three), in animal experiments. Both the mixed vapor and the component vapors have the same qualitative effect of anesthesia and narcosis, but quantitatively the components differ substantially in toxicity. The acute toxicity of the mixed vapor agrees within 10% with the geometric mean of the component toxicities weighted by their respective proportions in the mixture. This is not sufficient to prove synergistic or antagonistic effects of the components. The acute toxicity of the mixed vapor is close to that of methylethylketone. This study has demonstrated a method for determining the vapor toxicity of a composite solvent in relation to the vapor toxicities of its components.

- 238 The Toxicity of Certain Polymers with Particular Reference to the Products of Their Thermal Decomposition. J. F. Treon, F. P. Cleveland, J. Cappel, and E. E. Larson. Wright Air Development Center Tech. Rept. 54-301. 60 pp. (1954).

The toxicity of Teflon, Kel-F, Silicones DC-701 and DC-200 and Fluorolube F.S. and their decomposition products was investigated. The polymers themselves were found to be harmless to animals on a single oral dose and on skin contact. In general, animals tolerated repeated exposure to the mist of all these substances in the air at given concentrations. Inhalation of the mists of either of the silicones or of Fluorolube F.S. induced moderate degenerative changes in the livers of cats or guinea pigs. Their remaining viscera and all the viscera of the animals of other species were normal except for an increased evidence of pneumonitis. The maximum tolerable dose for animals exposed to the decomposition products of the substances under investigation for various periods of time are given.

-- Cond. from Chem. Absts.

- 239 The Toxicity of Certain Lubricants, Engine Oils, and Certain of Their Constituents with Particular Reference to the Products of Their Thermal Decomposition. J. F. Treon, F. P. Cleveland, and J. Cappel. Wright Air Development Center Tech. Rept. 54-344. 83 pp. (1954).

The toxicity of certain constituents of lubricants and engine oils was investigated. They included bis(2-ethylhexyl) sebacate, di-sec-amyl sebacate, and bis(2-ethylhexyl) adipate, also formulations used in practice containing one or more of those constituents and small quantities of other substances. They were found to be slightly toxic or nontoxic to animals on single oral administration. They were practically nontoxic on skin application. High concentrations of the mists of these substances were generally tolerated without untoward reactions. Toxic compounds are produced, however, by the thermal decomposition of these materials at 700°F. Extensive data are given on the inhalation toxicities of the various materials. Lowest lethal doses and maximum tolerable doses were of the order of magnitude of 0.2 to 4 mg. per liter of air.

-- Cond. from Chem. Absts.

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INDUSTRIAL DUSTS

- 240 Silicosis Risk in Relation to Silica Dust in the Environment and to Length of Exposure in a Ceramics Factory. F. M. Troisi and N. Zurlo. *Med. lavoro* 45, 614-623 (Nov. 1954). Italian with English summary.

The authors conducted a survey of a glazed tile factory, including airborne dust counts and determinations of free silica in the raw materials and settled and airborne dusts. Both the clay and ingredients of the glaze contributed to the dust. The atmospheric concentration of quartz under 5 microns in diameter varied from 196 particles per cc. to below 30, depending upon location. Three cases of early silicosis were found among 22 selected employees who had worked at the same tasks for over 20 years, although annual x-ray examinations had shown no cases of silicosis. Control measures are discussed.

-- Cond. from Bull. Hyg.

- 241 Statistical Synthesis of the Chemical-Petrographic Determinations of Free Silica in Some Argillaceous Materials. E. Occella. *Med. lavoro* 45, 715-720 (Dec. 1954). Italian with English summary.

The author reports on the examination of about 600 samples of clay and clay-like materials used in industry. The data are graphically charted and tabulated according to free crystalline silica content. The samples representing materials used in brickmaking are also charted separately. Only quartz particles under 5 microns need to be considered when dealing with the silicosis hazard, and the brick-making clays are classified according to the content of the fine quartz particles. Practically all the samples (excluding kaolins) contained quartz in varying proportions up to 55%, averaging 20%. The silicosis hazard from any one material is directly proportional to the degree of subdivision of the free silica particles, and this degree of subdivision may be inversely proportional to the total free silica content. However, the considerations applying to the raw material may not necessarily hold for the atmosphere of the place of work, where, on the one hand, baking of the ware may increase the temper of the material so as to favor further subdivision of the quartz and, on the other hand, the hazard may entirely disappear because the quartz reacts and combines with other oxides which are available at certain temperatures.

-- Cond. from Bull. Hyg.

- 242 Particle Size and Petrographic Analysis of Some Argillaceous Materials. E. Occella. *Med. lavoro* 45, 721-729 (Dec. 1954). Italian with English summary.

This paper deals with a total of nine mineral samples of raw materials used in the manufacture of earthenware, ceramics, bricks, and tiles. The loose and semi-loose particles were separated by sifting through screens of 4 to 400 mesh. Smaller particles down to 10 microns were analyzed by appropriate mechanical apparatus, and the still finer constituents, down to 1 micron, were determined by the polarizing microscope. Durkan's technique (IHF Abst. 1146, Dec. 1946) was then used to estimate the free silica content of each sample and of each of its granulometric groups. The results are tabulated and shown graphically. In general the samples with a lower quartz content were richer in the finer and more dangerous quartz particles. Therefore, in assessing the silicosis hazard from any particular raw material, it is not sufficient to estimate the overall free crystalline silica content without studying the granulometric distribution of particles of less than 5 microns in diameter.

-- Cond. from Bull. Hyg.

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- 243 Cyanosis and Dyspnea in Silicosis. F. Tronchetti and A. Torsoli.
Presse med. 63, 1390-1392 (Oct. 15, 1955). French.

Examination of 160 patients with silicosis showed that those who had dyspnea on exertion also had evident, constant signs of bronchitis. In some cases the illness is manifested by this bronchitis alone; bronchoscopy and bronchography reveal spasm of bronchi and bronchioles. The authors believe that the bronchospastic tendency is the most important feature in the dyspnea of silicosis. Considering cyanosis, it has been shown by angiopneumography that among silicotic patients the exclusion of large capillary beds is very frequent in those with severer cyanosis. The capillary exclusion is accompanied by decrease in pulmonary circulation time. It seems that the opening of arteriovenous shunts accounts, at least in part, for the cyanosis of silicosis. -- J. Am. Med. Assn.

- 244 Silicosis and Coronary Sclerosis. F. Boemke, M. Piroth, and F. J. Schulte-Stracke.
Beitr. Silikose-Forsch. No. 33, 1-29 (1955). German.

The relationship between silicosis and its effects on the heart and circulation are discussed. The reports of a large number of autopsies were examined, analyzed, and summarized. It was established that a connection exists between silicosis and coronary sclerosis; this does not suggest, however, that in every case of silicosis the development of coronary sclerosis, or unfavorable influence on existing sclerosis, is to be expected with certainty. Chronic diseases of the lung, including silicosis, is one of the exogenous factors in the formation and extension of coronary sclerosis; in so far as they react on the coronary system through injury to the pulmonary circulation. It was not possible, from the results of the investigation, to indicate which disease is the more important cause of death when both are present. -- Cond. from Bull. Hyg.

- 245 Some Problems of Pathogenesis of Pneumoconiosis. M. Timar.
Gigiena i Sanit. No. 7, 25-33 (1955). Russian.

A brief review is given of existing material on pneumoconiosis caused by dust inhalation. It is shown that silica determination in blood and urine is not a satisfactory diagnostic tool since patients with advanced stages of the disease do not show super-normal silica levels. Dust (cement, quartz, silicate) introduced into animals via the lungs or digestive tract results in increased silica levels in the body fluids usually not less than 1-2 days after the administration of the soluble varieties (cement), while the less soluble varieties produce an irregular pattern which is not significantly different from control variations. -- Chem. Absts.

- 246 Investigations into the Size of Dust Particles Deposited in Different Parts of the Lungs when Breathing Dusty Air. A. Policard and A. Collet.
Arch. maladies profess. 16, 239-242 (1955). French.

Most of the information on the distribution of inhaled dust particles depends upon observations made on pneumoconiotic lungs. The investigation described is based on observations on eight miners who died suddenly at work and were not pneumoconiotic. Only coal particles could be noted with certainty. Most of the particles found in the bronchi, bronchioles, alveoli, and pleurae were smaller than 2.8 microns. Similar small particles were found in the cervical glands. The observations seemed to indicate that 95% of the particles in the alveoli are less than 2 microns; particles of 2 to 4 microns form about 5%. The rest are negligible. These results confirm for healthy lungs the estimates made from pneumoconiotic lungs. Nevertheless, particles as large as 10 microns are found in diseased lungs; how they get there is a mystery. -- Cond. from Bull. Hyg.

- 247 The Pathophysiology of Respiration in Silicosis and the Assessment of Capacity for Work. P. H. Rossier, A. Buhlmann, and P. Luchsinger.
Deut. med. Wochschr. 80, 608-614 (Apr. 22, 1955). German.

Disturbances of lung function in the early stages of silicosis are mostly concerned with ventilation, and in progressive stages these disturbances are proved to be due to reduction

in the capillary surface. In the evaluation of large numbers of cases, although not in individual cases, there is a certain parallel between the radiographic changes and the severity of functional disturbances. The examination of lung function, especially by work tests, gives an objective criterion for assessment of incapacity, so that remedies may be applied, varying from removal from exposure to inhalation therapy and cardiac treatment, according to the stage of silicosis. In countries where silicosis is compensable as a disease, the system leads to late diagnosis depending on x-ray examination, when severe functional disturbances have already occurred. In Switzerland silicosis is compensable, not as a disease, but only through resulting incapacity for work; this leads to early diagnosis and exclusion of the patients from exposure. In early diagnosis the investigation of respiratory function is highly important. Hence the aim is to distinguish the limits of disturbances of function due to silicosis from those due to accompanying diseases. The basis of all research on respiratory function is spirometry and analysis of the gases in the arterial blood. The technique used in the investigations is described. A classification is given of the different disturbances of lung function and these are discussed very thoroughly. Assessment of capacity for work is made on the results of functional tests. Limiting criteria for this assessment are given. A study of 46 silicotic workers showed that, after at least four years' freedom from dust exposure, radiographic appearances had not changed for the worse in more than half of the patients, and in about half lung function and capacity for work were either improved or maintained. -- Cond. from Bull. Hyg.

- 248 Investigations on Breathing Capacity in Silicosis by Means of Oximetry During Work. E. Sartorelli and Eleonora Giorgi. *Med. lavoro* 45, 600-607 (Nov. 1954). Italian.

The procedure used in oximetry is described and results in 30 persons, normal and silicotic, are presented. In all the seven cases with silicosis in various forms, anoxemia appeared for lighter work-loads than in normal cases of the same age. The onset of severe anoxemia was noted even during light work-loads in two cases of nodular silicosis with severe emphysema and chronic cor pulmonale. Oximetry during work, as proved by the results obtained, is a method of undoubted practical utility for the study of the respiratory function. Compared with other methods by which the behavior of blood oxygen saturation is studied only indirectly, oximetry during work presents the following advantages: (1) the appearance of anoxemia is recorded directly; (2) the research is very rapid; and (3) the examination is better tolerated by the patients, because during work they are allowed to breathe freely without the use of a mouthpiece or a mask.

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

- 249 The Reaction of Middlebrook-Dubos in Silicosis and Silicotuberculosis among Coal Miners. J. Poignot. *Arch. belges med. sociale, hyg.* 13, 17-25 (Jan. 1955). French.

The reaction of Middlebrook-Dubos is concerned with the agglutination of red cells sensitized with tuberculin, by serum dilutions of 1 in 16 or more. Certain modifications, fully explained, were used in a study of 82 silicotic coal miners, of whom 18 were tuberculous, and 16 with tuberculosis without pneumoconiosis. Positivity of the reaction was found to depend upon the presence of tuberculosis rather than silicosis. The low proportion of positive reactions in advanced silicosis does not support the widely accepted claim that the passage from isolated nodules to more advanced confluent silicosis depends upon a superimposed tuberculous infection. The reaction may thus contribute evidence in the differential diagnosis between military tuberculosis and micronodular silicosis.

-- Cond. from Bull. Hyg.

- 250 Carcinoma of the Lung in Asbestosis: Report of Two Additional Cases. K. H. Lynch and H. R. Pratt-Thomas. *Southern Med. J.* 48, 565-568 (June 1955).

The evidence of correlation between the occurrence of asbestosis and of lung cancer is collected. No such correlation has been found with other forms of pneumoconiosis like silicosis and anthracosis, or pulmonary tuberculosis. The pathology of asbestosis is abnormal; it seems to be due to traumatism between large particles of asbestos, too large to penetrate into the alveoli, and the pulmonary tissues, while other pneumoconioses present reactions between minute particles and the living tissues. Further, no efforts to induce lung cancers in animals exposed to asbestos dust have been successful. Nevertheless, the statistical evidence is strong. Two additional cases of lung cancer associated with

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asbestosis are reported. In both cases x-ray examination showed the diffuse granular infiltration over both lungs characteristic of asbestosis and the lungs after death exhibited the fibrosis distinctive of asbestosis; but both patients succumbed to bronchogenic carcinoma. The appearances of the lesions are illustrated. The authors have seen four cancer cases in 49 autopsies of asbestos, 8.2%, compared with 0.7 to 2.4% in autopsies taken at random.

-- Bull. Hyg.

- 251 Asbestosis and Pulmonary Carcinoma in an Asbestos Spinner. Notes on the Induction of Lung Cancer by Asbestos Fibers. G. Rombola. Med. lavoro 46, 242-250 (Apr. 1955). Italian.

The first case of pulmonary carcinoma occurring in Italy in a subject affected by slight asbestosis is described. The diagnosis formulated in life was confirmed by autopsy, the gross and microscopic findings of which are briefly reported. The present clinical, pathological, and statistical knowledge on the capacity of asbestos to cause tumors is summarized. Statistical data are abundant, but experimental studies are few and not concordant. The author believes that a study should be made to determine how the capacity of the different types of asbestos to cause tumors differs according to their chemical composition.

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

- 252 Peritoneal Tissue Reactions Produced by Various Kinds of Carbon and Coal Dusts in the Rat. H. Sakabe and T. Chi. Bull. Inst. Public Health (Japan) 4, 18-22 (June 1955).

Peritoneal reactions in rats produced by various carbon and coal dusts were studied. The results showed that the natural and artificial graphites free from silica produced a fibrosis or granuloma on the peritoneum of rats, although far more feeble than the tissue reactions produced by quartz dusts. The more the graphitization of carbon dust progressed, the more the resulting tissue reaction became severe. The tissue reactions by graphite dusts were variable according to the type of graphite. Carbon black could not be assumed to be completely inert except types of large spherical carbon black. Potency of coal dusts for tissue reactions may lie somewhere between natural graphite and carbon black, but a difference of tissue reactions among various coal dusts was not demonstrated in this study.

-- Public Health Eng. Absts.

- 253 The Effect of Various Forms of Alumina on the Lungs of Rats. E. J. King, C. V. Harrison, G. P. Mohanty, and G. Nagelschmidt. J. Pathol. Bacteriol. 69, 81-93 (1955).

When introduced into the lungs of rats, powdered hydrated alumina and aluminum phosphate of small particle size produced reticulonodules. In the case of alumina, the nodules developed into areas of dense collagenous fibrosis. There was a slow dissolution of aluminum hydroxide into the surrounding tissues as shown by aurine staining of sections. The amount of alumina found in the lungs was less in the animals which survived longest. Condensed fumes from a corundum furnace, which consisted approximately of half finely divided alumina and half silica, produced a much less severe fibrosis, but there was a notable exudative reaction in the lungs and several animals died during the course of the experiment. This dust was partially eliminated from the lungs of animals during the 12 months of the experiment. The doses of dust used to produce these results are mostly in excess of those which have been used in the prophylaxis of human silicosis.-- Chem. Absts.

- 254 Baker's Rhinitis and Asthma. C. Pestalozzi and U. W. Schnyder. Schweiz. med. Wochschr. 85, 496-501 (May 21, 1955). German.

A study was made of the prevalence, symptomatology, course, sensitization, and spontaneous desensitization and the family disposition in baker's rhinitis and asthma. Of 159 bakers in Zurich, 42 had allergic symptoms of the respiratory tract; 36 had rhinitis only and six also had bronchial asthma. Skin tests with flour extracts gave positive reactions in 24 of the rhinitis cases. The rhinitis is apparently due to a flour allergy, but other factors must be considered the cause of the asthma.

-- Cond. from Bull. Hyg.

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- 255 A Clinical and X-Ray Study of the Action of Jute Dust on the Respiratory Apparatus. G. Cascelli. *Igiene e Sanita Pubblica* 10, 245-266 (May-June, 1954). Italian.

A clinical study of workers exposed to dust in a jute factory for at least ten years led to the following conclusions: (1) jute does not cause pneumoconiosis within the definition adopted by the International Labor Office; (2) some workers suffered from acute or chronic inflammation of the upper respiratory tract, sometimes made worse through spasm of the bronchial muscle; (3) no dust can be inhaled repeatedly without harm to the pulmonary tissue, and jute, which is more hygroscopic than other vegetable dusts, absorbs moisture from the atmosphere and in the bronchial tree and soon settles within the latter and there exerts its irritant effects; and (4) jute dust does not favor either the incidence or the progress of pulmonary tuberculosis.

-- Cond. from Bull. Hyg.

- 256 Corneal Changes in Stone Cutter's Eyes: Contribution to Occupational Hygiene of Eyes. W. Buttner-Wobst. *Klin. Monatsbl. Augenheilk.* 125, 572 (1954). German.

Studies were made on the eyes of 15 stone cutters, nine of whom had been in this occupation for over ten years. Practically all the work was done outdoors, so that dust did not constitute a great problem. There was no fibrosis of the lung. The sensitivity of the cornea was normal in eight eyes, somewhat reduced in 13 eyes, and greatly reduced in the remaining nine. Completely protective goggles were worn only by one worker. Efforts were made to establish a possible connection between the reduction in corneal sensitivity and the presence of healed-in foreign bodies (stone particles). These bodies or corneal scars were found in 24 eyes. The bodies were between 50 and 150 microns in diameter. The granules seemed to be surrounded by a connective tissue membrane. They were usually in the sub-epithelial layer, partly within Bowman's membrane and partly below it. Some of the foreign bodies were surrounded by a corona of bluish-white turbidity. Wimple-like streamers of turbidity radiated from others. The author assumes that the wimple-like areas are probably caused by silica particles, and the coronal areas presumably enclose limestone particles. There was no evidence that the visual acuity was impaired by the small areas of turbidity, and so the author believes that they cannot be regarded as an occupational disease, the less so since they do not impair working capacity and cause no subjective complaints.

-- Cond. from Arch. Ind. Health

PHYSICAL ASPECTS OF THE ENVIRONMENT

- 257 Quarterly Report No. 7, Subcommittee on Noise in Industry of the Committee on Conservation of Hearing of the American Academy of Ophthalmology and Otolaryngology. July 1 to Sept. 30, 1955. 12 pp.

Progress on the following research projects is reported: relation of hearing loss to noise exposure; temporary threshold shift; long term recovery from permanent hearing loss; evaluation of speech test material; and automatic audiometry. Three papers by members of the staff of the Subcommittee are included:

Industrial Audiometric Environments. D. E. Wheeler.

The possible influence of the noise environment in the test room is studied, and recommendations are made.

Some of the Steps Necessary for Gathering Data in Industry. J. A. Gustafson.

The success of a hearing research program involves not only accurate testing, but also the cooperation of many people in the plant. The necessary steps are outlined: (1) preliminary conferences with the medical and safety departments; (2) submission to the company of a general research outline; (3) orientation and briefing of supervisory personnel; (4) insuring that the subjects arrive at scheduled times; (5) advance preparation of the exact recording of pertinent data; (6) preparation of a list of instructions when more than one tester is to collect audiograms; and (7) explanations to the subject as a research participant.

Statistical Department Report for the Period July 1 to September 1, 1955.

R. R. Quiggle.

Details of the 1954 Wisconsin State Fair Hearing Survey are described.

A list of publications by members of the Subcommittee and the research staff is appended.

- 258 Occupational Deafness. Medical, Medicolegal, and Compensation Aspects and Constructive Approach to Problems. A. I. Goldner. Arch. Ind. Health 12, 643-656 (Dec. 1955).

In general the following industries are apt to have a noise hazard: (1) metal industries, especially in the fabrication and shaping of metal; (2) pneumatic tool employments; (3) spinning and weaving; (4) railroad transportation and repair shops; (5) aviation; and (6) telephone. There is no single numerical value below which noise exposure could be considered as harmless, but the gross classification of noisy industries, a simple observation on audibility of conversation, the character and type of exposure, and the clinical observation of impairment in large groups of workers, should be more than adequate to establish the presence of a noise hazard in the absence of specific criteria. The clinical picture of occupational deafness is discussed at length. The medical and compensation aspects are of the most concern. Problems associated with the New York compensation law are discussed. Experience in that state and others have demonstrated that the measures that have been adopted are temporary and will be changed when sufficient evidence and experience have been accumulated. The ultimate goal is the eradication or minimization of hearing impairment due to excessive industrial noise. Regulation of hours of exposure, with provisions for periods of recovery of the inner ear, elimination of confined spaces, use of ear protector, and elimination of vibration in machinery are important features of a program designed to eliminate occupational deafness.

The examination of workers with long exposure presents a serious economic problem to employers. On the other hand, if the discovery of hearing loss is not made with the employer's cooperation, it may be made through less desirable sources. Insurance companies, legislators, unionists, employers, and compensation boards can do the most to effect measures which would permit evaluation of these employees. Another question is what type of worker should be hired, how he can be protected against further loss, and how the employer can be protected against unwarranted claims. The workers with established occupational deafness or with established conductive deafness are not poor risks if their deafness does not progress. The worker with damaged eardrums is a poor risk, and elderly persons should be employed with caution. In the area of evaluation of established occupational deafness for claims purpose, the utilization of the services of an otologist experienced in the evaluation of compensable injuries will save large sums of money.

- 259 Asphyxia from Oxygen Lack in Underground Workings. A. Stokly. Arch. Gewerbepathol. Gewerbehyg. 13, 584-600 (1955). German.

This paper gives some technical details of the construction of shafts and adits required for the purpose of hydroelectric power installations and records the circumstances under which a worker lost his life, owing, it is believed, to oxygen lack in an underground shaft. Some other similar cases are described and discussed in considerable detail. Clinical particulars are also given of cases in which illnesses suffered by workers were regarded as attributable to the same cause. The evidence on which the diagnosis of asphyxia due to oxygen lack was based is described. It is believed that the oxygen was reduced to a dangerously low level through biological oxidation, as rotting wood is known to take up oxygen. The need for taking all precautions and for adequate instruction of workers in the practical use of oxygen apparatus is stressed. -- Bull. Hyg.

- 260 Some Cases of Microtraumatic Arthritis of the Elbow of Workers Who Had Never Handled Pneumatic Tools. E. Guyenot and R. M. Ducauquis. Arch. maladies profess. 16, 234-236 (1955). French.

Four instances are quoted of men who through physically active lives, following such occupations as road-making and navvy-work, had subjected their elbow joints to repeated efforts which must have been traumatic; but they had never used pneumatic tools. X-rays disclosed that their elbows exhibited lesions similar to those who have been attributed to the

frequent shocks arising from vibrations set going by the manipulation of pneumatic tools. The bony changes included extensive modifications of the articular surfaces, vacuoles in the head of the radius, numerous osteophytes around the joint and ossifications in the triceps tendon. There was some limitation in movement, but no clinical symptoms. An explanation of the lesions is difficult to suggest.

-- Bull. Hyg.

RADIOACTIVITY AND X-RADIATION

- 261 Problems Associated with the Application of External and Internal Radiation Exposure Limits. K. Z. Morgan. *Am. Ind. Hyg. Assn. Quart.* 16, 307-323 (Dec. 1955).

This paper is an extensive discussion of the many problems to be solved in order to establish adequate limits for exposure of persons to various forms of radiation externally and internally. The limitations of the use of the roentgen and other units are discussed. Basic and other criteria of permissible exposure are stated. The general types of experimental data needed to establish reliable maximum permissible exposure values are discussed at length. One need is experimentation on human volunteers. One source of data is that furnished from accidents or military operations, but such data, for instance from the tests in the South Pacific, are incomplete. Analyses of the distribution of radiation among the bodily organs are being made on the bodies of persons who have died from violence. It will require many years to establish reliable values from both animal and human experiments and from soil and water analysis, but this should not discourage present investigations or delay others that are contemplated. A number of administrative problems are discussed.

- 262 Radiation Hazards to Nonradiologists Participating in X-Ray Examinations. M. Rivo, G. J. D'Angio, and I. E. Rhodes. *J. Am. Med. Assn.* 160, 4-10 (Jan. 7, 1956).

Injuries to physicians continue to occur because of the increasing use of x-rays and gamma radiation in modern diagnosis. The danger to nonradiologists is especially great until they learn to practice safety habits and to use available protective equipment. The survey here reported revealed poor safety habits in most nonradiological personnel and resulted in striking improvement. In the past, fluoroscopic reduction of fractures was the commonest cause of injury. Highly malignant forms of carcinoma developed in the skin, but damage to the hemopoietic and reproductive organs has also been serious. New procedures such as cystourethrography, angiography, myelography, and hip-nailing are here analyzed as to the amount of exposure involved; and the methods needed for protection are described.

-- Editor's summary

- 263 Late Follow-Up Studies after Internal Deposition of Radioactive Materials. W. B. Looney and M. Colodzin. *J. Am. Med. Assn.* 160, 1-3 (Jan. 7, 1956).

Sources of material for defining the safe levels of radioelements in the body include: persons given radium salts for therapy during 1915-1930; employees of luminous-dial factories before adequate safety measures were taken; and patients given radiologic examinations with thorotrast from about 1930 to 1945. Many of these persons are still living. Radium is deposited in the skeleton in small areas of high concentration. Malignant tumors and roentgenographic changes and symptoms resulting from increased fragility of the skeleton may occur many years after deposition. Thorium is deposited in the reticuloendothelial system and remains throughout the life of the patient. The major sites of deposition are the liver, spleen, and bone marrow. Increased density of the liver and spleen are usually found on roentgenographic examination. Induration and contraction may be present at the sites of injection in the neck and arms. A small number of primary hepatic tumors, leukemias, and hematological disorders have been found. These results warrant further studies of large numbers of patients if the number of the disorders is significant when compared to suitable control groups.

-- Cond. from authors' summary

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- 264 Skeletal Lesions Following Internally Administered Radium. R. H. Marshak, R. A. Newburger, and Joan Eliasoph. *J. Am. Med. Assn.* 150, 41-44 (Jan. 7, 1956).

A case of late effects on the bones from internally administered radium is described, illustrated and discussed. It is to be expected that increasing numbers of such cases will become clinically evident, and as the roentgen appearance of these lesions becomes widely known, more of them will be accurately diagnosed.

- 265 Pulmonary Effects from Radioactive Barium Sulfate Dust. H. Cember, T. F. Hatch, J. A. Watson, and T. Grucchi. *Arch. Ind. Health* 12, 628-634 (Dec. 1955).

Rats were exposed by intratracheal insufflation to radioactive barium sulfate particles at three levels of exposure, namely 4.5 millicuries, 45 microcuries, and 4.5 microcuries radiosulfur, and were serially killed over a nine-month period. A very small increase in the intensity of inflammation and cicatrization was observed in the animals that received the highest dose. This increase, however, was not considered significant and was not attributed to radiation. It is therefore suggested that the intense radiation delivered to the small volume of lung tissue in the immediate vicinity of the barium sulfate particles may not be as hazardous as might be expected or that the latent period for production of serious radiation injury is very much longer than the nine-month period over which these animals were observed.

-- Authors' summary

- 266 Effects of Nuclear Weapons Testing. G. M. Dunning. *Sci. Monthly* 81, 265-270 (Dec. 1955).

The information given in this paper provides answers toward three basic questions: (1) What are the problems and possible risks associated with nuclear weapons testing? (2) What are the data concerning effects from past tests and what they might be if the tests are continued? and (3) What do these data mean—how serious are the possible risks? The subjects considered are: blast and thermal effects; external exposure to radiation; internal exposure (short and long term); genetic effects; weather; and nitric acid formation. Blast effects are mostly confined to the immediate neighborhood of the testing sites. Some structural damage has occurred outside the test site, but no detrimental effects have occurred on human beings and animals. No thermal injury has occurred outside the test site. Temporary blindness may occur at a distance of 30 to 40 miles, but adequate warning has been given, and the simple act of turning the head away can give adequate protection. Skin damage from external radiation has been noted within 20 miles of the explosion, but larger warning areas have now been established. It is shown that the internal exposure effects, genetic effects, and nitric acid formation from past tests and any likely to be given are much below any dangerous level. The effect on weather is insignificant.

- 267 Chorioretinitis Produced by Atomic Bomb Explosion. J. Landesberg. *Arch. Ophthalmol.* 54, 539-540 (Oct. 1955).

The energy released from an atomic bomb blast has visible infrared and long ultraviolet rays, which are capable of producing thermal burns involving the choroid and retina. The pupillary diameter at the time of detonation is a very important factor. The pupillary and blink reflexes are too slow to prevent burning of the retina because sufficient energy for this arrives after the first 0.1 second. These reflexes take a longer time. The distance at which burns may be produced is much greater than that at which any other harmful effects of the atomic bomb occur, and at a given distance the burns on the retina are severer than those of the skin. This is true because of the optical system of the eye. It seems apparent that in this case the right eye did not receive the rays because of the shielding effect of the bony structures of the nose. It is concluded that the necessity of covering the eyes during an atomic blast is of the utmost importance.

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

03120185

ENVIRONMENTAL MEASUREMENTS

- 268 Colorimetric Determination of Carbon Monoxide in Air by an Improved Palladium Chloride Method. T. H. Allen and W. S. Root. *J. Biol. Chem.* 216, 309-317 (1955).

Christman's method of analyzing carbon monoxide in air by the reduction of palladium chloride was extensively improved so that it is suitable for use in physiological experiments. With samples of less than 100 cc. it is possible to analyze samples ranging in CO content from 94.2 to 0.010% or even less, with a recovery of 99.6% and a standard deviation of 2.21%. The lowermost limit of the method, which has not been approached, is determined by the accuracy with which the least quantity of palladium chloride can be accurately measured by spectrophotometry of palladium iodide solutions. -- Chem. Absts.

- 269 An Improved Palladium Chloride Method for the Determination of Carbon Monoxide in Blood. T. H. Allen and W. S. Root. *J. Biol. Chem.* 216, 319-323 (1955).

An improved palladium chloride method for the determination of carbon monoxide in 0.2 to 1.0 cc. of blood is described. The results agree well with those obtained with a precise gasometric method. -- Chem. Absts.

- 270 Methods for the Detection of Toxic Gases in Industry. No. 10. Chlorine. (Revised.) Great Britain, Department of Scientific and Industrial Research. 6 pp. (1955). Obtainable from British Information Service, 30 Rockefeller Plaza, New York 20, N. Y. 20 cents.

The original leaflet was published in 1939. In this revised edition the sections on occurrence, poisonous effects, and first aid have been rewritten, but only minor amendments have been made to the sections dealing with the method of detection.

-- Cond. from Bull. Hyg.

- 271 Lead in Blood. A Rapid Method for Spectrochemical Analysis. Kathleen Kumler and T. P. Schreiber. *Am. Ind. Hyg. Assn. Quart.* 16, 296-300 (Dec. 1955).

Spectrographic methods that have been previously described give good correlation with chemicals, but are time-consuming. In a new method, which is fully described, the speed is increased by the following factors: the use of partially oxidized blood, the presence of nitrogen in the analytical arc gap, and a narrow (10 micron) entrance slit. In addition, the possibility of contamination has been greatly reduced. This results from the electrode loading technique and the need of very few reagents for the analysis. The accuracy and reproducibility of the method are good.

- 272 The Determination of Mercury in Urine—Single Extraction Method. E. E. Campbell and B. M. Head. *Am. Ind. Hyg. Assn. Quart.* 16, 275-279 (Dec. 1955).

Mercury is determined by the mixed color method using dithizone; interfering elements are eliminated by complexing with versene and by pH control. The published ashing techniques have been studied in conjunction with the single extraction method. Careful oxidation of urine with potassium permanganate and sulfuric acid is recommended. The sensitivity of the method is 1 microgram of mercury with an accuracy of $94.2 \pm 4.82\%$. The advantage of this procedure is the speed of analysis; and purification of the reagents is unnecessary. -- Editor's summary

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IN RE: AIRBORNE NOVENBER 1992

NW88-0016483

- 273 Determination of Methanol in Body Fluids. F. Stratton.
Tech. Bull. Registry Med. Technologists 25, 179-183 (1955);
Am. J. Clin. Pathol. 25, 1071-1075 (1955).

A preliminary isolation by steam distillation is followed by permanganate oxidation. A color reaction is then carried out with reduced fuchsin for a qualitative test, or chromotropic acid for a quantitative determination. Ethanol does not interfere with the methanol determination.

-- Chem. Absts.

- 274 Determination of Trichloroethylene in Air by the Rayleigh Interferometer. R. E. Jahn.
Analyst 80, 700-704 (1955).

The Rayleigh interferometer was used to determine the refractive index of samples of air containing 0 to 3% trichloroethylene vapor. The readings are not linearly related to the difference of refractivity between the two gases which are compared, but a simple calculation gives a value which is related. The interferometer is a very convenient instrument when a large number of determinations are to be made, but the high accuracy of the instrument is not fully utilized.

-- Chem. Absts.

- 275 A Method for Removing Insecticide Residues of Wettable Powders from Sprayed Surfaces. F. Barlow. Bull. World Health Organization 12, 359-364 (1955).

Sample surfaces of glass, unpainted plywood, and mud bricks were sprayed with a 75% DDT wettable powder. Adhesive tape carefully applied, removed, and analyzed for labile chlorine gave recoveries considered suitable for field studies for evaluation of residual DDT on sprayed surfaces.

-- Chem. Absts.

- 276 Some Principles of Airborne Dust Sampling. J. G. Dawes, B. A. Maguire, and D. L. Tye. Research Report No. 102, Safety in Mines Research Establishment, Portobello St., Sheffield, England. 16 pp. (1954). \$1.00.

In this report the authors bring together the information they have collected concerning the behavior of dust clouds in coal mines, in order that dust sampling may be economically performed and that the scope and limitations of the data it furnishes may be appreciated. At distances greater than ten roadway diameters from the source of dust the airborne concentration is substantially uniform over the cross-section of the roadway, and particles within the respirable range (0.5-5 microns) do not deposit appreciably over distances up to 100 yards from the source. Short-term fluctuations are less important at a greater distance from the source. Fluctuations in dust concentration are large, and either large numbers of short-period samples or a continuous sample are required to give a reliable mean. The relation between the shift mean and the mean of peaks, the differences of dust concentrations between shifts, and the correlation between thermal precipitator and P. R. U. hand pump results are discussed.

-- Bull. Hyg.

- 277 Sampling and Analysis of Industrial Process Dust. K. Westlin and L. J. Czerwonka. Am. Ind. Hyg. Assn. Quart. 16, 283-292 (Dec. 1955).

A technique is described for collecting a dust sample suitable for both concentration determination and analysis. The most suitable filter medium was found to be a type AA fiber-glass, of given size, density and pad thickness, heated to about 600°F to remove bonding material. The apparatus is described and illustrated. A null-balance type of sampling tube maintained sufficiently constant air velocity, which is essential. Sieving followed by elutriation was used in the size separations. Procedure for washing filter pads, sieve procedure, dust dispersion, and pipette procedure are described. Other methods for special purposes including dusts not suitable for wet recovery, and particles of very small size, are described and evaluated. A typical dust sampling and analysis problem is described. For most practical purposes the results obtained are apparently accurate. In some portions of the procedures, particularly in the size analysis, the methods become an art and not merely a mechanical procedure, and the skill and patience of the analyst play a large part in the final accuracy of the results.

- 278 Direct Photomicrography of Air-Borne Particles. R. D. Cadle and E. J. Wiggins.
Arch. Ind. Health 12, 584-591 (Dec. 1955).

A method is described for photomicrography of particles suspended in air. The difficulties involved in such methods are that the particles are in motion and that only a small number of particles are in focus. These difficulties have been overcome by: (1) short exposure periods (1 to 10 microseconds) and high intensity illumination; (2) a large number of flashes to expose each film; and (3) a high repetition rate so that numerous exposures can be obtained on each negative in a reasonable period of time. Details of construction of the apparatus are described. The method is used to determine the shapes, sizes, and concentrations of airborne particles. Shapes are observed directly. Sizes are determined by measuring image sizes and dividing by the magnification. Concentrations are calculated from the number of well-defined images on the negative, the area of the negative, and the depth of field of the objective. Counting the particles involves selecting the well-defined images, but experiments with six observers on average counts of 26 to 58 particles gave an average deviation of 20 to 25%. The method is easily applicable to particles of 2 microns and over, and can be used down to 0.3 micron. The technique has been used to investigate ice fogs in Alaska.

- 279 The Electron Microscopy of Airborne Dusts. J. Cartwright.
Brit. J. Appl. Phys., Suppl. 3, S109-S120 (1954).

There is difficulty in reconciling optical and electron microscope assessments of airborne dusts. The work described in the present paper was carried out to examine the relation between the two types of assessment of dusts within the size range of 0.3 to 3 microns. The thermal precipitator was used as the sampling instrument. Samples taken in the membrane-coated grid of the precipitator are not collected under the same conditions as on cover glasses for optical counting, and hence discrepancies may arise. The author has avoided these difficulties by taking samples on membrane-coated cover glasses, by collecting over a longer period, and by shadowing the cover glasses with an alloy of gold and palladium. The methods of preparing the cover glasses and manipulating the electron microscope are described in detail. When the resolving power of the electron microscope was reduced to that of the optical microscope, counts obtained by the two methods showed no serious discrepancy. The author concludes that it is normally desirable to use a combination of the two methods of counting, but because of the shortcomings of the optical microscope, some compromise is necessary in fitting the results. In the discussion of the paper various points of considerable technical significance were raised.

-- Cond. from Bull. Hyg.

- 280 Effect of Particle Size on the Determination of Quartz by X-Ray Diffraction. R. L. Gordon and G. W. Harris. Nature 175, 1135 (June 25, 1955).

A study has been made of the accuracy with which the determination of the quartz content of airborne dusts, lung residues, and similar materials arising in silicosis research can be made with a Geiger-Mueller counter x-ray diffractometer recently described (to be published in full later). In particular, the effect of the particle size of the quartz on the accuracy of the determination has been studied. The relative diffracted intensities of the 1122 line of quartz (spacing 1.82A) were measured as a function of the effective particle diameter and were shown to fall off on both sides of a maximum at an effective diameter of about 2 microns. The lower intensities for large particle sizes are to be expected as a result of extinction; those at smaller sizes are attributed to the existence of the "amorphous layer" previously reported. Removal of the amorphous layer by etching with hydrofluoric acid results in full intensities of the diffraction lines for particles greater than 0.5 micron in size, but not for smaller particles. In order to make accurate determinations of quartz by x-ray diffraction, it is necessary to know its particle-size distribution, and, possibly, whether it has received treatment equivalent to etching. In the size range 1-20 microns, the error introduced by ignoring these effects is about 12%.

03120188

PREVENTIVE ENGINEERING

- 281 Performance of Automatic Louvers in Industrial Ventilating Systems. I. Kingsley. Monthly Rev., N. Y. State Dept. Labor 34, 37-39 (Oct.); 43, 44 (Nov. 1955).

The industrial codes in New York State contain regulations prohibiting the use of louvers in exhaust systems. However, they may be desirable in some cases, and an investigation of the performance of louvers under actual operating conditions is in order to determine whether they may be used under specific conditions. The tests are described and results are reported. In summary: (1) the pressure drop through clean louvers appears to be excessively high, and this may result in increased expenditure for larger fans and motors or cause inadequate control at the operation; (2) automatic louvers should not be used on the discharge dusts of dry spray painting exhaust systems on account of the excessive pressure drop caused by the deposition of oversprayed material on the louver; (3) louvers should not be used in any exhaust system in which a tacky, sticky, linty, flammable, or corrosive material may be deposited on or cause corrosion of the louver; and (4) the only systems in which automatic louvers appear to be feasible are low velocity systems handling air or essentially air. Even then, the temperature should not be so high and the nature of any gaseous materials carried should not be such that corrosion will occur.

- 282 The Efficiency of Cyclone Dust Collectors. J. Dauphin. Genie chim. 73, 121-129 (1955). French.

Earlier theories of cyclones are discussed and a new theory is developed. The forces on particles in the upper and lower zones of the cyclone are analyzed by using the concept of the stationary particle, which is that particle size which will have no radial force component at $r(\rho)_0$, the arithmetical average of the radii of the separator and the concentric exit duct, because the radial component of the air drag on the stationary particle is equal to its centrifugal force. The data of ter Linden (Inst. Mech. Engrs. Proc. 160, 223, 1949) have suggested that at r_0 there is no vertical velocity component in the air, the vertical velocity being downward at a radius higher than r_0 and upward at a radius higher than r_0 . Equations for the separation are developed for particles larger and smaller than the stationary particle. The calculated efficiencies are in accord with the data of ter Linden.

-- Chem. Absts.

- 283 A Unique Wet Collector for Lightweight Aggregate Dusts. H. E. Seifert and J. H. Faaney, Jr. Am. Ind. Hyg. Assn. Quart. 16, 301-306 (Dec. 1955).

The lightweight aggregate industry is comparatively new and in the production of this material the emission of atmospheric dust can be a serious problem. The amount of effluent from the kilns of the plant described was approximately 50,000 c. f. m. Although several collectors were tried, including one commercial wet type, none of them operated successfully for more than a few weeks because of the abrasive action of the dust or the sulfur content of the gas. The temperature of the effluent from the kilns was approximately 500° F. In order to adequately control the dust from the kiln, a dust collector built of specially treated wood for resistance to heat and acid was constructed. A series of baffles and nozzles were installed to increase the collection efficiency. Over 90% of the atmospheric dust was eliminated and no complaints have been received since this collector was put into operation.

-- Authors' summary

- 284 Role of Electric Forces in the Filtration of Aerosols by Fiber Filters. T. Gillespie. J. Colloid Sci. 10, 299-314 (June 1955).

The net electric charge on the fibers of various filters and the electric charge distribution of typical test aerosols were measured. A simple theory of filtration which included electrical as well as mechanical effects was developed in order to apply

these data to appropriate filtration results. Most fibers have an electric charge. With a homogeneous uncharged aerosol under conditions described, a maximum per cent penetration occurs at approximately 0.05 micron, depending on the air velocity through the filter. In a normal heterogeneous aerosol, the peak in penetration versus particle radius curves appears at larger various values of the radius, depending on the net electric charge per unit length of the fibers and the electric charge distribution of the test aerosol. Some unexplained filtration results may be due to some of the particles escaping capture on contact. No attempt was made to assess the part played by electric forces in ensuring adhesion on contact.

-- Cond. from Atm. Poll. Bull.

COMMUNITY AIR HYGIENE

- 285 An Aerometric Survey of the Los Angeles Basin, August-November, 1954.
Air Pollution Foundation (Los Angeles) Rept. No. 9, 333 pp. (1955).

Further evidence was obtained on the importance of photochemical reactions in the production of smog. The chemical substances measured in the air in various parts of the Los Angeles Basin included oxidant, aldehydes, hydrocarbons, nitrogen oxides, carbon dioxide, sulfur dioxide, and particulate matter.

-- Chem. Absts.

- 286 Air Pollution Corrective Measures Complicating Water Pollution Control Problems. W. H. Lang.
Sewage and Ind. Wastes 27, 957-961 (Aug. 1955).

In spite of apparent differences between these two, there is a direct relationship between air pollution control and water pollution control. Scrubbing, to control air pollution, results in a liquid effluent which must be treated before the problem is fully solved. Therefore the study should show whether this effluent can be handled in existing facilities or if additions to the water pollution control facilities must be provided. Regeneration of the scrubbing medium is one way of handling this. There are a few cases where water pollution control results in liquid wastes which are odor producing and therefore air pollution.

-- Public Health Eng. Absts.

- 287 Particulate Atmospheric Carbon. A Method for Determination of Sources. G. D. Clayton, J. R. Arnold, and F. A. Patty. Am. Ind. Hyg. Assn. Quart. 16, 293-295 (Dec. 1955).

The determination of the carbon 14 content of atmospheric carbon gives an unequivocal distinction between that produced by combustion of fossil fuels such as coal, oil, and natural gas, and that from biological sources of all kinds, including trash burning, pollen, forest fires, etc. In two tests in Los Angeles approximately 25% of the particulate carbon was found to be of contemporary origin, and similar but inconclusive results were obtained in Detroit. The tests proved the effectiveness of the technique used, and reveal that the procedure is a useful tool in distinguishing whether the atmospheric particulate carbon is newly formed or aged. A few tests for beryllium 7, which is produced by cosmic rays, indicate that the method can be used as a measure of the rate of subsidence of the atmosphere in Los Angeles when sufficient results are obtained.

- 288 Wind Tunnel Scale Model Studies of Air Pollution from Industrial Plants. G. H. Strom.
Ind. Wastes 1, 1-4 (Sept.-Oct.); 55-59 (Nov.-Dec. 1955).

In the first paper the author describes the wind tunnel scale model studies made to determine the causative factors in air pollution and some means of abatement suggested by these studies. Emphasis is placed on those aspects of air pollution problems important to individual plants. Attention is confined to gaseous pollutants, because additional problems are involved in the study of particulate matter. The important factors are: (1) environmental

factors, including meteorological characteristics, topography, and sensitivity of surrounding areas to pollution; and (2) plant factors, including rate of industrial waste emission, stack density and ejection speed, and plant configuration, including stacks. The effects of inversion, cumulative effects, and wind speed effects are discussed. Scale model wind tunnel experiments have been most successful in the study of air pollution from short stacks, a field in which analysis of concentration characteristics by theoretical or empirical methods is difficult. In the second paper the New York University wind tunnel is described, including photographic apparatus and other methods of light measurement. Results obtained so far have not reached the stage of usefulness for routine investigations of air pollution problems, but a closer approach has been made to the understanding of the problems of individual plants and of groups of plants. The series will be continued.

- 289 Some Observations on London Fog. R. E. Waller and P. J. Lawther.
Brit. Med. J. 2, 1356-1358 (Dec. 3, 1955).

Visibility may be greatly reduced in London by smoke, in the absence of fog. On January 19, 1955, very wide variations in the concentrations of smoke were observed, and a tenfold increase occurred over a period of two hours. There was also an increase in sulfur dioxide, but no sulfuric acid was detected by the methods used, although traces might have been present in the form of minute droplets. A temporary deterioration in the clinical condition of some patients with chronic bronchitis and emphysema coincided with this episode. The results emphasize that measurements of pollution over 24- or 48-hour periods do not necessarily indicate the hazard to which the population may be exposed.

-- Authors' summary

MANAGEMENT ASPECTS

- 290 Executive Health: Fourteen Ways to Maintain It. L. J. A. Villalon.
Research & Eng. 2, 34-36 (Jan. 1956).

The following hints are given to the busy executive from leading doctors and psychologists on how to keep healthy without impairing drive and efficiency: (1) don't be afraid of finding something wrong with yourself; (2) don't neglect the annual physical examination; (3) don't let the job boss you; (4) get rid of health problems; (5) know your own limitations; (6) save yourself for the important things; and (7) most important of all, learn to relax. Seven sane ways to relax are: (1) change your pace; (2) plan and organize; (3) play to relax; (4) use your imagination; (5) talk to relax; (6) do for others; and (7) laugh to relax. Each of these hints is discussed.

- 291 Industrial Sanitation and the Worker's Health. J. L. Barron.
Modern Sanit. 8, 13-15, 48 (Jan. 1956).

The author pleads for more attention to industrial sanitation. A balance of sanitation, safety, and industrial hygiene yields a complete protection program. A sanitation program includes: (1) daily maintenance of personnel facilities; (2) cleaning and periodic refinishing of surfaces; (3) cleaning of machines and equipment used in manufacture; (4) protection of materials; (5) control of pests and prevention of bacteria and mold contamination; (6) collection, salvage, and disposal of refuse; (7) checking of water supply and water-borne waste disposal facilities; (8) operation of uniform, laundry and sanitation stock room services; (9) maintenance of exterior grounds; and (10) plant guarding and supervision of watchmen. Where occupation hazards exist, the inspection and surveillance may require extensive work by industrial hygienists and safety engineers to discover and evaluate the hazard, and periodical inspections to verify the effect of corrective measures. These special services, distinct from the day-to-day sanitary maintenance of the work environment, are, however, complementary and interdependent. The administration of an industrial sanitation program by a

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medical director, and industrial hygienist, or a safety director may result in an inadequate and unbalanced performance of the total function through lack of interest in some of the more prosaic parts of sanitary maintenance. All aspects of industrial sanitation should be placed under a high level administrator.

- 292 Health and Welfare Benefits in New York State, June 1954. State of New York, Department of Labor, Division of Research and Statistics. Publication No. B-83. 95 pp. (Dec. 1955). Obtainable from Division of Research and Statistics, State of New York, Department of Labor, 80 Centre St., New York 13, N. Y.

This report presents the findings of a survey of health and welfare benefits, in New York State that are paid for, in whole or in part, by the employer. The main exclusions are farms, government offices, railroads, nonprofit establishments, and establishments with fewer than four employees. It supersedes Memorandum No. 57, (IHF Abst. 1025, Aug. 1955). Tabulated information is given on hospital, surgical, medical, life, and accidental death and dismemberment insurance, and retirement pensions. Some of the data in the tables are classified according to types of industry and some according to geographical location.

- 293 Supplementary Report of Board of Trustees: Progress Report of Commission on Medical Care Plans. J. Am. Med. Assn. 159, 1370-1379 (Dec. 3, 1955).

Statistics are presented on the number, scope, costs, and features of medical care plans, including those for occupational and nonoccupational medical care by industry, as well as Blue Shield and other medical society plans. Additional and continuous studies are recommended in order to accomplish the prime purpose of the investigation, which is to determine whether the plans are being utilized to their highest degree and whether they are being so conducted as to protect the public and the best interests of the medical profession.

- 294 Health and Welfare Plans from the Viewpoint of the Practicing Physician. P. G. Bovard. Penna. Med. J. 58, 1329, 1330 (Dec. 1955).

The author discusses some of the abuses in welfare and retirement fund practice, especially that of the UMWA (see abstract following). Criticism of professional care by the medical management of the Fund should be taken up at the hospital level, and abuses of fiscal behavior by doctors should be investigated at the county society level. Two other alternatives, namely (1) appointment of a bargaining agency by the medical profession to meet with the miners' agency, and (2) letting the Fund have a close and select panel of its own choice and at its own price, are rejected as contrary to the principles of good medical practice.

- 295 Health and Welfare Plans. Present Status from the Viewpoint of the State Society. E. W. Meiser. Ind. Med. & Surg. 24, 522, 523 (Dec. 1955); Penna. Med. J. 58, 1331, 1332 (Dec. 1955).

The idealism of medicine and the realism of organized labor have given rise to mutual distrust, dislike, and misunderstanding. Somewhere between these two attitudes there must be a mutually accepted area of medico-socio-economic relationship; this area must be found by mutual effort. Every problem that has arisen between labor and medicine in the operation of welfare funds is based on the question of remuneration. Some fruits of mutual efforts are described. These include methods of choice of physicians and methods of payment by the Funds. The examples are cited to prove that the differences between medicine and labor can be resolved, and it is felt that the major ones have already been solved or are nearing solution.

- 296 Problems in the Operation of the United Mine Workers of America Welfare and Retirement Fund. W. F. Draper. Ind. Med. & Surg. 24, 519-521 (Dec. 1955); Penna. Med. J. 58, 1334-1339 (Dec. 1955).

Satisfactory progress is reported in the organization and operation of the Fund. Several problems are discussed, including (1) lack of information, misunderstanding, and prejudice regarding the Fund; (2) abuses, such as unnecessary hospitalization and procedures; (3) relative responsibility of organized medicine and the Medical Service of the Fund; and (4) methods of payment for physicians. Progress in the solution of these problems is discussed.

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- 297 A "Human Relations" Approach to Sickness Absenteeism and Other Employee Problems.
L. Wade. Arch. Ind. Health 12, 592-608 (Dec. 1955).

The author first makes the point that adoption of a medical program often increases the absentee rate rather than lowers it, because sickness absenteeism is more adequately reported than before, and because a backlog of previously unrecognized medical problems is uncovered. However, by recognition and treatment of such cases, long-term absences in later life are avoided and the net result is a reduction of absenteeism. Three varied cases are presented which show that many cases are "abnormal" and should be considered individually. Data collected over a two-year period for a group of 28,000 employees are reviewed, analyzed, and tabulated. One point demonstrated is that fewer absences occur among older workers but their duration is longer. Regarding the effect of weather, the only correlation is between temperature and absenteeism. The higher the average temperature, the lower is the frequency. Figures from one refinery do not support the contention that shift work is the cause of increased absenteeism. The point made at the beginning regarding medical services and absenteeism is again discussed. The frequent statements that the available medical services reduces absenteeism are not corroborated. On the other hand, the fewer visits to the medical department the higher is the cost of sickness absenteeism. Absenteeism rates frequently vary among departments, and there is evidence that the personality of the supervisor is an important factor. Intrinsic and extrinsic factors influencing sickness absenteeism are classified. The factors of a constructive program are outlined. A company physician and an employer relations representative should meet at regular intervals with each department head or his deputy to consider the program and especially the problem employees.

Factual information should be available on: (1) attendance records; (2) objective evaluation of the employee's job performance at regular intervals; and (3) definition of the difficulties presented often not given in the medical records. A number of questions that should be answered by the physician (without violating the confidential nature of the doctor-patient relationship) and by the supervisor are suggested. In this approach to the correction of abuses of the sickness absenteeism privilege lie the seeds of a "human relations" program which can also deal with many other employee programs. Firm but friendly and intelligent action can lead only to improved relations.

- 298 What is Aging? A. I. Lansing. Bull. N. Y. Acad. Med. 32, 5-13 (Jan. 1956).

Satisfactory definitions for most diseases can be given, but not for the aging process. The problems of the aged are distinct from the problems of aging, that is, of its nature, cause, and the changes that occur. The problems of the aged are of great concern and have received much attention, but little work has been done on the problems of aging. Among the causes for the paucity of basic scientists on research on aging are lack of funds and lack of clues that might direct research into specific avenues. Several theories have been advanced, but no reliable evidence has been produced to substantiate them. The author points to several biological researches that may serve as starting points for future experimentation. He presents a definition of aging that summarizes the present state of knowledge: aging is a process of unfavorable progressive change, usually correlated with the passage of time, becoming apparent after maturity, and terminating invariably in the death of the individual. Quotations from a monograph by Raymond Pearl, entitled "The Biology of Death" published in 1922, show that his concepts of aging are substantially the same as those held at present, and that the study of the mechanism of aging is lagging seriously. Yet, in the long run, much that can be done in at least the clinical care of the elderly will depend upon developments at the biological level. The biological research on aging of today is the geriatrics of tomorrow.

- 299 The Psychological Aspects of Aging. R. A. McFarland.
Bull. N. Y. Acad. Med. 32, 14-32 (Jan. 1956).

The process of aging follows no clearly defined course of events by which it is possible to determine accurately the "age" of any individual. In appraising the capabilities of older people, the important variable to consider is not chronological, but rather functional age, or the ability to perform required duties efficiently and safely. Eventually a battery of tests may be developed in which visual accommodation, auditory acuity, light sensitivity, and other measures will be used to estimate functional age. The natural process of aging is of more significance for some occupational groups than others by virtue of the demands made upon individual abilities. Very few studies have been made in which the psychology of aging has been followed over a period of years. There is little evidence to justify arbitrary

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retirements at 65 since each person's occupational future should be judged on its own merits. The trends in studies of mental ability have shown a sharp rise in scores to a peak around 20 years of age, followed by a gradual decline. These studies involve specific time limits and older people are at a disadvantage. Judgment, reasoning, and other complex psychological functions are more resistant to deterioration, and it has been shown that older persons are able to learn new tasks. It has been shown that the prejudices against older workers in industry are being minimized because they have fewer accidents, smaller labor turnover, and satisfactory rates of production. Furthermore, they tend to be more stable, loyal, and responsible. The experimental findings on the social behavior and emotional adjustments are more limited and less reliable. These areas are of the greatest importance, however, in successful adaptation to age. Physicians and psychologists can do much to aid older people by encouraging them to maintain a wide variety of interests, accept personal and social changes, and participate actively in community activities.

-- Cond. from author's summary

ACCIDENTS AND PREVENTION

- 300 The Deposition of Dust on Conveyor Roads. F. Bradshaw, A. L. Godbert, and E. Leach. Research Report No. 106, Safety in Mines Research Establishment, Portobello St., Sheffield, England. 22 pp. (1954). 65 cents.

Three types of deposited dust are distinguished: (1) that deposited upon the road surfaces from the air; (2) that deposited beneath the conveyor belt; and (3) that in the coal on the conveyor belt. All three types of dust (limited to that finer than 60 mesh) have been investigated on conveyor roads in a Yorkshire colliery. The results are considered from these points of view: (1) an estimation of the dust explosion hazard; (2) routine sampling of the dust; and (3) the use of the depositions as a control method for checking the dustiness of the road. Both types of deposition vary from shift to shift. If a control system is based upon continual sampling of these dust depositions it seems desirable to sample the dust both on the road sides and beneath the belt. Control sampling for the dust beneath the belt is difficult, and on the two roads in question the time and labor involved would have been repaid only when the operation of the dust suppression devices had been brought under better control. The results of the investigation are shown in a series of graphs.

-- Cond. from Bull. Hyg.

- 301 When Dust Explodes. H. R. Brown. Natl. Safety News 72, 28, 29, 102-106 (Dec. 1955).

A dust-explosion hazard exists in more than 30,000 industrial plants in the United States. More than 600 lives have been lost and approximately \$90,000,000 worth of property has been destroyed since 1860. Explosive dusts include (1) carbonaceous, (2) plastics, and (3) metallic. Information on the explosibility of a large number of dusts has been published by the Department of Agriculture and the Bureau of Mines. Chemical substances that may form explosive dust and air mixtures, and chemical reactions that occur in dust explosions are discussed. Chemical means of preventing explosions or reducing the hazard include limiting the oxygen available for combustion and addition of an inert dust. A number of methods are described. Another subject that has not received so much attention is venting to reduce the damage to permanent structures. The types of open vents include louvers, hangar-type doors, and open roof vents. Closed or sealed vents are necessary under some conditions, and various types are available.

- 302 Hazards from Working in Tanks and Pits. S. Moskowitz and W. J. Burke. Monthly Rev., N. Y. State Dept. Labor 34, 41-43 (Nov.); 47, 48 (Dec. 1955).

A number of deaths and exposures which have nearly caused death are reported in cases where workmen entered pits or tanks, even when they were entirely open at the top. It cannot be assumed that air contaminants diffuse from such enclosures without mechanical

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ventilation, first because carbon dioxide and most toxic materials are heavier than air, and second, because natural diffusion is very slow. The principal effect of carbon dioxide is asphyxiation, and many other materials are anesthetic. A table gives rapidly fatal concentrations of carbon tetrachloride, trichloroethylene, and benzene and the density of such mixtures relative to air, all of which are definitely over one. Anesthetic effects may be produced by concentrations as low as one-third of those which are rapidly fatal. The following precautions are recommended: (1) each worker who enters a pit should wear a harness with a rope or cable held by another worker outside the enclosure, and a third worker should be available for assistance; (2) no enclosed or partly enclosed space should be entered until its contents of volatile or partly volatile material are removed; the air should be tested for oxygen content; (3) clean, fresh air should be supplied to the tank after contaminants are removed; (4) if the contaminants cannot be completely removed, the worker who is to enter must be provided with a positive source of respirable air or oxygen (an "all purpose" gas mask is useless); (5) if operations are to be performed in such spaces, exhaust ventilation balanced with an equal volume of supplied uncontaminated air must be used; and (6) when skin absorption of contaminants is possible, protective clothing should be provided. These precautions are described in greater detail.

- 303 Pole-Top Resuscitation. Data Sheet D-376, National Safety Council. Natl. Safety News 72, 33-39 (Dec. 1955).

Pole-top resuscitation is often necessary immediately after an electric shock, without waiting until the rescuer and victim are in the most comfortable and ideal positions. The standard and modified methods are described. The procedure will be determined largely by the individual company policy and the training, confidence, and resourcefulness of the rescuer. Detailed instructions are given for the rescuer and assistants, including precautions for the safety of the rescuers, methods of placing the victim in position, lowering the victim to the ground, after-shock precautions, and training of line crews.

- 304 The Suppression of Methane-Air Ignitions by Fine Powders. J. E. Dolan and P. B. Dempster. J. Appl. Chem. 5, 510-517 (Sept. 1955).

The effect of the particle size of some inorganic materials on their efficiency as ignition suppressors has been studied. It has been found that there is a direct relationship between this efficiency and the surface area of the powder exposed to the advancing flame. Flame inhibitors have been placed in an order of efficiency on this basis. The alkali halides have been shown to have an efficiency which cannot be fully accounted for by the thermal characteristics of the powders, and an explanation is suggested. -- Editor's summary

- 305 Thirty-Second Annual Report on Safety in Mines Research 1953. Great Britain, Ministry of Fuel and Power, Safety in Mines Research Establishment, Portobello St., Sheffield, England. A. H. A. Wynn, Director. 83 pp. (1954). 65 cents.

This report describes a wide variety of researches concerned with safety and health in mines. Among the subjects are: development of safer methods of blasting; measurement of deposition of coal dust; studies of the use of stone dust for prevention of explosions; studies of breathing apparatus; research on dust sampling problems; study of dust produced by rotary drilling; studies of the hazards of kaolin dust; and studies of the amorphous layer on silica dust. Much of this work has been presented in papers which considered some of these subjects in detail. -- Cond. from Bull. Hyg.

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