

INDUSTRIAL HYGIENE FEATURES

Periodic health evaluation and some developments and practices are discussed in Abst. No. 120.

Abst. No. 125 surveys the behavioral implications of exposure to industrial chemicals.

Abst. No. 126 examines the indices of heart rate as substitutes for respiratory calorimetry.

The main functions of the pulmonary circulation are discussed in Abst. No. 132.

Abst. No. 140 investigates cigarette smoking and respiratory infections in a class of student nurses.

Abst. No. 145 is concerned with talc granulomas of the skin.

Information on lanolin dermatitis is given in Abst. No. 146.

Abst. No. 151 reports on carcinogens in a cracked petroleum residuum.

Information on sodium in drinking water a pitfall in maintenance of low sodium diet is given in Abst. No. 158.

Abst. No. 162 presents a case of acute iron intoxication which was treated by chelation.

Chronic toxicity of gadolinium oxide is described in Abst. No. 164.

Abst. No. 166 gives details on mercury exposure in a jewelry molding process.

Permanent encephalopathy from toluene inhalation is discussed in Abst. No. 169.

Details concerning graphite pneumoconiosis of electrotypers are given in Abst. No. 177.

Abst. No. 180 discusses thesaurosis and pulmonary function studies in beauticians.

A report on fiberglass conjunctivitis and keratitis is detailed in Abst. No. 181.

FOUNDATION FACTS

NEW MEMBERS: The Foundation is pleased to add the names of The American Welding & Manufacturing Company, Standard Oil Company (Indiana), and Westinghouse Air Brake Division, Westinghouse Air Brake Company to membership.

MEETINGS: A Chemical-Toxicological Committee sponsored Threshold Limit Values Workshop on February 2, attended by 40 registrants, was chaired by Dr. Emil A. Pfitzer of the University of Cincinnati's Kettering Laboratory. Dr. H.E. Stokinger (Chairman of the American Conference of Governmental Industrial Hygienists Threshold Limit Committee) was principal speaker and presented documentation in support of 1967 intended changes. He advised of a proposal that in the future the old values be retained under "Recommended Values" and intended changes appear only as a "Statement of Intent." If adopted, this should help forestall transposition of new tentative values to serve in the place of values formerly recommended, especially where these are used in legal codes. There appeared to be unanimous endorsement of this proposal by those present and Dr. Stokinger expects that his committee may be inclined to act favorably upon it. Dr. John A. Zapp, Director of duPont's Haskell Laboratory, is a member of the American Industrial Hygiene Association-American Conference of Governmental Industrial Hygienists Committee on Threshold Limits, which has proposed a revision to the preface to the Threshold Limit Values. Dr. Zapp discussed the rationale for the proposed modification, indicating that it would better fit the needs of users, and be less likely to be misconstrued if introduced into legal codes. Mr. T.F. Hatch, Professor Emeritus of the University of Pittsburgh, Graduate School of Public Health, said the most precious possession of the industrial hygienist is the knowledge that individuals may be exposed to contamination below certain levels without adverse health effects. Professor Hatch argued against inclusion of limits based on considerations other than health in the Threshold Limit list. There was general agreement that separate listing of substances for purposes of health versus housekeeping is essential to proper understanding and use of Threshold Limit Values.

At a meeting of the Board of Governors of Asbestos Textile Institute at Cherry Hill, N.J., February 9, Dr. deTreville reported progress on the Foundation's research on fibrous dusts, including asbestos. (Medical Series Bulletin No. 11, distributed in December 1966, and entitled "Asbestos Bioeffects Research for Industry" describes these studies.)

TABLE OF CONTENTS

THIS ISSUE CONTAINS ABSTRACT NUMBERS 97-208

	<u>Page</u>
News Items	1
Coming Events	3
Legal Developments	3
Books, Pamphlets and Notices	4
Industrial Medical Practice	6
Skin Diseases and Burns	14
Chemical Hazards	15
Industrial Dusts	21
Physical Aspects of the Environment	25
Radioactivity and X-Radiation	25
Environmental Measurements	26
Preventive Engineering	26
Community Air Hygiene	27
Management Aspects	28
Accidents and Prevention	28
Miscellaneous	28
Index	29
Addresses of Journals Abstracted	32

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INDUSTRIAL HYGIENE DIGEST
Literature and News

NEWS ITEMS

- 97 The Soap and Detergent Association Survey Highlights Need For Employee Cleanliness Programs in Industry.

According to questionnaires completed and returned by 69 industrial medical directors representing 220,000 workers in about 100 plants in 1964, skin health hazards are present in almost every form of industrial endeavor. Principal causes of skin irritations included plastics and synthetic resins—55%, (Within this group, and of greater concern because of the hazards involved, 82% are handling epoxy resins); solvents and lubricants—77%; acids—75%; alkalies and cements—75%; greases and lubricants—67%; and cutting and cooling oils—58%. Others, potentially harmful to the skin, in regular use are: biologic agents—5%; chromates and chromic acid—40%; cleaning compounds—68%; coal tar products—33%; dyes and dye intermediates—26%; furs and hides—2%; metals and metal plating—34%; paints and varnishes—56%; plants and woods—7%; rubber and its compounds—26%; and vegetable oils, fats and waxes—34%. Manufacturers of chemicals and allied products constituted the largest single industry whose plants were surveyed. Every one of the companies surveyed provide their employees with hand washing products. Some make available two, three and even four different types for efficient removal of all kinds of soil. Employees are cooperating with employers to keep skin troubles out of their plants—only seven of the medical directors felt that the wash-up facilities provided were insufficiently utilized by production workers. Speakers and visual aids on plant and personal hygiene are available according to the organization which made the survey: The Soap and Detergent Association, Industrial Division, 295 Madison Avenue, New York, N. Y. 10017.

- 98 Asbestos-Dust Deaths Rising in PHS Study.

Exposure to high levels of asbestos dust 20 to 30 years ago was probably responsible for a 21% increase in the death rate among certain workers in a large group recently studied by the U.S. Public Health Service. This excess mortality—in the asbestos textile industry—was due to cancer of the lung and gastrointestinal tract and to asbestosis. The report was presented to experts on environmental disease attending a Conference on Asbestos Research sponsored by occupational health officials of the Public Health Service in Cincinnati. "While dust levels have been sharply reduced in the asbestos textile industry, the finding adds to the growing evidence that asbestos exposure is associated with cancer of the lung," said Dr. Murray C. Brown, chief of the Division of Occupational Health. Dr. Brown's report was based on research being conducted by Dr. Philip Enterline, of McGill University, and Dr. Mildred Kendrick, of the Division.

-- Medical News 1, 3 (Jan. 2, 1967)

- 99 Fluorides May be Useful in Preventing Atherosclerosis and Osteoporosis.

Fluorides in drinking water may help to prevent hardening of the arteries and to reduce osteoporosis, Dr. Mark Hegsted of the Harvard School of Public Health told the annual meeting of the American Dietetic Association at the Sheraton Boston Hotel. He was reporting on a study of 1,000 North Dakota residents over 45 years of age. Three hundred lived in an area with high natural fluoride content in the water, the remaining 700 in a low fluoride area. All had x-rays of their spines and, incidently, of their aortas, during an investigation of osteoporosis, calcium loss in the bone. It was the x-rays of the aortas, primarily an after thought, that disclosed there were far fewer cases of calcium deposit in the people from the high fluoride areas. Calcification of arteries, often present in the last stages of atherosclerosis, is commonly a precursor of arteriosclerosis or hardening of the arteries. Assuming that the North Dakota findings can be confirmed, Dr. Hegsted said, the data indicated that somehow fluoride helps to keep the calcium in the bone and prevent its deposition in the blood vessels, where it does not belong. In the high fluoride areas there was substantially less osteoporosis, whether judged from the relative bone density or from the presence or absence of collapsed vertebrae. In low fluoride areas, reduced bone density was very prevalent in older women, reaching 85% in those 65 or over, much higher than in men in the same area. In the high fluoride area the difference between the sexes was less, suggesting that fluoride is markedly effective in women but relatively unimportant in men. Further investigation is needed to determine how much fluoride should be added to drinking water to prevent osteoporosis.

-- Conn. Health Bull. 80, 302 (Dec. 1966)

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100 Aflatoxin.

Aflatoxin, the cancer-causing agent found in edible nuts, has been fully characterized as mutagenic and carcinogenic by a team of Food and Drug Administration (FDA) scientists. FDA's Bureau of Science group, headed by Dr. Marvin Ligator, says the agent causes breakage at the long arm of chromosomes, apparently through an alkylating complex with deoxyribonucleic acid. Dr. Ligator's work, performed with white blood cells and kangaroo rat kidney cells, is the first aflatoxin study on mammalian cells. It complements the DNA complex research on the mycotoxin performed by Dr. A. W. Wogan at the Massachusetts Institute of Technology. Aflatoxin's cancer-causing properties have thrown scares into the peanut industry, which now is effectively monitoring its products.

-- Chem. Eng. News 45, 33 (Jan. 23, 1967)

101 Smog Chamber to be Constructed.

The construction of a smog chamber is planned to begin this month (January) at the Battelle Memorial Institute, Columbus, Ohio. The National Paint, Varnish and Lacquer Association (NPVLA) has agreed to finance operation of the chamber for three years as part of its program of pollution abatement. During this time, the chamber will be used for evaluating smog-forming tendencies of organic solvent vapors. The Battelle unit will be only the sixth smog chamber in this country having a capacity of more than 100 cubic feet.

-- Chem. Eng. News 45, 47 (Jan. 16, 1967)

102 Occupational Health Nursing.

The American Nurses' Association has announced the publication and availability of a report prepared by a Special Committee to Identify Occupational Health Nursing. This publication is entitled Selected Areas of Knowledge or Skill Basic to Effective Practice of Occupational Health Nursing. It is available free in limited quantities, from the American Nurses' Association, Inc., 10 Columbus Circle, New York, N. Y. 10019. Please specify publication I-25 when requesting. The publication contains a section listing and briefly discussing the distinctive characteristics of occupational health nursing and follows this with a survey of the many-faceted skills and knowledge which the occupational health nurse must possess. The publication defines the practice of occupational health nursing and provides a summation of basic concepts which can be useful in both nursing education and practice. (See Ind. Hyg. Digest 30:10, p. 3-4, Oct. 1966.)

-- Am. Ind. Hyg. Assn. J. 27, 532 (Nov.-Dec. 1966)

103 Alcoholism in Industry.

A 24-page booklet entitled Alcoholism in Industry, recently released by the Industrial Medical Association, tells how to recognize and manage problem drinkers in industry and details of starting an industrial alcoholism program. Copies of the booklet are available at \$1.00 each from the Industrial Medical Association, 55 East Washington Street, Chicago, Illinois 60602.

-- Am. Ind. Hyg. Assn. J. 27, 558 (Nov.-Dec. 1966)

104 American Industrial Health Conference.

The 1967 American Industrial Health Conference will meet April 10-13, 1967 in New York City with headquarters at the Americana Hotel. The Conference is cosponsored by the Industrial Medical Association and the American Association of Industrial Nurses. Further information may be obtained by writing to the American Industrial Health Conference, 55 East Washington Street, Chicago, Illinois 60602.

-- Am. Ind. Hyg. Assn. J. 27, A-4 (Nov.-Dec. 1966)

105 National Congress on Environmental Health Management.

The National Congress on Environmental Health Management will be conducted by the American Medical Association in New York City, April 24-26, 1967 at the Hotel Americana. The Congress is convened to explore the varied aspects of the management approach to environmental health problems. For further information write to the Department of Environmental Health, American Medical Association, 535 North Dearborn Street, Chicago, Illinois 60610.

-- Am. Ind. Hyg. Assn. J. 27, A-4 (Nov.-Dec. 1966)

106 Hygienic Guide Series.

The following additional Hygienic Guide Series are now available: Ethyl Acrylate (Ethyl Propenoate) $\text{CH}_2 = \text{CHCOOC}_2\text{H}_5$ and Ethylene Glycol Dinitrate (Nitroglycol, Dinitroglycol, EGDN, EGN, Ethylene Nitrate) $\text{C}_2\text{H}_4(\text{ONO}_2)_2$. They are given in the November-December 1966 AIHA Journal pages 571-577 and can be obtained from the American Industrial Hygiene Association, 14125 Prevost, Detroit, Michigan 48227, at 50 cents each. -- Am. Ind. Hyg. Assn. J. 27, 571-577 (Nov.-Dec. 1966)

COMING EVENTS

- 107 Mar. 1-3 International Conference on "Malnutrition, Learning and Behavior," Cambridge Mass.
- Mar. 4-11 CAMDA (Canadian-American Medical and Dental Association) Vail, Colo.
- Mar. 5-9 International Anesthesia Research Society (41st Congress) Bal Harbour, Fla.
- Mar. 9-11 AMA-ABA National Medicolegal Symposium, Miami Beach, Fla.
- Mar. 10-11 National Conference on Rural Health (20th), Charlotte, N.C.
- Mar. 10-12 American Association of Pathologists and Bacteriologists, Washington, D.C.
- Mar. 12-15 International Academy of Pathology, Washington, D.C.
- Mar. 19-24 American College of Allergists, New Orleans, La.
- Mar. 21-31 American College Health Association, Washington, D.C.
- Mar. 22-25 American Orthopsychiatric Association, Washington, D.C.
- Mar. 23-25 Society of Toxicology, Atlanta, Ga.
- Mar. 29-Apr. 1 Conference on the Microcirculation as Related to Shock, Boston, Mass.
- Mar. 30-Apr. 5 American Leprosy Missions—USPHS Seminar on Leprosy, Carville, La.
- Mar. 31-Apr. 1 Annual Midwest Cancer Conference, Wichita, Kan.

LEGAL DEVELOPMENTS

108 Federal Grants for Air Pollution Control Programs.

On January 26, 1967, the National Center for Air Pollution Control of the Public Health Service announced three regional meetings to discuss proposed rules for awarding of Federal grants to help maintain effective air pollution control programs at the local, State, and regional levels of government. Also scheduled for discussion at the meetings are proposed certification procedures involved in establishing eligibility for the Federal tax credit now available for air pollution control equipment installed by private firms. The meetings were to be held as follows: San Francisco, January 27, State Office Building, 455 Golden Gate Avenue; Kansas City, Missouri, January 30, New Federal Office Building, 601 East 12th Street; and New York, February 2, offices of the Federal Trade Commission, 30 Church Street. The major purpose of the meetings was to give State and local officials an opportunity to present their views on proposed regulations for awarding of air pollution control program maintenance grants, as authorized by the October 1966 amendments to the Clean Air Act. Tax credit is provided under provisions of Public Law 89-800, passed in November 1966. This legislation suspended the seven percent credit that had been available for investment in new commercial and industrial facilities, but it stipulated that the credit remain available for air and water pollution control facilities. To qualify under the law, air pollution control equipment must be used primarily to remove, alter, or dispose of air pollutants; in addition, it must be certified both by the appropriate State air pollution control agency as being in conformity with applicable State regulations and by the Secretary of Health, Education, and Welfare as being in compliance with applicable Federal regulations and the general policies of the Federal Government with respect to cooperation with States in the prevention and control of air pollution. Proposed rules for certification by the Secretary will be discussed. Further information may be obtained from Mr. Charles D. Yaffe, Chief of the Office of Program and Survey Grants of the National Center for Air Pollution Control.-- U.S. Department of Health, Education, and Welfare, Public Health Service, Washington, D.C. 20201.

109 Cobalt-Containing Drugs.

Cobalt-containing drugs for treating iron-deficiency anemia have been withdrawn from the market at the request of the Food and Drug Administration (FDA). A panel of hematologists will be set up by FDA to determine whether there are any conditions under which these drugs may be used safely and effectively. In an unrelated development, Chas. Pfizer has withdrawn its veterinary antibiotic preparation Mastalone because residues were found in milk from cows treated (for mastitis, an udder infection) after the time specified for the milk to be discarded. Hailing Pfizer's voluntary action, Dr. James L. Goddard, Commissioner of FDA, says, "It is a good example of self-regulation by a manufacturer in the interest of protecting the public health."

-- Chem. Eng. News 45, 29 (Jan. 23, 1967)

110 Labels on Irradiated Foods.

The Food and Drug Administration (FDA) has issued the final rules for labels to be used on irradiated foods. The FDA says that comments received after the rules were proposed in mid-1966 are not significant enough to warrant a public hearing on the subject. It turned down a proposal that "pasteurized" be used instead of "treated" and that "sterilized" be substituted for

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"processed." The agency claims that the commonly accepted meanings "pasteurized" and "sterilized" do not apply to the status of irradiated foods. The FDA agreed that the radiation (gamma, X, or electron) be specified. -- Chem. Eng. News 45, 35 (Jan. 16, 1967)

BOOKS, PAMPHLETS, AND NOTICES

- 111 Environmental Biology. P.L. Altman and Dorothy S. Dittmer, Editors. AVAILABLE FROM: Federation of American Societies for Experimental Biology, 9650 Rockville Pike, Bethesda, Maryland 20014. 694 pp. (1966). PRICE: \$15.00.

This volume, one of a series of handbooks prepared for use by specialists and published by the Federation of American Societies for Experimental Biology presents quantitative and qualitative data on effects of environmental factors on man, other animals, and plants, specifically compiled for reference purposes. Most of the tables, graphs, and diagrams (totaling 190) were contributed especially for the Biological Handbooks series by outstanding scientists from their own collections of data and from the current literature. Contents of the volume have been authenticated by 450 leading investigators in the fields of botany, zoology, and medicine. The review process to which the data have been subjected was designed to eliminate, insofar as possible, unacceptable material and errors of transcription. Tables of interest to those in Occupational Health and Environmental Pollution Control activities in industry are found in chapters on Temperature; Radiant Energy; Sound, Vibration and Impact; Acceleration and Gravity; Atmosphere and Pollutants; and Atmospheric Pressures and Gases, all of which contain references to human factors and tolerances. It is interesting that the chapter on Water (pages 455-564) makes no reference to Quality Criteria, however (See Industrial Hygiene Digest 30:1 p.4, January 1966). "Pneumoconioses" is not mentioned in the index, nor are "disease" or "occupational." On the other hand "emphysema" appears with subheadings "acceleration; air pollution—engine exhaust, gases and vapors; decompression; and impact." Under "Pneumonitis: air pollution" are listed "acute exposure, gases and vapors; particulates and petroleum asphalt." "Maximum Breathing Capacity" is listed with "air pollution; divers, resting; and gaseous ions" but there is no mention of Maximum Acceptable Concentrations or Threshold Limit Values. "Although this reference is obviously not concerned with occupational health per se, industrial hygienists should be aware of its existence and scope of coverage." -- RTPdeT

- 112 Civil Defense: Planning For Survival and Recovery. National Security Management. D.W. Mitchell. Industrial College of the Armed Forces, Washington, D.C. AVAILABLE FROM: Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. 217 pp. (1966). PRICE: Not Given.

This text discusses the nature of the nuclear threat; the evolution of the United States civil defense program; and the problems anticipated and the preparedness measures taken and contemplated to protect lives and property, to insure the continuity of government at all levels, and to maintain or restore services and facilities essential to survival and recovery from a thermonuclear attack. Since 1961 especially, the essential components of an effective civil defense program—designed to protect the large group of people who would survive the blast and heat effects of a nuclear attack if only they could be safeguarded from radioactive fallout—have been put in place. That program is now adequately based and sufficiently broad to accommodate expansion and improvement. The central focus of the present effort is to develop it further and to prepare to put it to effective use in the event of a nuclear attack. The table of contents includes chapters on: The Nature of the Threat; The Development of Civil Defense; The New Image of Civil Defense; Postattack Rehabilitation; and Civil Defense Studies and Proposals. In chapters IV and V the following subtitles will be of special interest to those in industry: Resource Management During Recovery; Essential Services; Manufacturing; Construction; The RAND Recommendations; The Economics of Civil Defense; and Civil Defense—Project Harbor Summary Report. An appendix includes: (1) The Federal Civil Defense Act of 1950, as Amended. (2) The President's Civil Defense Message, May 25, 1961. (3) Executive Order 10952, as Amended. (4) Department of Defense Directive No. 3025, March 29, 1965, subject: Military Support of Civil Defense. Suggestions for further reading are given.

- 113 Programmed Cleaning and Sanitation. J.C. Gardner, Editor. AVAILABLE FROM: The Soap and Detergent Association, 295 Madison Avenue, New York, N.Y. 10017. 56 pp. (1966). PRICE: Not Given.

Maintenance of sanitation in buildings, the selection of cleaning materials for these purposes, and the organization and supervision of the cleaning program are becoming increasingly complex and needful of a higher order of handling. This booklet describes these problems and gives helpful information and guidance for their solution, directed to the management level; it is not intended

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as a janitorial handbook. Modern management is not only concerned with the costs of sanitation maintenance, but with the economies in production, the support of quality, and the promotion of employee morale, which result from clean and orderly work places. Rising capital investments in better plants, machines, and personnel facilities not only warrant but require maintenance of similar caliber. Just as a clean and attractive home is evidence of a family's pride, thrift and energy, so do clean factories, stores, office buildings, schools and institutions reflect competence of management; furthermore, a sense of social responsibility is thereby exemplified which is an essential element in our rising standards for living and working. If one in thirty represents a conservative ratio of those engaged in cleaning maintenance to those employed, we are concerned with the labor of over 2,000,000 persons. With 19,200,000 man (and women) hours applied each working day to the cleaning of buildings and equipment, at a labor cost of \$1.50 per hour, in 250 working days, the annual labor cost is estimated to be \$7,200,000,000. Well planned and organized industrial sanitation pays its way, not necessarily by reducing expenditures for sanitary maintenance (although this is frequently the result) but by enabling production and machine maintenance to be done with greater efficiency, and employees to work in greater comfort and safety. The office building, commercial establishment, public facility, or institution differ from the industrial plant only in that the rendering of service or the performing of desk work takes the places of production; mechanical maintenance becomes a lesser function, and sanitation maintenance increases in importance, thus placing greater emphasis on the efficiency and economy of the sanitation function, and calling for more expert supervision. In the non-industrial operation, mechanical and sanitation maintenance may be more readily combined under one supervision, as in a school system. Various methods of dust collection and removal, even though efficient in the range of 80 to 99 plus percent, still permit substantial quantities of dusts to escape or remain in the atmosphere and to be deposited on surfaces from which they must be removed. While those who are maintaining office and institutional buildings do not have the massive dust problems of some industrial plants, they still have the continual load of dust characteristic of all urban areas, varying usually from 1 to 10 million particles per cubic foot. Quantitatively, fairly clean city areas may have solids loadings in the atmosphere from 0.4 to 0.8 grains per 1,000 cu. ft. of air; city industrial sections may range from 1.0 to 2.0 grains, and heavy industrial areas from 4.0 to 80 grains. On the basis of the intermediate loading of 1.0 grain per 1,000 cu. ft., one pound of soil would be carried into an industrial enclosure with every 7,000,000 cu. ft. of outside air. While some of this air-borne soil will be carried out by the air change, some of it joins the dusts and fumes being generated within and creates the condition which normally requires each day some form of cleaning of horizontal surfaces in the lower part of the room, and periodically a cleaning or renewal of all of the room surfaces. "Clean rooms" demand the extremely high standards of environmental control and cleanliness necessary for their proper function in the process of assembling, testing and repairing of precision instruments and other highly sophisticated devices requiring infinitesimal tolerances. Special attention must be given to the selection of highly motivated and above average personnel for this job. Exacting standards, written work procedures and very selective equipment and materials must be used. Such operations are essential to our space and missile program and require the highest caliber supervision. (A United States Air Force Technical Manual, T.O. 00-25-203, deals with clean room standards.)

- 114 Preliminary Report on Microbiological Studies in a Laminar Down-Flow Clean Room. Research Report SC-RR-65-47. V.E. Arnold, et al. AVAILABLE FROM: Sandia Corporation, Albuquerque, New Mexico. 27 pp. (Jan. 1965). PRICE: Not Given.

Based on a preliminary investigation (and an independent confirmation study), it appears that the potential of the Sandia laminar down-flow clean room to control airborne microbiological contamination (bacteria and fungi) is approaching the absolute. Because of the significance of this information, it is reported before further tests are performed. In the original series of tests performed in the Sandia clean room, no bacteria or fungi spores were introduced as test organism. Only those organisms were used which were naturally present in the atmosphere and those which were inadvertently introduced by personnel performing the tests. In the confirmation study, tracer bacteria were introduced in one series as additional proof. Based on the results of the experiments reported here, it can be stated conclusively that the Sandia laminar down-flow clean room—using filtration and airflow control alone—can control airborne bacteria and fungi as successfully as it can airborne dust and droplets.

- 115 Cleanliness Meter and its Application to Solvent Cleaning. Reprint SC-R-66-865. (March, 1966). R.C. Marsh and F.W. Oswalt. AVAILABLE FROM: Technical Information Division III, Sandia Corporation, Albuquerque, New Mexico. 27 pp. (1966). PRICE: Not Given.

This paper describes the development and application of a new instrument which will measure the soluble residue content of volatile cleaning solvents. The instrument, called the Solvent Purity

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Meter, is capable of giving an instantaneous and continuous read-out of residues as low as one part per million and may be used either for batch sampling or as an on-line continuous monitor for recirculating cleaning systems. Typical laboratory studies using the meter, as well as results from in-process cleanliness testing applications on component production lines, are discussed. Evaluations of the instrument, to date, have shown it to be a useful production line monitor for testing the purity of cleaning solvents, as an indirect measure of component cleanliness, and for pointing out errors or problem areas when troubleshooting component cleaning problems.

- 116 Clean Room and Work Station Requirements, Controlled Environment. Federal Standard No. 209a, Aug. 10, 1966. Superseding Fed. Std. No. 209, Dec. 16, 1963. General Services Administration. AVAILABLE FROM: General Services Administration, Specifications Activity, Printed Materials Supply Division, Bldg. 197, Naval Weapons Plant, Washington, D.C. 20407. pp. I-II and 1-21. PRICE: 15 cents.

In recent years, components and systems have become more sophisticated. This sophistication has brought with it many new requirements, one of which is the demand for new cleanliness standards. Manufacturing facilities providing the environmental control necessary for this type of cleanliness are known as clean rooms, white rooms, and dust controlled facilities. Thus, a clean room may be: "A space in which airborne contamination, and if needed, temperature and humidity are controlled to a far higher degree than conventional air-conditioned areas." Many industrial corporations, educational institutions, and governmental agencies have contributed to the advancement of the state-of-the-art clean room design and operation without adequate standardization. The need for standardization of definitions and levels of environmental control is now recognized.

- 117 Fire Protection Guide on Hazardous Materials. National Fire Protection Association. AVAILABLE FROM: National Fire Protection Association, 60 Batterymarch Street, Boston, Mass. 02110. 768pp. (1966). PRICE: \$4.75.

This work, which is a collection in a single volume of five indispensable reference manuals, has recently been published by the National Fire Protection Association. The content of the new guide is as follows: Flash Point Index of Trade Name Liquids (NFPA No. 325A) listing flash points of more than 6,300 trade name products; Fire Hazard Properties of Flammable Liquids, Gases and Volatile Solids (NFPA No. 325M) summarizing available data on more than 1,100 substances, listed alphabetically; Hazardous Chemicals Data (NFPA No. 49) covering more than 500 chemicals which have a health or reactivity hazard or present unusual storage or fire fighting problems; Manual of Hazardous Chemical Reactions (NFPA No. 491M) listing alphabetically by chemical name the mixtures of two or more chemicals reported to be potentially dangerous as causes of fires, explosions or detonations; and Recommended System for the Identification of the Fire Hazards of Materials (NFPA No. 704M) describing the Hazard Index which simplifies identification of type and degree of health, flammability and reactivity hazard of materials; particularly in industrial and storage situations where fire hazards of materials may not be readily apparent. This authoritative reference volume has been designed for persons inspecting, handling, using, storing, pre-planning or fighting fires in chemicals (including flammable liquids, gases and volatile solids).

INDUSTRIAL MEDICAL PRACTICE

- 118 The Teaching of Occupational Health in Israel. K. Dror. Arch. Environmental Health 13, 220-222 (Aug. 1966).

Teaching of occupational health has progressed in Israel, in spite of the lack of a properly equipped, staffed and endowed institute of occupational health. In order to put this teaching on a firm basis, including research and contact with clinical teaching, it seems highly urgent to create such an institute of occupational health for purposes of service, teaching, and research. Such an institute, as an organic part of medical schools and their hospitals, would represent the experts' center for problems of occupational health for the whole teaching body and a place for the specialist to familiarize himself with the day-to-day problems of occupational health, methods used, and research performed. There are 10 references. -- Author's conclusions

- 119 Closed-Circuit Television. A Communication Technique for Industrial Medical Departments. G.H. Collings, Jr. J. Occ. Med. 8, 578-580 (Nov. 1966).

As facilities become more generally available for closed-circuit television (CCTV), large industry is finding this medium ideal for management communication between plants, offices, or other divisions of the corporate enterprise. Similarly, CCTV offers the industrial medical department a degree of communication throughout its often scattered operations which has not been possible

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before. Eventually, linkage of a company CCTV network with external locations such as hospitals, clinics, universities, and even other industrial medical departments will add still further to its usefulness. The first industrial medical conference on CCTV in the New York Telephone Company is described. A total of 25 company physicians at the four locations or from nearby points participated in the first CCTV seminar. The presentation, plus the discussion among the participants which followed lasted approximately 1-1/2 hours. Future seminars and conferences will explore some of the many other obvious uses for this new communication medium. For example, the stimulation of visiting authorities who may be present at the company medical headquarters may be shared with branch offices of the medical department; special cases which are brought to the attention of the medical director may be discussed with the entire staff; new procedures or techniques may be introduced and explained; and a demonstration of new equipment may be made once, yet be seen by all.

- 120 Periodic Health Evaluation: Some Developments and Practices. N.J. Roberts.
J. Occ. Med. 8, 581-588 (Nov. 1966).

Arrangements can be made to examine any population in depth and detail, if the needed funds, personnel, and facilities are available. However, the best periodic health examination is not necessarily the one that costs the most money, consumes the most time, or includes the most study and testing. The law of diminishing returns is as applicable to periodic examinations as it is to cameras, coats, and cars. To gain the greatest amount for a cost (in terms of money, time, people, and facilities) that can be widely afforded, the most promising routes would seem to be through more efficient and less extensive use of physicians; greater use of nurses, technicians, and especially automation; and development of better examination techniques. In doing periodic health examinations, physicians should be willing to face the somewhat unpalatable proposal that some historical information is better and more economically elicited by a questionnaire completed by the literate patient. A questionnaire* several pages long, with ample wording and spaciousness, can be completed in only 20-30 minutes of the patient's time at home. In addition to helping assure thoroughness, a properly designed questionnaire completed at home with the help of the patient's spouse often gives more information and more accurate information, at least with reference to certain subjects, than we customarily elicit in interviews. For example, most wives remember family and personal histories better than their husbands do and they can often stimulate the admission of a wheeze or of an appreciably more exact estimate of tobacco or alcohol use. Even the best questionnaire has deficiencies, most notably the impossibility of seeing or feeling the patient's reaction to questions which he may not understand or which may be emotionally charged for him. But the effectiveness and depth of an interview can be appreciably increased by structuring it with the help of a questionnaire. As automation techniques become more widely and practically available, valuable information concerning the probability that an individual has certain diseases will be obtainable promptly from his responses to a questionnaire. Such data would help shape the patient's subsequent interview, his physical examination, and the X-ray, laboratory, and other studies performed. Some periodic health examination programs have already moved in this direction. Patients sort into "Yes" and "No" boxes data-processing cards on which individual questions are printed, allowing prompt electronic handling of their responses. (*Samples of such questionnaires are available from the author on request: Dr. Norbert J. Roberts, Associate Medical Director, Standard Oil Co. (N.J.), 30 Rockefeller Plaza, New York, N.Y. 10020.)

- 121 Some Economic Estimates of Job Disruption—From an Industrial Mental Health Project.
W.W. Winslow, et al. Arch. Environmental Health 13, 213-219 (Aug. 1966).

A method of calculating specific costs to industry stemming from job-disruptive behavior is presented. Costs to the company, the employee, and the insurance carriers were calculated based on the following indices: (1) cost of impaired productivity; (2) cost of interpersonal frictions as manifested in grievance, disciplinary, and garnishment procedures; (3) cost of absenteeism; and (4) cost of health and accident problems as manifested in compensation and hospital-medical-surgical claims, and medical-surgical and weekly sick benefit payments. Costs were calculated for suspected problem drinking, miscellaneous problem, and problem-free samples, and cost changes over time were examined for three employee samples based on whether remedial intervention was recommended, followed through, or not followed through. Evidence is presented which demonstrates the significantly higher costs to industry accrued by problem-drinking and other-problem employees. However, this study did not demonstrate the economic value of secondary prevention or early remedial intervention within the relatively short span of follow-up which was possible in this project. There are 22 references.

-- Authors' summary

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- 122 Suicide and Weather. Effect of Barometric Pressure and Humidity. A.D. Pokorny.
Arch. Environmental Health 13, 255-256 (Aug. 1966).

This is a report of a partial replication of the study of Digon and Bock (Arch. Environmental Health 12, 279-286 (Mar. 1966)) in which they found significant relationships between suicide and (1) a barometric pressure-humidity combination, and (2) large daily change in barometric pressure. These portions of their study were replicated, using 1960 suicide and suicide attempt data from Houston, to see if these might not have been chance positive findings among the large number of analyses performed. Neither of their findings was confirmed in the present study. The same was true when the same type of analysis was applied to suicide attempts. It therefore appears likely that the two positive findings of Digon and Bock are really chance relationships, and that the negative findings in the remainder of their study are more likely to represent the true relationship between suicide and weather changes. Two references are given. -- Author's summary

- 123 Personality and Cognitive Characteristics of Engineering Students: Implications for the Occupational Psychiatrist. H. L. Rosett, et al. Am. J. Psychiat. 122 (10), 1147-1152 (1966).

Initial data from a longitudinal study of an entire graduating class at Cooper Union School of Engineering suggest that the concepts of ego psychology and cognitive control (perceiving, recognizing, conceiving, judging, and reasoning), as brought out by appropriate tests, offer a theoretic framework with the potential to encompass many aspects of the productive functioning of scientists in industry. A follow-up study is planned in eight years to determine the practical significance of the preliminary findings that the engineering students showed a predominance of compulsive personality types with high field articulation. The concept of the "clinically normal compulsive personality" who is over-conscientious and has an inordinate capacity for work seems to be descriptive of many effective engineers and scientists. The severity of the compulsive character traits was not significantly related to the cognitive approach. Ultimately industry must adopt a clinical approach in dealing with the uniqueness of the individual scientist.

-- J. Occ. Med. Absts.

- 124 Your Psychiatric Patient at Work. A. A. McLean.
J. Kentucky State Med. Assn. 64 (2), 129-133 (1966).

Work has an increased psychological and social meaning and workers have a greater recognized incidence of psychiatric disorder. Three areas of importance are brought to the attention of people who serve the mental health of the working population. (1) One of the most common prescriptions—time off for emotional disturbance—is incompatible with contemporary thinking in psychiatry, and should be used sparingly when the illness is not completely incapacitating. (2) The industrial medical consultant and industrial management must be aware of the stressful factors impinging upon the life of an employee to intelligently alter his work situation without triggering the development of emotional difficulty. (3) Appropriate medical care for the employee with psychiatric problems requires not drug therapy alone, but drug therapy with more definitive psychological counseling. The overwhelming majority of disrupting emotional disturbances perceived in industry are amenable to treatment.

-- J. Occ. Med. Absts.

- 125 Behavioral Implications of Exposure to Industrial Chemicals. H. V. Brown.
J. Occ. Med. 8, 561-566 (Nov. 1966).

When a layman says that a substance is poisonous or toxic, he usually means that it is capable of causing death. An industrial hygienist or an industrial physician describing a toxic material usually implies that it may damage an important organ system such as the liver, lungs, or kidneys. He may possibly mention skin irritation, and, as an afterthought, he may make a comment concerning headaches or dizziness. This order of effects, ranging from severe systemic injury to the minor headaches, is not the order in which they appear in industrially encountered intoxications. Most frequently, the headache and dizziness appear first, then organ damage, and then death. By far the earliest indications of systemic poisoning are the effects on the nervous system. The need for investigating the psychotoxic effects of industrial chemicals has been voiced by a number of people working in the fields of industrial medicine, industrial hygiene, and industrial toxicology. In the face of such interest by nonpsychiatrists, it is surprising to note that little apparent interest in these aspects of industrial mental health has been evidenced by psychiatrists. For example, the author of a recent book on occupational psychiatry devoted less than two pages to a discussion of physical and chemical agents, and another did not even mention the idea that industrial chemicals can affect one's emotional health. Perhaps Kety^{*} was correct when he commented that psychiatrists tend to relegate to medicine or neurology those mental disorders resulting from biochemical agents. He said: "... Once a mental disorder is reasonably well understood and has had its etiology and pathogenesis adequately explained, it ceases to be part of psychiatry, as if we insisted that only the mysterious ailments were psychiatric in nature." Although it has been known for centuries that behavioral changes can result from industrially encountered toxic materials, only within

the last five or six years has any great attention been given to measuring quantitatively the behavioral changes induced in animals in order to predict similar effects in humans. Because psychiatrists do not appear to have much interest in this field, it will become, if only by default, an increasingly important part of occupational medicine. If the industrial physician is sufficiently aware, properly astute, and observant, and if he keeps detailed records, serious intoxications can be prevented by watching for the subtle behavioral changes which usually precede more serious intoxications. There are 35 references. (Kety, S. The heuristic aspect of psychiatry. *Amer. J. Psychiat.* 118:385, Nov. 1961.)

- 126 Indices of Heart Rate as Substitutes For Respiratory Calorimetry. R.B. Andrews. *Am. Ind. Hyg. Assn. J.* 27, 526-532 (Nov.-Dec. 1966).

The most promising potential substitutes for respiratory calorimetry are regression equations that relate caloric expenditure to heart rate. This study evaluates multiple regression equations, employing seven indices derived from the time pathway of the heart rate, as a means of increasing the precision of the heart rate method. Regression equations are based on the aggregation of different tasks and subjects as well as on the single task and subject. The multiple regression equations are compared with simple regression equations and with respiratory calorimetry in terms of the errors of estimation that each introduces into the measurement of caloric expenditure. The results show that multiple regression equations based on a single subject and single task are as precise as respiratory calorimetry. There are 14 references. -- Author's abst.

- 127 Hand, Wrist, and Forearm Injuries. The Result of Repetitive Motions. L. Hymovich and Miriam Lindholm. *J. Occ. Med.* 8, 573-577 (Nov. 1966).

Experience is reported with 47 persons sustaining 62 injuries of hand, wrist, and forearm, attributable to repetitive work in the electronics industry. While most of the injuries were not serious and responded satisfactorily to simple therapeutic measures, some were more resistant, requiring surgical intervention and involving considerable disability as measured in days off work. In two cases, permanent partial disability necessitated the separation of the worker from this type of job. The following program was suggested: (1) An analysis of the hand motions that had been performed by the injured workers to determine whether other methods of doing the same work could be developed and employed by all those doing the same types of work. (2) Proper instruction and continued supervision of each worker doing this type of work to be sure that errors previously made would not be repeated. (This involves repeated review of presently used methods and a course of continuing instruction to the employees.) (3) Use of spring suspension or counterweighting to make heavier tools easier to hold, the substitution of power-activated tools for those that require force in their use, especially for obviating the rotation of the wrist and the moderately great hand force required in using a screwdriver, plus redesigning of tools, where practicable. (4) Rotation of workers among several jobs in the order shown to be most practicable by hand-motion studies, when relief from repetitive motions cannot be provided by the methods given above.

- 128 Cytodynamics in the Respiratory Tract of the Rat. R.G. Shorter, J.L. Titus, and M.B. Divertie. *Thorax (London)* 21, 32-37 (Jan. 1966).

The cytodynamics of cells in the respiratory tract have been studied in normal adult Sprague-Dawley rats after the parenteral injection of tritium-labeled thymidine combined with autoradiography. The findings in the epithelia of the trachea and large bronchi showed an apparent migration time of labeled cells of six to seven and seven to eight days, respectively. Nuclear labeling in the epithelial cells of the small bronchi persisted for five to six days. The results indicate that two populations of alveolar macrophages exist, one with a life span of seven days, and the other of two to three weeks. The phase of synthesis of deoxyribonucleic acid (S phase) for the tracheo-bronchial epithelial cells and alveolar macrophages was eight hours. The classification of the cell population into "renewing cell populations" is discussed. Differences in labeling were seen in bronchi showing purulent bronchitis. -- Am. Rev. Resp. Dis. Absts.

- 129 Low-Cost Tuberculin Screening for Large Populations. L.M. Hursh. *Arch. Environmental Health* 13, 622-624 (Nov. 1966).

A rapid, low-cost technique is described for mass tuberculin screening using a jet injector and tuberculin PPD (purified protein derivative of tuberculin; Protoderm) properly diluted. Standardization procedures and statistical analyses were used in accord with the 1958 British Pharmacopoeia. One milliliter of tuberculin PPD Protoderm provided enough purified protein derivative to test over 30,000 patients with a five tuberculin unit dose. A summary of relative costs of several techniques is listed. Three references are given. -- Author's summary

- 130 Comparative Responses of Elderly Persons to Aqueous and Depot Influenza Vaccines. D.W. Voth, H.A. Feldman, and A. Steinschneider. Arch. Environmental Health 13, 576-585 (Nov. 1966).

After randomly distributing 119 elderly persons into three groups, sera were obtained and each person was injected with either a saline placebo, aqueous, or adjuvant, polyvalent influenza vaccines. By means of the application of the law of initial values, serial HI (hemagglutinating-inhibiting antibodies) titers against nine influenza antigens over a 44-week period demonstrated a greater, more persistent, and broader immunologic response to the repository agent. No serious or residual reactions were observed. The maximal response to a single dose of influenza vaccine was not observed in all vaccinees until some weeks after its administration. Measurements of HI antibodies made on follow-up specimens obtained 14 days after vaccine administration provide incomplete information on the response to it. Antibodies to a 1963 strain of equine influenza virus was demonstrated in 34% of the subjects. There are 15 references. -- Authors' summary

- 131 Passive Immunization With Gamma Globulin. T.J. McDonagh. J. Occ. Med. 8, 567-572 (Nov. 1966).

The present concepts and recommendations on the use of human immune serum gamma globulin in passive immunization against measles, rubella, chickenpox, infectious hepatitis, and serum hepatitis are reviewed. Limitations of previously accepted procedures and newer areas of application are discussed, with particular consideration of the problems of immunization for industrial personnel sent to areas of endemic hepatitis. In a limited inquiry into industrial practices, it appears that not many industries have set up a definite program for immunization of their employees who are to visit or reside in areas of endemic hepatitis. A strong case can be made for giving prophylactic gamma globulin to employees under such circumstances. Certainly the policies of the World Health Organization, the Peace Corps, and Army, and the State Department could be cited in support of this proposal. The reports reviewed and the opinions of the majority of medical experts sampled also tend to agree with the use of prophylaxis. It is true, however, that the use of gamma globulin in short- and long-term residency in areas of endemic hepatitis is not as well documented in the literature as the use of gamma globulin in institutions and cases of exposure. Of importance is the absence of a recommendation for the use of gamma globulin in overseas travelers in the authoritative handbook Immunization Information for International Travel, published by the Public Health Service and used as a reference by many industries. However, the reporting of infectious hepatitis is not carried out by the health services of various countries with the same degree of dedication and one would have to define endemic, for the purposes of this potential program, as an incidence of infectious hepatitis many times greater than the rate in the United States. Although some data are available for this type of classification, it certainly is not adequate. Much more information is necessary before a definitive statement can be made about the use of gamma globulin in the modification of infectious hepatitis in overseas personnel. Since this problem affects industry, it may be time for industrial physicians to become more interested in this problem, and to aid in defining it further. An analysis of industrial records, combined with prospective studies of the problem of hepatitis in overseas activities and the results of gamma globulin usage, might add significant information to the literature on this problem, which at the present time is not very extensive. The Public Health Service has expressed an interest in working with industry along these lines.

- 132 The Main Functions of the Pulmonary Circulation. J.H. Comroe, Jr. Circulation 33, 146-158 (Jan. 1966).

The five main functions of the lung are discussed in some detail: (1) participation in pulmonary gas exchange, a function long known; (2) service as a blood reservoir for the left ventricle, demonstrated quantitatively only recently; (3) provision for the nutrition of the alveoli and alveolar ducts, discovered in the past two years; (4) filtration of particles from the mixed venous blood (this sometimes results in dysfunction, but is, instead, a function sometimes abused); and (5) removal of excess fluid from the alveoli, known for over 90 years. In the future, unsuspected functions of the lung and the pulmonary circulation may be found. Why, the writer asks, is the lung rich in histamine, heparin, adenosine deaminase, and in certain proteolytic enzymes? Why are leukocytes, separated briefly from blood and then reinjected, trapped preferentially in the pulmonary circulation? Why do certain bacteria, given intravenously, stay in fine pulmonary vessels although they are small enough to pass through any capillary bed? Why do certain diseases of the lung lead to inappropriate secretion of an antidiuretic hormone? Why is bronchial carcinoma often associated with clubbing of the fingers although there is no arterial hypoxia? The answers to these questions will be interesting.

-- Am. Rev. Resp. Dis. Absts.

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- 133 Metabolism of Pulmonary Phospholipids in Normal Lung and During Acute Pulmonary Edema. W.R. Harlan, Jr., S.I. Said, and C.M. Banerjee. Am. Rev. Resp. Dis. 94, 938-947 (Dec. 1966).

When radiolabeled (C-14 and H-3) palmitic and oleic acids were injected intravenously into normal dogs, the fatty acids were quickly incorporated into pulmonary lipids. Incorporation was four times as rapid for palmitic as for oleic acid, and occurred principally into phospholipids—lecithin and phosphatidyl ethanolamine, and into triglyceride. Following induction of pulmonary edema by intravenous infusion of dextran, there was a significant decrease in total phospholipid and in the radioactivity of phospholipids. The loss of phospholipids was nonselective. Radioactivity was present in the pulmonary edema fluid and its characteristics suggested a mixed origin from pulmonary phospholipid and plasma. Atelectatic areas of edematous lung, having decreased surface activity, also showed significantly less phospholipid and tissue radioactivity than aerated areas. These observations are compatible with an important role for phospholipids, particularly lecithin, in preventing alveolar collapse, and shed some light on the dynamics of pulmonary lipids in the intact animal and during acute pulmonary edema. There are 20 references.-- Authors' summary

- 134 Urban Factor and Prevalence of Respiratory Symptoms and "Angina Pectoris." R. Cederlöf. Arch. Environmental Health 13, 743-748 (Dec. 1966).

An investigation was performed to elucidate (1) whether urban and rural population groups differ in regard to the prevalence rate of angina pectoris, cough, and bronchitis and, if so, (2) whether these differences can be explained by group incompatibilities with regard to constitutional factors or smoking habits or both. The investigation was based on a population of Swedish same-sex twins born between 1886-1925, provided that both twins in each couple were still alive and living within the country at the time of compilation (1961-1962). The following conclusions were drawn. The prevalence of angina pectoris was higher among smoking men in urban than in rural areas, as judged on the basis of the population sample. This hypermorbidity was less apparent in the analyses according to the twin-control method. The prevalence of the respiratory symptoms was higher among smoking men in urban than in rural areas, as judged on the basis of the population sample as well as on the analyses of the twin pairs (twin-control method). This speaks in favor of a specific urban factor that is in some way interacting with smoking. The study does not reveal what constituent in the urban factor is the causative agent; air pollution must be suspected. There are 19 references.

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- 135 Epidemiology of Coronary Disease in Industrial Workers. II. Absentee Rates and Serum Lipids. J.W. Meigs and Margaret J. Albrink. Arch. Environmental Health 13, 645-655 (Nov. 1966).

Absenteeism and serum lipids were studied in a group of 164 male production workers of a factory, in relation to coronary disease. After exclusion of groups with excessive absence rates and men with nonheart disease causes of abnormal serum lipids, 98 men without evidence of IHD were available for comparison with 17 survivors and nonsurvivors of IHD. A number of trends and statistical differences between groups supported the hypothesis that subjects with IHD differed, perhaps genetically, from the normal men, and that the differences point toward underlying factors promoting resistance to noncoronary diseases in some men with a predisposition to ischemic heart disease. There are 22 references.

-- Authors' summary

- 136 Epidemiology of Coronary Disease in Industrial Workers. III. Absentee Rates and Parental Disease Histories. J.W. Meigs. Arch. Environmental Health 13, 655-661 (Nov. 1966).

Absenteeism was studied in relation to reported causes of parental deaths in a group of 98 men, aged 50 and over, and free of diagnosed coronary disease, other atherosclerotic disease, or diabetes over a 12-year period of observation. There was statistical associations between low absentee rates and reported parental death from coronary disease. In general, reported parental death from atherosclerosis or diabetes, as well as coronary disease, associated with lower absentee rates. The results support the hypotheses that genetic factors play a part in the occurrence of ischemic heart disease and that these factors have, under proper environmental circumstances, a potential for health as well as disease. There are 10 references.-- Author's summary

- 137 Prevention of Urolithiasis. Education to Adequate Fluid Intake in a New Town Situated in the Judean Desert Mountains. M. Frank and A. deVries. Arch. Environmental Health 13, 625-630 (Nov. 1966).

A study was carried out on the effect of education to high fluid intake on urine output and on the incidence of urolithiasis in the newly established town of Arad, situated in the arid Judean desert mountain region. Settlers of the nearby town Beersheba, not subjected to the educational program,

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served as a control. Preliminary results, summarizing a three-year period of study, suggest that education is capable of raising urine output and of preventing urolithiasis in a hot, dry climate. Four references are given. -- Authors' summary

- 138 Brain Potentials Studied by Computer Analysis. C. Xintaras, et al.
Arch. Environmental Health 13, 223-232 (Aug. 1966).

Brain responses to flashes of light in the freely moving rat can be examined with on-line summation techniques (Xintaras, et al., *Toxicol. Appl. Pharmacol.* 8, 77-87 (1966)). This development encouraged a study to furnish additional information about response morphology, particularly as it might vary as subjects move from alert wakefulness through drowsiness and into deeper stages of spontaneous or induced sleep. Male rats were implanted with cortical and subcortical recording electrodes and placed in an electrically shielded chamber. Photoc stimuli were presented to the rat, and conventional EEG recordings obtained. Cortical potentials evoked in response to each light flash were either averaged on-line by computer or recorded on a tape recorder for later averaging. Computer-summed responses (30-350 light flashes) were also graphically displayed by an x-y plotter. In the transition from wakefulness to sleep, specific components of the evoked response were attenuated whereas others were markedly augmented. Carbon monoxide and pentobarbital induced changes in the response that appeared similar to the changes recorded during the subjects' normal transition from wakefulness to spontaneous sleep. Consistent relationships were noted between the spontaneous EEG and the magnitude of the visual evoked response. This was particularly evident with wave IV during paradoxical sleep and with wave V during the onset of light sleep. The findings suggest that the alterations in the evoked response during light spontaneous or induced sleep may be associated with a general lowering of the level of vigilance and may be related to the integrative functions necessary to awareness and for processing sensory signals into something meaningful—perception. There are four references. -- Authors' summary

- 139 Smoking and Cancer of the Urinary Bladder in Males in Poland. J. Staszewski.
Brit. J. Cancer 20, 32-35 (March, 1966).

In a retrospective study, a significant association was found in males between smoking and urinary bladder cancer, as manifested by the percentage of smokers, average intensity of smoking (number of grams of tobacco smoked daily), and the smoking index (number of cigarettes smoked daily multiplied by the duration of smoking in years). The risk of male smokers' developing urinary bladder cancer was 2.7 times greater than that of nonsmokers, a figure close to that found by other investigators. Inhaling of smoke was more common and smoking of pipes or cigars less common for the bladder cancer patients than for the controls. The results of the present study are compatible with the view that cigarette smoking increases the risk of cancer of the urinary bladder. An excess of coal miners and of white collar workers, as well as of individuals with a history of pulmonary tuberculosis or peptic ulcer, was noticed in the group of bladder cancer patients as compared with the control group. -- Am. Rev. Resp. Dis. Absts.

- 140 Cigarette Smoking and Respiratory Infections in a Class of Student Nurses. J. L. Parnell, D. O. Anderson, and C. Kinnis. New Engl. J. Med. 274, 979-984 (May 5, 1966).

The incidence and duration of pure infections of the upper respiratory tract, tracheitis-bronchitis-pneumonia, and coryza syndrome were determined from September 1, 1963 to August 31, 1964, for two groups of senior student nurses at the Vancouver General Hospital School of Nursing. The comparison groups consisted of 47 students who were regular smokers from September 1, 1963, to May, 1964, when these smoking habits were determined by questionnaire, and a group of 47 nurses who had never smoked regularly. The incidence and incidence rate for respiratory diseases were less in nonsmokers; coryza syndrome and tracheitis-bronchitis-pneumonia were found to occur more often in smokers than in nonsmokers; and the total number of days off duty per student per year was greater for smokers. For nonrespiratory diseases the incidence was also greater in smokers, although the duration was greater in nonsmokers. -- Am. Rev. Resp. Dis. Absts.

- 141 An Epidemiological Study of Certain Aspects of Lung Cancer in New South Wales. D. L. Jones.
Med. J. Australia 1, 765-770 (May 7, 1966).

An epidemiologic study of certain aspects of lung cancer in New South Wales was undertaken for a 12-month period October, 1963 to September, 1964. The following factors were selected for investigation: smoking, chronic bronchitis, previous tuberculosis, residential history, and familial predisposition. The survey was undertaken by means of a questionnaire administered by an interviewer, and the patients were matched with suitably chosen controls. In no case did a patient fill in his own questionnaire. In this study the only etiologic factors which have been demonstrated to bear a causal relationship to lung cancer are the smoking of cigarettes and the presence of chronic bronchitis. Suggested, but not established, is a possible role of urban life with its

associated air pollution. It is possible that much of the effect of chronic bronchitis is attributable indirectly to cigarette smoking and to air pollution. There is in New South Wales a highly significant relationship between cigarette smoking and lung cancer. It was found that the greater the number of cigarettes smoked, the greater was the risk of lung cancer.

-- Am. Rev. Resp. Dis. Abstr.

- 142 Influence of Respiration on Venous Return in Pulmonary Emphysema. F.K. Nakhjavan, W.H. Palmer, and M. McGregor. *Circulation* 33, 8-16 (Jan. 1966).

The influence of respiration on the flow of blood from the abdominal vena cava into the thorax was studied in 15 patients with pulmonary emphysema and in ten control subjects without thoracic disease or heart failure. During quiet breathing in the control subjects, blood flowed into the thorax throughout the respiratory cycle at a rate which was greatest during inspiration. Simultaneously, the transmural pressure of the abdominal vena cava fell and transmural right atrial pressure increased. The same pattern of flow was observed in nine of the patients with emphysema. In the other six patients, however, flow was greatly reduced or completely arrested during inspiration, with simultaneous increase in transmural caval pressure and reduction in transmural atrial pressure. This inspiratory obstruction at the thoracic inlet was associated with gross hyperinflation of the lungs and low diaphragmatic position. It probably was not the result of the high negative and positive intrathoracic pressures that develop during inspiration and expiration, respectively, in such subjects. It is possible that this phenomenon may account for the peripheral edema that occurs in patients who have emphysema without associated hypertension or cardiomegaly.

-- Am. Rev. Resp. Dis. Abstr.

- 143 The Effect of Posture on Respiratory Function in Patients With Obstructive Pulmonary Emphysema. W.S. Erwin, D. Zolov, and H.A. Bickerman. *Am. Rev. Resp. Dis.* 94, 865-872 (Dec. 1966).

Respiratory function as measured by arterial blood gases and ventilometry is assessed in various positions ranging from the erect to the 20° Trendelenberg in ten patients with documented obstructive pulmonary emphysema. There were no significant differences in the values of blood gases, pH, or residual volume of patients tested in the various positions. In general, the vital capacity, functional residual capacity, and flow rates were lowered when the patients were placed at 20° Trendelenberg, or with a 15 pound weight over the lower abdomen in the supine position. A significant reduction, averaging 20%, in the minute ventilation breathing room air occurred with both the 20° and 10° head-down positions as compared with the erect positions. The finding was not associated with any alteration in the blood gases, suggesting a more efficient pulmonary ventilation. The 10° head-down position was more comfortable for the patient and, significantly, higher flow rates were recorded than for the 20° angle. There are 20 references.

-- Authors' summary

- 144 Experimental Production of Acute Pulmonary Emphysema in Newborn Piglets. Elinor M. Glauser. *Am. Rev. Resp. Dis.* 94, 873-881 (Dec. 1966).

The results of prolonged severe hyperventilation in newborn piglet littermates were studied. It was found necessary to combine both low oxygen and high carbon dioxide in the inspired gas to achieve this stressful hyperventilation to a degree of four to five times the level of the control animals. Exposure to 10% carbon dioxide and 7% oxygen for 24 hours resulted in marked hyperventilation. At autopsy the lungs were found to be over-inflated, weighed more, and showed some hemorrhage in contrast to the control littermates whose lungs were collapsed at death. Microscopic findings of distended alveoli with ruptured walls and thinning of the walls gave a picture microscopically resembling pulmonary emphysema in man. The hyperventilated piglets had a greater weight loss without a greater urinary excretion. Arterial blood analysis showed the hyperventilated piglets to have a lower pH, P_{O_2} and per cent saturation, and an elevated P_{CO_2} . These findings are consistent with the picture of acute pulmonary emphysema. There are 29 references.

-- Author's summary

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SKIN DISEASES AND BURNS

- 145 Talc Granulomas of the Skin. M.J. Tye, K. Hashimoto, and F. Fox.
J. Am. Med. Assn. 198, 1370-1372 (Dec. 26, 1966).

Surgical glove talc can cause granulomas in various intestinal and pelvic organs. In the skin, localized silica granulomas due to the glove talc have been observed in surgical scars and as the result of the impregnation of the skin by silicious particles, such as glass or sand, following an injury. Extensive talc granulomas of the skin have not been reported, to the authors' knowledge. In the present case hundreds of talc granulomas of the skin had developed in a 45-year-old woman. It is postulated that the talcum powder gained entrance through the skin at the sites of draining or incised furuncles. Electron microscopic studies showed the electron-dense lamellae to be morphologically indistinguishable to that of talc in many phagocytic cells. X-rays diffraction studies confirmed the foreign crystal to be talc. There are 11 references.

- 146 Lanolin Dermatitis. E. Cronin. Brit. J. Dermatol. 78, 167 (March, 1966).

Sheep fleece consists of several components among which wool wax and its principal derivative, lanolin, are the most important. The manufacture and uses of lanolin are described and the results of a study encompassing 40 lanolin-sensitive patients are reported. Of interest was the finding that varicose and facial eczema were the most common patterns seen in the patients and that the facial eczema due to lanolin sensitivity, presumably in cosmetic preparations, was found only in women. Different materials and techniques of patch testing are compared in an effort to find a reliable method for diagnosing lanolin sensitivity. -- J. Occ. Med. Absts.

- 147 Office Management of Acne Vulgaris. E.H. Tuttle.
N.Y. State J. Med. 66, 259-265 (Jan. 15, 1966).

Acne vulgaris accounts for approximately one of every five patient visits in the private office practice of dermatology. The following categories of treatment are discussed: hormonal, antibiotic, corticosteroid, topical, dietary, x-radiation, ultraviolet light, local surgical, and psychotherapy. The cleansing agents and lotions used as topical therapy possess merit only if they incorporate one or more of the following medications: sulfur, salicylic acid, or resorcinol. Ultraviolet light therapy was thought to be beneficial. The systemic administration of broad spectrum antibiotics has markedly improved the management of these patients. It is felt that androgenic hormones are the primary cause of acne and the use of estrogens is well justified in certain patients. Attention is called to the social and psychological problems of the acne patient. Since the problem requires long-term therapy, consideration should be given to the cost of medication prescribed. -- J. Occ. Med. Absts.

- 148 Studies in Burns: II. The Role of Hydrational Status on Water Loss From the Body Surface.
C. Jelenko and R.W. Buxton. Am. Surg. 32, 781-793 (Nov. 1966).

Measurements of water loss were made upon the surface of intact skin, burn eschars, and open wounds on humans and on rabbits in vivo under varying conditions of body hydration utilizing a modified gas chromatographic technique. The prior state of hydration did not seem to significantly affect the pattern or gross amount of surface water loss occurring upon parenteral administration of saline at similar times post-burn. The burn eschar of a man or animal dehydrated prior to being burned, required a much longer time to attain maximum water retentivity than the eschar of those normally hydrated. The immediate post-burn water loss of a man or a rabbit, dehydrated prior to being burned, is significantly less than that lost by the eschar of the normally hydrated subject. Nonetheless, the total water lost by the eschar as it becomes maximally water retentive is as great, and perhaps greater, if the subject was dehydrated prior to burning. A marked increase in water loss occurred from the eschar of a man or an animal rehydrated, when the original burns occurred during a time of partial body dehydration. Hydrational state did not seem to significantly alter the pattern or total amount of water lost from intact skin or open wounds. -- J. Am. Med. Assn. References & Reviews

- 149 Macroscopic Appearance of Malignant Melanoma of the Skin. N.C. Davis, J. Herron, and G.R. McLeod. Med. J. Australia 2, 883-886 (Nov. 5, 1966).

A malignant melanoma of the skin may develop from a pre-existing nevus or de novo. A history of recent change is of paramount importance of the diagnosis. The patient's attention may be attracted to the mole by itching, weeping, or bleeding on minor trauma. He may notice that the lesion has increased in size; an irregular extension at the periphery is particularly significant. The lesion may become raised and palpable, whereas it was previously flat. A change in color

may occur, and this is usually from brown to black. This is often seen as an uneven black speckling within the mole, or as a dark staining at the periphery. Less commonly, pale non-pigmented areas or fleshly tumors are seen. The doctor should suspect the lesion on the history before he even examines the patient. If suspicions of malignant melanoma are supported by the appearance of the lesion, wide surgical excision should be recommended as an initial procedure.

-- J. Am. Med. Assn. References & Reviews

- 150 Detection of Chromate Sensitivity: Intradermal Versus Patch Testing. S. Epstein. *Ann. Allergy* 24, 68 (Feb. 1966).

Three cases are described which demonstrated clinical contact allergy to chromium with negative patch tests. However, each individual developed positive reactions to intradermal testing with weak dilutions of potassium dichromate. In addition to discussing the indications for intradermal testing versus patch testing, the reliability and risks involved with intradermal tests are described.

-- J. Occ. Med. Absts.

CHEMICAL HAZARDS

- 151 Carcinogens in a Cracked Petroleum Residuum. The Contributions of Various Polycyclic Aromatic Hydrocarbons to the Carcinogenic Potency of a Catalytically Cracked Oil. R. Tye, et al. *Arch. Environmental Health* 13, 202-207 (Aug. 1966).

Fractionation by several techniques and bioassay have been applied to a petroleum residuum that had come from a process that had involved catalytic cracking. The major carcinogens in this oil were categorized according to whether they were found in the relatively high boiling portion (438-455 C) characterized by the presence of 5-ringed or alkyl 4-ringed polycyclic aromatic hydrocarbons (PAH), in intermediate fractions (404-438 C) characterized by unsubstituted and methyl substituted 4-ringed PAH, and in lower boiling fractions characterized by assorted smaller compounds including alkyl 3-ringed PAH. In the same order the percentages by weight (of the whole oil) of characteristic carcinogens found in each category were as follows: benzo(a)pyrene, 0.4%; benz(a) anthracene and alkyl homologs 0.4%; and benzo(c)phenanthrenes, 0.01%. Larger quantities of benzo(c)phenanthrenes may have been present in the intermediate fractions, which were not analyzed for these compounds. In spite of the small percentage that was found, the presence of this class of carcinogens may be significant because they were the dominant carcinogens in the most volatile portion of the oil. There are six references.

-- Authors' summary

- 152 The Estimation of a Euglobulin by Ion-Exchange Chromatography. C.H. Powell, et al. *Arch. Environmental Health* 13, 199-201 (Aug. 1966).

A chromatographic appraisal of a euglobulin was developed utilizing a column of finely divided amberlite IRC-50. A concentrate of the human euglobulin was chromatographed at $-10 \pm 2^\circ\text{C}$, pH 5.38 with a flow rate of 8 ml/hr. The eluted fractions were subjected to a bioassay for euglobulin and absorbance was measured at 278 m μ . A peak of concentration of protein corresponded closely with the peak of biological activity. Sera from experimental animals were tested by both techniques and a linear relationship was found between the level by bioassay and the quantity of protein as indicated by the absorbances of a chromatographic peak. There are 13 references.

-- Authors' summary

- 153 Eye Irritation Response at Low Concentrations of Irritants. E.A. Schuck, et al. *Arch. Environmental Health* 13, 570-575 (Nov. 1966).

The linear relationship between reported eye irritation and formaldehyde concentration in simulated atmosphere experiments does not hold when the formaldehyde concentration is below 0.3 parts per million (ppm). Subjects may experience equal irritation at irritant concentrations differing by an order of magnitude. Thus most subjects experienced the same irritation intensity at 0.05 ppm of formaldehyde as they did at 0.5 ppm. At irritant concentrations less than 0.3 ppm, the rate of blinking determines to an important extent the intensity of eye irritation which the subject detects. The eyes of human subjects can readily detect and react to as little as 0.01 ppm formaldehyde. From these simulated atmosphere experiments, one can predict that the concentrations of formaldehyde and peroxyacetyl nitrate found in atmospheres polluted with photochemical air pollution can account for most of the detected eye irritation. It should be noted that the experimental design used in these experiments does not preclude the postulated presence of an unknown short-lived irritant formed in the early stages of the photochemical reactions. However, these results indicate that such postulated irritants are not required in order to account for the observed irritation. There are nine references.

-- Authors' summary

- 154 Calcium Disodium Edetate Nephrosis in Inbred Rats. Variation in Marshall, Buffalo, Fischer, and ACI Strains. M.D. Reuber and C.W. Lee.
Arch. Environmental Health 13, 554-557 (Nov. 1966).

Calcium disodium edetate (calcium disodium ethylenediamine tetraacetate; Calcium Disodium Versenate) has resulted in nephrosis in human beings treated for lead poisoning. Toxicity studied in rats includes hydropic swelling and necrosis of the proximal convoluted tubules. The age, strain, and sex of the rats have varied. Many investigators did not give such information; others referred to their animals as albino rats; some gave weights. Random bred Sprague-Dawley male rats have generally been used. In this investigation the incidence and severity of renal lesions varied in inbred male rats of four unrelated strains (Marshall, ACI, Fischer, and Buffalo) given daily intraperitoneal injections of calcium disodium edetate. There was least involvement in Marshall rats and greatest in ACI rats. Marshall rats had minimal and Buffalo rats had moderate hydropic swelling of the proximal convoluted tubules. Advanced lesions with disruption of tubular cells were present in Fischer and ACI rats. In ACI rats, there was also regeneration of epithelial cells. The severity of lesions in the different strains may be related to genetic differences, the most important being differences in hormones. There are 13 references.

- 155 Poisoning of Industrial Origin in a Community. H. Oyanguren and E. Perez.
Arch. Environmental Health 13, 185-189 (Aug. 1966).

The occupational health worker should always bear in mind that toxic hazards originating in industry may also affect groups in the population near factories and in certain avenues of commerce. Likewise, the general practitioner or the pediatrician, in the presence of poisoning, should look for the source in the environment; the sources of arsenic poisoning of occupational origin may extend to neighboring populations without appearing as poisoning, per se, but simply as a degree of absorption of a toxic material, which may give rise to serious effects, at long range, under appropriate conditions. Lead poisoning of industrial origin in the community may arise out of unusual conditions. It has been found especially among children, who live near smelters, or come in contact with lead-containing wastes of old industrial plants, or in homes in which lead-containing materials are handled or processed. The physician who encounters illness suggestive of lead poisoning in children should first substantiate or exclude lead as the toxic agent by appropriate trustworthy analytical means, and, if lead is convicted, should seek out the source in the environment of the child, so as to prevent recurrence of the illness in his patient, or further cases of poisoning from the same source. There are four references. -- Authors' summary

- 156 Reproducibility of Single Oral Dose Toxicity Testing. C.S. Weil, et al.
Am. Ind. Hyg. Assn. J. 27, 483-487 (Nov.-Dec. 1966).

The single peroral dose toxicity of 26 chemicals was estimated each year for 12 years to determine the reproducibility of the test and of commercial production. For 11 years the resultant median lethal doses were relatively unaffected by the different samples of each chemical received annually, by changes in the stock of rats, by the diluted or undiluted state of the materials, or by the change of personnel performing the tests. Only one variable, the weight of the rat, appeared to have a significant effect on the LD50. -- Authors' abst.

- 157 Spectrographic Determination of Microgram Quantities of Tellurium in Biologic Materials. R.E. Kinser and R.G. Keenan. Am. Ind. Hyg. Assn. J. 27, 501-505 (Nov.-Dec. 1966).

A spectrographic method for the determination of microgram amounts of tellurium in biological materials is described. The residues of wet-ashed samples are converted to the chloride form for excitation. Waterproofed electrodes containing the internal standard (thallium), the sample, and 5 mg. of spectroscopic buffer are capped with boiler caps. Each electrode is excited as anode in a 10-ampere 220-volt direct-current arc. The intensity ratio of the tellurium 2385.8-A line to the thallium 2379.7-A line (the internal standard line) is calculated. Replicate determinations of tellurium in standard samples prepared from a liver ash matrix gave a detection limit of 0.1 microgram of tellurium per 2 mg. of tissue ash. Repeated analysis of liver ash standards yielded an overall relative standard deviation of 10.6%. The method is particularly valuable for the analysis of small body organs containing submicrogram quantities of tellurium. There are 12 references. -- Authors' abst.

03122414

- 158 Sodium in Drinking Water. Pitfall in Maintenance of Low Sodium Diet. G.E. Garrison and O.L. Ader. Arch. Environmental Health 13, 551-553 (Nov. 1966).

It is well established and widely accepted that restriction of dietary sodium is an important component of therapy in chronic congestive heart failure, hypertension, certain types of renal disease, advanced cirrhosis of the liver, and during a large percentage of pregnancies. The sodium content of most foods has been determined, and this information is widely utilized in sodium restricted diets. On the other hand, less attention has been given to the concentration of sodium in water that is ingested. Available information indicates that water supplies contain marked variations in sodium concentration; some supplies have sodium concentrations that make even mild sodium restricted diets impossible to follow if the usual water is used. It is, therefore, extremely important to know the concentration of sodium in the water that is consumed by a patient on a sodium-restricted diet. Data are presented on the sodium concentration in water from the municipal supply and from selected wells in a county (Durham) in North Carolina; in addition, information is provided on the increase in the sodium concentration produced by home water softeners. There are four references. -- Authors' introduction

- 159 Limits of Detection of Beryllium in Tissues by Microemission Spectrography. S.F. Brokesoulder, et al. Am. Ind. Hyg. Assn. J. 27, 496-500 (Nov.-Dec. 1966).

The metal beryllium has been successfully and unequivocally demonstrated by microemission spectrography on a semiquantitative basis in tissue sections 50 microns thick. The beryllium was localized in individual pulmonary granulomas in dogs exposed to beryllium. The determination of the lower limit of detection could indicate the threshold level of beryllium in tissue that can induce injury. Beryllium acetylacetonate dissolved in technical-grade xylene was used to prepare a series of working standards. Initial results indicate that as little as 1.48×10^{-12} gm. of beryllium is a sample of paraffin weighing about 2.91×10^{-8} gm. has been detected. Similar or greater quantities of beryllium have been demonstrated in similar-size samples of embedded lung tissue from dogs exposed to beryllium. -- Authors' abst.

- 160 Hypertension in Rats from Injection of Cadmium. H.A. Schroeder, et al. Arch. Environmental Health 13, 788-789 (Dec. 1966).

Cadmium acetate was injected into rats at dosages of 2 mg/kg. Arterial hypertension resulted, at incidences similar to or exceeding those resulting from partial constriction of one renal artery. Six references are given. -- Authors' summary

- 161 Determination of Cobalt in Air and Biological Material. D.M. Hubbard, F.M. Creech, and J. Cholak. Arch. Environmental Health 13, 190-194 (Aug. 1966).

A procedure combining various ideas obtained from the literature was developed for the determination of cobalt in a variety of biologic materials, such as urine, blood, and tissue. The method involves the removal of iron by treating the solutions of the ashed sample with cupferron, followed by complexing the cobalt with sodium diethyldithiocarbamate and extracting the metal complex into chloroform. Cobalt in the chloroform extract is then determined colorimetrically by forming the cobalt-Nitroso-R-Salt complex. It was found that the levels of concentration of cobalt in the urine and blood were extremely low, varying from 1 microgram to 7 micrograms liter of urine, and less than 0.25 microgram/100 gm of blood. There are ten references.-- Authors' summary

- 162 Acute Iron Intoxication. A Case Treated by Chelation. G. Whelan, V. Fazio, and J.C. Biggs. Am. J. Med. 41, 626-628 (Oct. 1966).

Iron salts, usually regarded as harmless and of proved therapeutic value in iron deficiency, can lead to death when taken in excessive quantities by young children. Fatal iron poisoning accounts for a significant proportion of the deaths in this age group from accidental ingestion of potentially lethal substances. Aldrich reviewed the literature in 1958 and found that the overall mortality was 50% in reported cases of iron intoxication. Ferrous sulfate was usually implicated and the fatal doses ranged from 3 to 18 gm. Survival has been reported after ingestion of 15 gm. of ferrous sulfate. This paper gives a description of a two-year-old girl who ingested an ordinarily fatal dose of ferrous sulfate (20 gm). The early oral and parenteral administration of an iron-chelating agent (desferrioxamine) undoubtedly had a favorable influence on the ultimate outcome, which was early and complete recovery.

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- 163 Lead, Chromium, and Molybdenum by Atomic Absorption. J.O. Pierce and J. Cholak. Arch. Environmental Health 13, 208-212 (Aug. 1966).

Atomic absorption spectrophotometry for the routine analysis of trace metals, especially lead, in biological systems of urine and blood is now possible. For the determination of lead, 25 ml of urine and 5 ml of blood are required. The analysis is rapid, free of interferences, and involves few manipulations. Most of the methods reported in the literature involve the extraction of lead as a chelate into an organic solvent. This procedure is quick and reliable, but fresh urine is usually required and whole blood must be used. For samples from which the lead cannot be extracted, ashing may be used satisfactorily. For samples of comparable and suitable size, the sensitivity of detection and the accuracy of analysis are equal to those obtained by present chemical and spectrographic methods. For handling traces of lead in samples of less than 1 gm or less than 1 ml in volume, only the spectrographic method is suitable. Analyses for chromium may be achieved by ashing the samples, whereas, in the case of molybdenum, the procedure lacks sensitivity and interferences add to the difficulties of analysis. The atomic absorption spectrophotometer has considerable potential as an analytical tool for the industrial hygienist. The speed of analysis and the possibility of the elimination of complex manipulations for most applications make the procedure very attractive for handling biological specimens as well as dusts and fumes collected from the atmosphere in the impinger, electrostatic precipitator, or on filter media. In the analysis of biological materials for trace metals by atomic absorption, consideration must be given to the absolute quantity of the specific metal present, as well as to the size of sample available. This technique may be used to supplement existing methods, but does not, in itself, solve all of the problems associated with microchemical analyses. There are 14 references.

-- Authors' summary

- 164 Chronic Toxicity of Gadolinium Oxide for Mice Following Exposure by Inhalation. R.A. Ball and G. VanGelder. Arch. Environmental Health 13, 601-608 (Nov. 1966).

The increased industrial use of rare earth metals has led to a realization that much remains to be learned about their toxicity, especially the chronic effects. Their use, therefore, may be attended by a real or potential health hazard to personnel using them. In the present investigation mice exposed to gadolinium oxide aerosol for 20 to 120 days were studied for evidence of chronic toxicity. Two to five weeks after exposure started, there was a marked increase in deaths due to pneumonia in mice inhaling the dust. There was also a trend toward shorter life spans in the mice which survived the exposure. Analyses of weight gains and hematologic values failed to show significant differences in exposed mice compared to controls. Although some rare earth dust was removed from the alveoli to the regional nodes, the large amounts left in the lungs several months postexposure suggest that the mouse has an inadequate clearing mechanism for removing this compound. The histological features support the conclusion that even at heavy exposure levels, gadolinium oxide ranks as a low-grade pulmonary irritant for mice, inciting focal areas of interstitial thickening around macrophages which contain rare earth dust, and with very little tendency towards pulmonary fibrosis. An unusual histological finding was pulmonary calcification in the region of the alveolar basement membranes and elastic laminae of small pulmonary vessels of exposed mice. The approximately equal incidence of primary lung tumors, mostly bronchial adenomas, in both exposed and control groups, indicates that gadolinium oxide is not a lung tumor accelerator for this strain of mice. There are 31 references.

- 165 Acute Tetramethyl Lead and Trimethyl Lead Chloride Intoxication in the Rat. Histopathological and Serological Data. M. Gherardi and A. Gnudi. Med. lavoro 57, 53-59 (Jan. 1966).

Rats were intoxicated with tetramethyl lead administered by inhalation, or with trimethyl lead chloride given intraperitoneally. As observed by previous authors, the rats were very little affected by the action of tetramethyl lead, even if inhaled, while they became severely intoxicated when treated with trimethyl lead chloride. The symptoms produced by the two substances were identical, the only difference lying in the different degree of toxicity. This fact stresses the determining role played by the trimethyl lead ion in the pathogenesis of the intoxication. The main serum indexes studied during the stage of intoxication did not differ significantly from the normal values, and the histological examination of the most important organs did not demonstrate any significant specific changes.

-- APCA Absts.

- 166 Mercury Exposure in a Jewelry Molding Process. A.T. Jones and E.O. Longley. Arch. Environmental Health 13, 769-775 (Dec. 1966).

A jewelry molding process involving the use of a low-melting-point, mercury-cadmium alloy has been investigated in seven small factories. At each, considerable exposure to mercury vapor occurred, ranging overall from 0.17 to 35.0 mg of mercury per cubic meter of air prior to,

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and 0.001 to 0.18 mg per cubic meter following, installation of control measures. Of 36 employees, one showed definite symptoms of mercurialism, while others exhibited vague changes. There appeared to be no correlation between mercury exposure and urinary levels of mercury. The cadmium portion of the alloy did not appear to constitute an exposure problem. There are six references given. -- Authors' summary

- 167 A Note on Methyl Bromide. G.R. Simpson. Arch. Environmental Health 13, 673-674 (Nov. 1966).

Methyl bromide is one of the three declared noxious substances under the New South Wales Fumigation Regulations. Because it is colorless, practically odorless and tasteless it is not apparent to the operator when a toxic atmosphere is encountered. As a result, severe cases of methyl bromide poisoning from house fumigation and from fire extinguishers and some milder ones in agriculture have occurred. During the last few years the use of methyl bromide has gained popularity in New South Wales, particularly as a total herbage destroying agent for golf and bowling greens. The method of application to such greens, the concentrations found, and the necessary precautionary measures are described in this paper. The author concludes that tests for methyl bromide in air during fumigations for total herbage destruction on golf or bowling greens indicated a severe potential hazard for the operator. It is essential respiratory protection be afforded at all times and dermal protection as well while gassing.

- 168 Hydrocarbon Pneumonitis in Rats. R. Ring and J.D. Nelson. Arch. Environmental Health 13, 749-752 (Dec. 1966).

Hydrocarbon pneumonitis in rats due to kerosene and mineral seal oil furniture polish (Old English) was compared by inducing aspiration in a standardized fashion. The death rate within 24 hours from pulmonary congestion and edema was the same in both groups (60%). The extent of pneumonitis and the histopathologic changes in those that survived four days were indistinguishable in the two groups. The clinical observation that pneumonitis in children due to mineral seal oil furniture polish is more severe than that due to kerosene cannot be supported by these studies as being related to difference in aspiration hazard or toxicity. It has been suggested that the clinical observation may be related to the volume consumed, the furniture polish being more appealing to the child than kerosene. In the second set of experiments an attempt was made to evaluate the hazard of gastric lavage following intragastric instillation of kerosene in rats. Gastric lavage neither increased nor decreased the incidence and extent of pneumonitis in rats. These findings are in agreement with results of the cooperative clinical study of hydrocarbon poisoning in children. There are six references. -- Authors' summary

- 169 Permanent Encephalopathy From Toluene Inhalation. J.W. Knox and J.R. Nelson. New Engl. J. Med. 275, 1494-1496 (Dec. 29, 1966).

Inhalation of glue vapors in an attempt to induce euphoria has recently become quite popular, particularly among teen-agers. The desired effects are probably produced by toluene, the major component of the vapors. The acute central-nervous-system symptoms after toluene inhalation are transient euphoria, exhilaration and excitement, but in high doses confusion, headache, nausea, tinnitus, ataxia, tremors and fasciculations often occur. Acute, reversible hepatic decompensation and bone-marrow suppression are also prominent effects of exposure to high concentrations of toluene. The severity of the acute symptoms correlates well with the concentration of toluene vapor, and specific safeguards have been established for industrial workers who must be exposed to this highly used solvent. Although acute toluene encephalopathy in human beings is well documented, irreversible brain damage after chronic exposure to toluene vapors has not been conclusively proved. In 1961 Grabski (Am. J. Psychiat. 118, 46 (1961)) briefly reported the first case in which long-term toluene inhalation had apparently led to cerebellar degeneration. The present paper describes the same patient in more detail after eight additional years of exposure to toluene and documents permanent central-nervous-system damage from nearly daily inhalations of large quantities of toluene over a 14-year period. The clinical findings of ataxia, tremulousness, emotional lability, a marked snout reflex and a Babinski sign on the right side were accompanied by diffuse electroencephalography. A plea is made for greater investigation of the extent of chronic toluene habituation in adults. There are eight references.

- 170 A Summary of Work on Aldrin and Dieldrin Toxicity at the Kettering Laboratory. F.P. Cleveland. Arch. Environmental Health 13, 195-198 (Aug. 1966).

The level of agricultural productivity in the United States depends upon the use of effective broad spectrum insecticides. Two of the most efficacious insecticides are aldrin and dieldrin. While these substances are highly toxic to insects and experimental animals, no definitive evidence is available that any harm has resulted to mankind. The incidence of tumors in male and female

rats fed on diets containing aldrin and dieldrin for a period of two years was of the same order of magnitude as that observed in control animals. Thus, on this basis, aldrin and dieldrin are neither tumorigenic nor carcinogenic substances. Although it is essential to protect the health of the general public, it is equally essential that any decision to restrict the use of aldrin and dieldrin by enforcement agencies must be based on sound and factual data, first establishing that a hazard in reality exists. There are 15 references.

-- Author's summary

171 Organochlorine Insecticides: Concentrations in Human Blood and Adipose Tissue.

J. Robinson and C.G. Hunter. Arch. Environmental Health 13, 558-563 (Nov. 1966).

The mean (geometric) concentrations of HEOD (1, 2, 3, 4, 10, 10-hexachloro-6, 7-epoxy-1, 4, 4a, 5, 6, 7, 8, 8a-octahydro-1, 4, 5, 8-endo, exo-dimethanonaphthalene), the major constituent of technical dieldrin, in the whole blood and depot fat of 44 persons with no known occupational exposure were 0.0014 ppm and 0.22 ppm respectively; the corresponding concentrations of total DDT-type compounds were 0.013 and 4.0 ppm respectively. The ratio of the concentrations in the blood and depot fat were 159 and 306 for HEOD and total DDT-type compounds respectively. In these people no significant relationships were found for either type of compound between the concentrations in the whole blood and depot fat; this is considered to result from the errors present in the observations as a significant correlation is found if the results for males with elevated body burdens of HEOD (arising from occupational or deliberate exposure) are taken into account. No significant change in the HEOD concentration of the bloods of the general human population of England has occurred over the period 1962-1965, and it is concluded that a state of equilibrium had been established between the intake and elimination of this compound. There are 11 references.

-- Authors' summary modified

172 Methoxychlor Toxicity. Comparative Studies in the Dog and the Swine. A.S. Tegeris, et al.

Arch. Environmental Health 13, 776-787 (Dec. 1966).

Methoxychlor (DMDT) mixed in the feed at 1, 2, and 4 gm/kg body weight per day, was given to three groups of dogs and three groups of swine seven days a week for six months. Most of the dogs in the medium and high dose groups started convulsing within six weeks after initiation of the experiment, and most of them died within three weeks thereafter. All dogs on pesticides lost weight during the experiment. There were no hematological abnormalities noted. Biochemically, alkaline phosphatase and both serum transaminases were significantly elevated in the DMDT dogs in a dose-dependent relationship. At autopsy the mucosa of the small intestine was congested. The swine receiving methoxychlor lost weight during the first month of the experiment, but afterwards the low and mid-dose groups regained their original weight while the high dose group never did. There was a striking degree of mammary gland hypertrophy in the sows of the experimental groups, observed as early as seven weeks after initiation of the experiment. There were no hematological abnormalities. Biochemically the blood urea nitrogen was elevated. At autopsy there were striking changes in the kidneys of all methoxychlor-treated swine compatible with chronic nephritis. The uteri of all the sows from the high dose group and of some sows from the other two pesticide groups were grossly hypertrophic. Microscopically, the uteri from all the pesticide-treated sows showed a thick hyalinized layer separating the endometrium from the myometrium; the mammary gland of the sows from all the DMDT animals were both hypertrophic and hyperplastic in a dose-dependent relationship. In a subsequent experiment it was found out that no toxicity signs developed when methoxychlor suspended in 1% gum tragacanth was administered to dogs by gastric tube for as long as six months. There are 25 references.

-- Authors' summary

173 Degradation of Insecticides by the Human and the Rat Liver. Metabolic Fate of Carbaryl, Malathion, and Parathion. F. Matsumura and C.T. Ward.

Arch. Environmental Health 13, 257-261 (Aug. 1966).

The results of a survey on the human and rat liver capacity to degrade three different insecticides indicated (1) the general degradation patterns of the livers from these two different species are very similar, (2) aging at room temperature and freeze-storing had some denaturation (or deactivation) effects upon malathion phosphatases and, to a less extent, upon carbaryl oxidative degradation enzymes, (3) malathion carboxyesterases and parathion phosphatases seem to be very stable enzymes against the above treatments, and (4) no detectable evidence to suggest a relationship between the enzyme activities toward these substrate insecticides and the age, sex, the cause of death, postmortem period (aging), and freeze-storing period of each liver sample; except for one case with carbaryl, where the liver samples from male patients showed a higher rate of water-soluble metabolites production as compared with those from female patients. There are 17 references.

-- Authors' summary

03122418

- 174 Rapid Determination of Blood Cholinesterase Activity. J.H. Holmes and Lucy Jankowsky. Arch. Environmental Health 13, 564-569 (Nov. 1966).

Two rapid methods for measurement of plasma cholinesterase activity, the Acholest test paper and the bromothymol blue test kit, were investigated in relation to their effectiveness in diagnosis of organophosphorus insecticide exposure. Both methods provided reasonable correlation with measurements of the plasma cholinesterase activity by the Michel method, and proved of diagnostic value for 117 patients with suspected exposure to the organophosphorus insecticides. The Acholest test gave more consistent results (with two exceptions) and a better quantitative correlation with the Michel measurements. The tests did not correlate well with changes in RBC cholinesterase activity (Michel method) and thus would have limitations in atypical toxicity problems. While the tests described are diagnostically effective, there is still a need for development of a more definitive test for use in small hospitals in regions where extensive spraying operations are in progress. There are 13 references.

-- Authors' summary

- 175 Subacute Oral Toxicity of a Biodegradable Linear Alkylbenzene Sulfonate. J.H. Kay, F.E. Kohn, and J.C. Calandra. Toxicol. & Appl. Pharmacol. 7, 812 (Nov. 1965).

A linear, biodegradable sodium dodecylbenzene sulfonate was fed to rats at dietary levels of 0.02%, 0.1%, and 0.5% for 90 days. No adverse effects were found on the following parameters: growth, food consumption, food utilization, survival, hematologic values, urinary analytical values, organ weights, and organ/body weight ratios. There were no gross or microscopic tissue changes attributable to ingestion of the test material. The study was conducted to determine any toxicologic differences between this type of molecule and the non-linear (ABS) type.

-- J. Occ. Med. Absts.

- 176 Discussion of the Interpretation of Threshold Limit Values. J. Novak and V. Vasak. Am. Ind. Hyg. Assn. J. 27, 555-558 (Nov.-Dec. 1966).

In the calculation of threshold limit values for mixtures, the assumption of ideal behavior of liquid mixtures can lead to results considerably apart from actual conditions. Better results can be obtained by taking into account the activities of the components of such mixtures. The necessary equations and several examples are presented. There are 12 references.

-- Authors' abst.

INDUSTRIAL DUSTS

- 177 Graphite Pneumoconiosis of Electrotypers. E.A. Gaensler, et al. Am. J. Med. 41, 864-882 (Dec. 1966).

Lung disease resulting from work with natural graphite has received scant attention despite the fact that this crystalline form of carbon is used in a wide variety of industrial processes. The few reports that appeared prior to 1950 are not easily interpreted because they dealt with roentgenographic findings only or because they concerned workers who had also been exposed to large amounts of rock dust, sand or clay. Among the eleven recorded cases with tissue studies, it appears that only three patients were exposed to natural graphite alone. Graphite lung disease has not been described in this country. The present paper is a report of four patients who were electrotype molders for 18 to 40 years. Their chief complaint was dyspnea and two died of cardiopulmonary insufficiency. Chest roentgenograms, available in three, showed, respectively, fine reticulation, coarse nodulation and progressive massive fibrosis with cavitation. Lung function studies in three patients revealed severe respiratory impairment. In two the changes were those associated with the "alveolar-capillary block" syndrome with severely reduced diffusing capacity and markedly increased A-a oxygen gradients, venous admixture and physiologic deadspace, while in the third the picture was largely one of obstructive emphysema. A lung biopsy in one patient showed massive infiltration with black dust and a diffuse interstitial fibrosis. Postmortem examination in three revealed heavy black lungs filled with graphite, interstitial fibrosis, perifocal emphysema, massive fibrosis with "graphite cyst," severe vascular sclerosis and cor pulmonale. This picture was indistinguishable from that seen in coal workers with progressive massive fibrosis. Analysis of electrotypers graphite and lung tissue revealed no detectable silica in two instances and 5% alpha cristobalite in one case. Heat and acid-treated slides showed a close relationship between silica and pathologic changes in one case and not in the other. Tuberculosis was ruled out as a cause of progressive massive fibrosis. Silica was thought to have played a small role, if any, because the pathologic picture did not resemble silicosis, because of the absence of significant amounts of silica in the lung tissue in two of three cases, and because pneumoconiosis with progressive massive fibrosis, as seen here, can be produced by silica-free

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soot or carbon black. Progressive massive fibrosis was most likely the result of the physical presence of large amounts of carbon interfering with the normal pulmonary drainage mechanism aggravated by repeated episodes of infection. There are 36 references.

NOTE: The following appears in the authors' acknowledgment: "We also gratefully acknowledge the assistance of Dr. Paul Gross, Director of the Research Laboratory, Industrial Hygiene Foundation of America, Inc., at the Mellon Institute who interpreted some of the microscopic sections and who prepared for us the special slides illustrated in Figure 11."

- 178 The Deposition of Unipolar Charged Particles in the Lungs of Animals. D.A. Fraser.
Arch. Environmental Health 13, 152-157 (Aug. 1966).

This investigation has shown that the degree of retention of particles in the respiratory tracts of animals could be doubled by placing a charge of 1,000 electrons per particle on these aerosols. A qualitative analysis of the mechanisms which account for the deposition of airborne particles in the respiratory tract indicates that, in each case, the effect of placing a unipolar electrical charge on the particles would be to increase the rate of deposition of the particles. A quantitative analysis, to predict the magnitude of this effect, is impractical because of the complexity of the respiratory tract and the fact that such physical properties of the particles as density, size, shape, and dielectric constant, will differ with every dust and so influence the results. The qualitative prediction, however, is in agreement with the experimental observations. The increase in retention in the entire respiratory tract does not appear to be related to the size of the particles inhaled, within the limits of size investigated. This would suggest that the image force of attraction which is induced between the charged particle and the vessel wall is the most significant factor contributing to the increased rate of deposition for charged particles. It was originally thought that the existence of electrical charges on either naturally occurring aerosols or those produced in industry might have a significant effect on the retention of these particles in the lungs. Under normal circumstances, however, these particles would not acquire charges of more than ten or perhaps 20 electrons per particle. It has been demonstrated that the increase in the deposition of particles bearing charges of this magnitude could not amount to more than 1% or 2%. Such an increase would not ordinarily have any significance. There are 20 references.

-- Cond. from author's conclusions

- 179 Identification of Vehicle Tire Rubber in Roadway Dust. R.N. Thompson, C.A. Nau, and C.H. Lawrence. Am. Ind. Hyg. Assn. J. 27, 488-495 (Nov.-Dec. 1966).

A technique combining pyrolysis and chromatography for the detection of vehicle tire abrasion products in roadway dust is described. Samples of elastomers used in tire formulations were volatilized and separated by gas-liquid chromatography to provide characteristic chromatograms. These identifying patterns appeared consistently in the chromatographic separations of the pyrolyzates of compounded tire rubber and various roadway dusts. To confirm the technique two chromatographic procedures were used for the identification of specific components of the thermal degradation products of raw elastomers, compounded rubbers, and roadway dusts. There are eight references.

-- Authors' abst.

- 180 Thesauriosis. Pulmonary Function Studies in Beauticians. O.P. Sharma and M.H. Williams, Jr. Arch. Environmental Health 13, 616-618 (Nov. 1966).

Pulmonary function studies were done in 62 beauticians and 33 controls. Although a wide range of values for lung volumes and diffusing capacity was encountered, there was no significant difference between the two groups. Part of this variation was due to smoking habits among the beauticians, and cigarette smoking was associated with significant reduction of diffusing capacity and duration of work as a beautician, and the authors conclude that there is little evidence for the concept that exposure to hairspray is associated with significant impairment of pulmonary function or disease. There are 16 references.

-- Authors' summary

- 181 Fiberglass Conjunctivitis and Keratitis. E.O. Longley and R.C. Jones. Arch. Environmental Health 13, 790-793 (Dec. 1966).

Fiberglass dust is suggested as a probable cause of conjunctivitis and keratitis. There appears to have been a clear relationship between exposure to fiberglass and development of symptoms on a number of occasions. Four other employees who did the same work as the patient reported here all wore glasses, and none was affected by irritation of the eyes although all had experienced fiberglass skin irritation. In the light of this experience, it appears reasonable to suggest that protective goggles should be worn if employees handling fiberglass develop soreness of the eyes, as keratitis is always a serious condition often resulting in corneal scarring. The authors would be interested to hear of other cases of keratitis in which fiberglass might be implicated.

-- Authors' comment

03122420

- 182 Rheumatoid Factor in Serum of Individuals Exposed to Asbestos. B. Pernis, et al.
Ann. N.Y. Acad. Sci. 132, 112-120 (Dec. 31, 1965).

The presence and titer of rheumatoid factors in the sera of 315 asbestos insulation workers and of 103 controls were determined by conditioned hemagglutination with tanned red cells coated with aggregated human or rabbit gamma globulins. The asbestos workers were exposed to the dust for periods from 1 to 54 years, and most of them showed x-ray evidence of asbestosis that was graded into grades from one to three. A definite increase in frequency and titers of rheumatoid factors in the controls of same age and sex, was found in workers with asbestosis of grades in two and three. Similar serological abnormalities are found in cases of pulmonary fibrosis of different origin, idiopathic, silicosis, coal workers' pneumoconiosis, and sarcoidosis.

-- APCA Absts.

- 183 Occupational Hazards of Pipe Insulators. W. T. Keane and M. R. Zavon.
Arch. Environmental Health 13, 171-184 (Aug. 1966).

In this survey the attempt has been made to investigate all of the substances with which insulators come in contact in the normal pursuit of their trade. In the present state of technology, and in light of existing medical and toxicological data, the majority of the substances examined proved incapable of presenting a serious health hazard to insulators. The only insulating substance which justifies concern is asbestos. This report and other available scientific data at the present time are insufficient to provide an adequately based conclusion. The most convincing data are those of Selikoff. The further results of his and other investigations will be awaited and should contribute toward sound judgment of this matter. There are 155 references. -- Authors' summary

- 184 Malignancies in Asbestos Workers. J. Lieben.
Arch. Environmental Health 13, 619-621 (Nov. 1966).

A study of 68 hospital admissions with asbestosis from an asbestos textile and friction materials plant included 21 malignancies—13 of these were carcinoma of the lung and eight carcinomas of other organs. Eighteen of the patients had exposures to asbestos in their occupational environment for a period of 10 to 36 years. Only three patients had their first exposure after 1940. Extensive dust control measures have been instituted by the plant. There are six references.

-- Author's summary

- 185 Exposure to Asbestos and Malignancy. Anonymous.
London Clin. Med. J. 7, 10-11 (Jan. 1966).

Recent surveys have shown asbestos bodies to be present in many of the otherwise normal lungs of those living in clean, non-industrial communities, suggesting that environmental contamination with asbestos dust is widespread. Perhaps this is not altogether surprising considering the variety of domestic asbestos products that exist and their wide use in modern building. Present evidence suggests that there is a wide spectrum of pathological changes resulting from asbestos inhalation. Prominence was given recently to the relationship between asbestos exposure and mesothelioma. Possible widespread community contamination by asbestos clearly calls for a full assessment of its carcinogenic properties. Both crysotile and crocidolite have been associated with bronchial carcinoma and mesothelioma, but amosite has not. It follows that both qualitative and quantitative analyses of asbestos in tissues could be most helpful in the further elucidation of this problem. In addition the relationship between asbestos exposure, smoking, and neoplasia formation, requires analysis.

-- APCA Absts.

- 186 Pleural Calcification as a Sign of Silicatoses. M. Kleinfeld.
Am. J. Med. Sci. 251, 215-224 (Feb. 1966).

Of the agents capable of producing a pneumoconiosis, only asbestos, talc, and mica (and rarely, free silica) have so far been incriminated in the production of pleural calcifications. Such calcifications following silicate exposure may vary from a few linear or circular plaques over the dome of either or both leaves of the diaphragm or the lateral chest wall to formation of an extensive shell over the whole lung field. The configuration may be bizarre, but the nature of the calcification usually is readily apparent on standard posteroanterior and lateral films. Pleural calcification is usually asymmetric. The plaques are most frequently located over the dome of the diaphragm rather than in other lung areas. Clinical and environmental evaluation was made of eight workers showing varying degrees of pleural calcification from exposure to talc, asbestos, or mica. The minimal duration of exposure was 23 years and the longest, 54 years. Respiratory symptoms, chiefly dyspnea, were present in six. Four of the six showed clubbing. In five,

the pleural calcification was confined to the diaphragmatic regions. The chest roentgenograms of five showed varying degrees of pulmonary fibrosis. Of the five individuals given pulmonary function tests, the findings were abnormal in four. Of these four, two had impairment in both ventilation and diffusion capacity and two demonstrated ventilatory dysfunction indicative of a restrictive breathing disorder.

-- Am. Rev. Resp. Dis. Absts.

- 187 Deposition and Fate of Inhaled Iron-59 Oxide in Rats. L.J. Casarett and B. Epstein. Am. Ind. Hyg. Assn. J. 27, 533-538 (Nov.-Dec. 1966).

The fate of inhaled Fe_2-590_3 in rats at short intervals of time after inhalation has been studied primarily to evaluate this material for cytokinetic studies of the lung. Following "nose only" types of exposures, complete analyses were performed on tissues and excreta. Upper and lower respiratory tract retention has been presented in two ways. The differences in clearance rates thus obtained are due to a significant early absorption or transport as reflected in carcass values. Suitability of Fe_2O_3 for cell studies is concluded to be adequate, but further emphasis is given to the need for characterization of this aerosol, particularly for solubility and ultrafiltrability in other test uses. There are 17 references.

-- Authors' abst.

- 188 Dust Counting Variability. R.G. Edwards, Jr., C.H. Powell, and Mildred A. Kendrick. Am. Ind. Hyg. Assn. J. 27, 546-554 (Nov.-Dec. 1966).

A dust counting study is described, involving seven people with various amounts of experience, two methods of lighting (lightfield and phase contrast), 30 concentrations, and the counting of two types of particles (grains and fibers). The purpose of this study was to determine the effect of these variables on dust count results. An analysis of variance was made by means of a computer on 8,400 values comprising the basic data. The biggest single source of variation in results is individual differences of the counters. Methods of keeping this variance to the minimum are discussed. Other methods of improving dust count reliability are also presented. There are nine references.

-- Authors' abst.

- 189 Ultra-Clean Operating Rooms. J.G. Whitcomb, et al. Sandia Corp. Reprint SC-R-65-965. 5 pp. (Aug. 1965). Issued by Technical Information Division III, Sandia Corp., Albuquerque, New Mexico.

Air-borne bacteria are held suspect in the pathogenesis of postoperative wound infections. A plan is presented for the definitive control of bacterial contamination in the atmosphere of operating rooms by using the ultra-clean, laminar, down-flow technique. Bacterial monitoring of the air in a laminar flow, industrial clean room substantiates the validity of this concept of air conditioning for use in operating rooms of the future.

- 190 Applying "Downflow" to Dust-Fume Control in a Plastics Facility. J.A. Kenagy. Sandia Corp. Reprint SC-R-66-922. 3 pp. (June, 1966). Issued by Technical Information Division III, Sandia Corp. Albuquerque, New Mexico.

Toxic components of plastics systems call for special dust-and-fume-exhausting facilities during potting and encapsulating procedures. Sandia Corporation found that a complete laminar down-flow clean room, rather than the bench approach, is the answer for this purpose. The plastic objects involved are produced for a specific aerospace application; but the article is applicable to numerous other plastics operations.

- 191 The Adaptability of Laminar Air Flow for Contamination Control. R.C. Marsh. Sandia Corp. Reprint SCR-691. 6 pp. (April, 1964). Issued by Technical Information Division, Sandia Corp., Albuquerque, New Mexico.

Laminar air flow in clean rooms is presently much discussed. In this article the author states the Contamination Control requirements for various processes and operations, and the laminar air flow "approach" for each, plus descriptions of available devices for accomplishing these various purposes.

03122422

PHYSICAL ASPECTS OF THE ENVIRONMENT

- 192 Long-Term Study Relating Temporary and Permanent Hearing Loss. J. Sataloff, et al. Arch. Environmental Health 13, 637-640 (Nov. 1966).

In 1961 a longitudinal study in a large paper plant was initiated in an attempt to answer certain questions concerning the effect of industrial noise on temporary threshold (TT) and on permanent threshold (PT). The authors were especially interested in determining whether permanent threshold shift due to noise could occur in the absence of temporary threshold shift measured within ten minutes after exposure and whether ears exhibiting some amount of temporary threshold shift (TTS) in turn incurred more permanent damage than did ears exhibiting no TTS. There are nine references.

RADIOACTIVITY AND X-RADIATION

- 193 Chromosome Studies on Women Formerly Employed as Luminous-Dial Painters. J. T. Boyd, et al. Brit. Med. J. 1, 377-382 (Feb. 12, 1966).

Sixty-two former luminizers were found to have a radium body content ranging from not measurable to as high as 0.56 microcurie. A control population of 57 women was chosen within the age limits 35-64 years. Blood cultures were made, and the chromosome abnormalities in lymphocytes counted. It was found that the incidence of abnormal chromosomes was higher in the luminizer group, and that there was a consistent gradient when a grouping by body content of radium was made. The control group was older than the luminizer group. Consequently, the difference may actually be larger, since an increase in abnormal forms with age has been reported.

-- J. Occ. Med. Absts.

- 194 Effects of Radiation on Learning Ability. J. H. Schulte and J. W. Schulte. Arch. Environmental Health 13, 662-663 (Nov. 1966).

In the past 20 years, the total production of radioisotopes in the United States has increased from less than 100 curies to more than two million curies. During the same period of time, the number of industrial plants using radioactive sources expanded from less than 100 to more than 7500. There are also more than 500 nuclear power reactors which have been constructed during this brief time and there are more than half a million people who are engaged in some form of employment which involves exposure to ionizing radiation. Soviet scientists have extensively studied the effects of radiation on cortical functions as they relate to conditioned reflexes, behavioral reactions, and electrophysiological responses. The purpose of this study was to determine whether or not alterations in the functions of some of the higher learning centers in the central nervous system could be demonstrated in animals exposed to sublethal doses of ionizing radiation. There are five references.

- 195 The Standard Man in Relation to Internal Radiation Dose Concepts. W. S. Snyder. Am. Ind. Hyg. Assn. J. 27, 539-545 (Nov.-Dec. 1966).

The extension of the Standard Man concept, insofar as radiation protection is concerned, is considered to provide a basis for estimation of dose when exposure of a population is in question. Discussion is organized around three main considerations: (1) data of a physical and chemical nature concerning the principal organs and tissues; (2) data of metabolic nature concerning bodily intake and excretions; and (3) ranges of individual variation that are not uncommon and means of allowing for these differences. There are 12 references.

-- Author's abstr.

- 196 Detection of Effects of Ionizing Radiation by Population Studies. G. Hems. Brit. Med. J. 1, 393-396 (Feb. 12, 1966).

By interpolation, one would expect any effects of the low population radiation doses produced by occupational exposure or variation in natural background to be of very low incidence. For statistical significance, then, large populations would be necessary to draw meaningful conclusions concerning this association. Calculation shows that the minimum population size of tens of thousands of man-years would be necessary to detect radiation-induced leukemia, and even more man-generations for the detection of radiation-induced dominant mutations. It appears unlikely that populations of sufficient size with sufficient exposure will be found. Additional problems would attend the selecting of a suitable control population.

-- J. Occ. Med. Absts.

- 197 The Evaluation of Risks From Radiation. R.S. Russell.
Health Physics 12, 239 (Feb. 1966).

The imprecision of assessing risks from radiation permits only a definition of the range or "orders of risk" within which effects they may lie. For the somatic effects quantitative estimates of risk have been attempted only for the induction of cancer. "There is no clear evidence, from the human studies, that radiation in small doses will give rise to appreciable 'non-specific life shortening' or to other serious consequences to the exposed individual other than cancer." Radiation-induced leukemia will appear in about 20 persons per million during a period of 10 to 20 years after exposure to 1 rad. The total yield of all other fatal malignancies appears to be comparable to that of leukemia. Thyroid carcinoma appears to have a comparable incidence which is described as a fifth order risk (1×10^{-5} — 10×10^{-5} probability). The only comprehensive parameter available currently to assess the effects of radiation on future generations is "genetic death." The exposure of a parental generation of 1 million persons to 1 rad may cause approximately 2,000 genetic deaths during the next ten generations; this "fourth order of risk" corresponds to 0.1% of the natural incidence. A number of reasons are suggested why estimates of genetic death may represent the possible upper limit of the total genetic injury. The average annual occupational exposure of 0.5 rad per year represents a fifth order risk as compared to a fourth order risk of deaths due to other occupational injury, i.e., 100-200 deaths per million male workers in all occupations in England and Wales.

-- J. Occ. Med. Absts.

- 198 Radiobiologic Aspects of the Supersonic Transport. A.C. Upton.
Health Physics 12, 209 (Feb. 1966).

The supersonic transport (SST) will fly at altitudes of 60,000-80,000 ft. At this upper altitude, the galactic cosmic radiation is estimated not to exceed 1-2 mREM/hr. Solar flare radiations, produced intermittently in outbursts associated with sunspots, may be expected to contribute on the average only a small fraction of the total exposure to occupants of the SST. On rare occasions, perhaps once or twice during an 11-year period, a major flare may deliver peak dose rates of as much as 1-10 REM/hr. at 80,000 ft. on polar flights with 0.5-5 REM or more in the first hour and decreasing amounts during the succeeding 12-48 hr. A warning system is necessary to direct the SST to descend to a lower altitude if necessary. If major solar flares are avoided, the cumulative exposures to the crew and passengers should be within permissible limits.

-- J. Occ. Med. Absts.

ENVIRONMENTAL MEASUREMENTS

- 199 The Evaluation of Efficiency and Variability of Sampling for Atmospheric Nitrogen Dioxide.
F.L. Meadows and W.W. Stalker. Am. Ind. Hyg. Assn. J. 27, 559-566 (Nov.-Dec. 1966).

A study of the efficiency and variability of the sampling system used to collect nitrogen dioxide in the Alabama Air Pollution and Respiratory Disease Study is described. Experimental sampling was conducted with single and multiple bubblers in series, equipped in each case with either fritted-tip or restricted opening air dispersers. Comparative evaluations of 0.4 to 0.5 lpm and 0.2 to 0.3 lpm air-flow rates indicated that higher collection efficiency, but greater variability, can be expected with lower air-flow rates. Fritted-tip bubblers were found to be more efficient, but restricted-opening bubblers are preferable because their variability is about half that of the fritted-tip bubblers. Sampling variability apparently was not affected by ambient air temperatures, humidity, or the concentration of collecting solution used. Collection efficiency, variability, and the method of empirically determining these factors should be specified when reporting ambient atmospheric nitrogen dioxide. There are 13 references.

-- Authors' abst.

PREVENTIVE ENGINEERING

- 200 Practical Designs for Noise Barriers Based on Lead. B. Fader.
Am. Ind. Hyg. Assn. J. 27, 520-525 (Nov.-Dec. 1966).

Acoustical theory predicts that sheet lead and soft plastic materials loaded with finely divided lead should be excellent sound barriers. Seven case histories are given to show how this "limp mass" has been applied in practical problems.

-- Author's abst.

03122424

COMMUNITY AIR HYGIENE

- 201 Animal Exposure Chambers in Air Pollution Studies. R.G. Hinners, J.K. Burkart, and G.L. Contner. Arch. Environmental Health 13, 609-615 (Nov. 1966).

The main objectives in the design and construction of an animal inhalation facility are performance and ease of operation. Any design features, however, that would result in poor performance should be eliminated regardless of contribution to ease of operation and maintenance. The following requirements were considered mandatory in the design and installation of the animal exposure facility described in this report: (1) a source of clean filtered air supply; (2) a constant flow of air; (3) controls to vary air flow over a suitable range; (4) instruments for accurately metering air flow; (5) apparatus for injecting an aerosol or gaseous contaminant into the input air stream; (6) uniform distribution of the input air stream throughout the exposure zone; (7) an air supply cooling system to maintain a constant exposure chamber temperature, despite the animal heat load and variations in ambient temperature; (8) signal devices to indicate failure of operating equipment; (9) provision for exhausting air from the chambers; (10) maintenance of a slight negative pressure to prevent outward leakage from the exposure units; (11) a means of conveniently cleaning the exposure chambers; (12) facilities for taking representative samples of the exposure chamber atmosphere; (13) appropriate sampling ports from which any part of the exposure chamber may be probed; (14) ease of access to exposure chamber interior, (15) suitable observation windows; and (16) automatic control and recording of exposure chamber variables, such as temperature, humidity, and contaminant concentration. The preceding conditions were all incorporated into the current long-term study. Seven references are given.

-- Authors' summary

- 202 Bacterial Air Pollution From Activated Sludge Units. C.W. Randall and J.O. Ledbetter. Am. Ind. Hyg. Assn. J. 27, 506-519 (Nov.-Dec. 1966).

Large numbers of potentially pathogenic bacteria were collected from the air surrounding activated sludge units, and many persisted for a considerable time and distance. Significantly, the airborne enteric pathogens were greatly outnumbered by bacteria of proved pathogenicity in the respiratory tract. Klebsiella pneumoniae was the pathogen isolated most frequently, and several studies concerning the spread, longevity, and factors of pathogenicity of this organism were conducted. The potential health hazard of the emitted respiratory pathogens was considerably increased by the fact that a large percentage of the aerosol particles transporting viable bacteria were of a size permitting lung penetration. There are 31 references.

-- Authors' abst.

- 203 Effects of Environment Upon Respiratory Function. II. Daily Studies in Patients with Chronic Obstructive Lung Disease. W.S. Spicer, Jr., W.A. Reinke, and H.D. Kerr. Arch. Environmental Health 13, 753-762 (Dec. 1966).

The effects of selected meteorologic changes and air pollutants upon the mean daily values of ten respiratory function tests obtained from small groups of patients with chronic bronchitis or bronchial asthma has been assessed for two seven-week study periods. A logical biostatistical approach, which places chief reliance upon the multiple regression technique, has been used to sort out major effects from a mass of data. The most important environmental-physiologic relationships appeared to be those associated with temperature, wind speed, barometric pressure, and sulfur dioxide levels. Two distinct patterns of physiologic response were found. In the final analyses, total lung capacity (TLC) and residual volume (RV) were used to exemplify the volume group and airway resistance at functional residual capacity and percentage of the forced vital capacity exhaled in three seconds (FEV_{3.0%}) the "resistance" group. Airway resistance and TLC increased as temperature decreased. Airway resistance increased and FEV_{3.0%} fell in both patient groups and RV increased in patients with asthma either 14 or 38 hours (or both) following a rise in sulfur dioxide in the second study where the range of sulfur dioxide levels was greater than in the first study. Airway resistance increased and FEV_{3.0%} decreased 24 hours after a fall in barometric pressure while TLC and RV rose in patients with chronic bronchitis 14 hours after a drop in wind speed. Particular care has been taken to point out that a direct cause and effect relationship cannot be implied from these significant findings. There are 12 references.

-- Authors' summary

- 204 Air Pollution and Asthma in Yokkaichi. K. Yoshida, H. Oshima, and M. Imai. Arch. Environmental Health 13, 763-768 (Dec. 1966).

In Yokkaichi (in the central part of Japan along the Pacific coast) where electric power stations, oil refineries, and petrochemical plants exist, growing numbers of bronchial asthma patients have been observed since the plants were put in operation. At Isozu district, where air pollution is the most severe, the prevalence of bronchial asthma involved 2.3% of the total population and

7.1% of inhabitants over 40. Studies covering the whole of Yokkaichi reveal that the average value of sulfur dioxide by the lead-peroxide method in 13 districts was directly proportional to the prevalence of bronchial asthma. The results of skin tests (house dust) showed positive reactions for only 6.4% of the asthmatic patients in contrast to classical asthma, in which positivity is 50%-90% in Japan. These results suggest that Yokkaichi asthma differs from classical asthma. As for chronic bronchitis, increasing numbers of cases were found by mass screening techniques in polluted districts. There were two to six times as many as in nonpolluted districts. Judging by $FEV_{1,0}$, the number of cases of obstructive impairment among the inhabitants was also increased two to six times. There are six references. -- Authors' summary

- 205 Status of Committee Work on Air Pollution Control Equipment. K. J. Caplan.
Am. Ind. Hyg. Assn. J. 27, 567-570 (Nov.-Dec. 1966).

A number of professional societies and trade groups are highly interested in various aspects of the application, performance, and testing of air pollution control equipment. An AIHA manual on the subject is nearing publication. As a matter of current interest, and perhaps leading toward better coordination of effort, all such organizations and committees having a probable interest in this field have been contacted. Their activities are reported, with some detail as to scope and status of highly active groups. An analysis is presented of overlap in individual committee membership. Especially bothersome roadblocks to progress are discussed.

MANAGEMENT ASPECTS

- 206 Making Off-the-Job Safety Pay—With Interest. M. J. Caserio.
J. Occ. Med. 8, 589-592 (Nov. 1966).

The problem of off-the-job safety is a great responsibility and challenge, a matter which should be of great personal concern to all. The industrial physician can help to make the homes and communities of the employees whom they serve better and safer places in which to live. Not only are in-plant programs needed, but community-wide and individual efforts as well. The contributions which the industrial physician can make will produce valuable dividends—life instead of death, health instead of injury, and happiness instead of misery. Off-the-job safety can pay—
-- Author's conclusion

ACCIDENTS AND PREVENTION

- 207 Barehand Live Line Working on High Voltage. A. C. Chapman.
Elec. Eng. 42, 18-19, 21, 23, 25, 27 (Nov. 1965).

Problems in barehand live line working are discussed, including insulation requirements of a suitable platform, the availability and type of suitable equipment, operating controls, safety precautions, hydraulic rams, training of aerial work platform operators and electrical testing of mobile work platforms; also types of jobs which can be carried out barehand. There are 15 references.
-- J. Am. Soc. Safety Eng. Absts.

MISCELLANEOUS

- 208 Environmental Hazards. Urban Solid-Waste Management. M. W. First.
New Engl. J. Med. 275, 1478-1485 (Dec. 29, 1966).

Solid wastes, often called refuse, include a wide variety of discarded, and generally useless, materials, resulting from normal community activities. Garbage and rubbish from households, institutions and commercial establishments comprise the largest fraction of municipal waste collections, but bulky objects, such as stoves and refrigerators and, especially, abandoned automobiles, represent more difficult municipal collection and disposal problems. Industrial refuse from factories, power plants and food-processing plants may contain waste materials not usually found in municipal collections, but more often the difference is quantitative rather than qualitative since industrial processes, by their very nature, generate large amounts of one, or a few, kinds of waste products. By contrast, ordinary municipal collections tend to be extremely diverse. An urgent need for better methods of solid-waste management in all sectors of the economy, combined with the powerful stimulus provided by Solid Waste Act funds, is opening up a period of active development and experimentation in solid-waste technology that will result in the rapid introduction of the modern systems now needed. The need will be even more urgent by the end of the century. A most hopeful sign is the current interest among universities and research institutions in tackling solid-waste problems as an interdisciplinary study involving the special skills of urban planners, sociologists and economists, with those of sanitary engineers, public-health administrators and public-works specialists.

INDEX

<u>Acne vulgaris, office management</u>	147	<u>Chromium</u>	
<u>Aerosol(s), deposition of unipolar particles in the lungs</u>	178	determination by atomic absorption	163
<u>Air pollution</u>		<u>Civil defense: planning for survival and recovery (bk. rev.)</u>	112
and asthma	204	<u>Cobalt</u>	
bacterial, from activated sludge	202	determination in air and biological material	161
control, committee work on equipment	205	<u>Computer analysis</u>	
effects on respiratory function	203	study of brain potentials	138
measurement(s)			
animal exposure chambers	201	<u>Dermatitis, dermatosis(es)</u>	
<u>Aldrin, toxicity</u>	170	acne vulgaris, management	147
<u>Angina pectoris, urban factor</u>	134	chromate sensitivity	150
<u>Animal exposure chambers</u>		from lanolin	146
in air pollution studies	201	talc granulomas	145
<u>Asbestos</u>		<u>Detergents, toxicity of alkyl benzene sulfonate</u>	175
malignancies in workers	184, 185	<u>Dieldrin</u>	
occupational hazards of pipe insulators	183	concentrations in human blood and fat	171
rheumatoid factor in individuals	182	toxicity	170
<u>Asthma, and air pollution</u>	204	<u>DMDT (metoxychlor) toxicity</u>	172
<u>Aviation</u>		<u>Dust(s)</u>	
radiobiological aspects of supersonic transport	198	deposition of unipolar particles in the lungs	178
		Iron-59 oxide fate of inhaled in rats	187
<u>Beryllium</u>		<u>Dust counting, determination</u>	
limits of detection in tissues	159	variability in counting	188
<u>Biology, environmental (bk. rev.)</u>	111		
<u>Books</u>		<u>Electrical workers</u>	
Civil Defense: Planning for Survival and Recovery	112	barehand live wire working	207
Cleanliness meter and its application to solvent cleaning	115	<u>Electrotypers</u>	
Environmental biology	111	pneumoconiosis from graphite	177
fire protection guide on hazardous materials	117	<u>Emphysema</u>	
Microbiological studies in laminar down-flow clean room	114	pulmonary	
programmed cleaning and sanitation	113	acute experimental in piglets	144
<u>Brain potentials</u>		effect of posture on respiratory function	143
studied by computer analysis	138	influence of respiration on venous return	142
<u>Burns, role of hydrational status</u>	148	<u>Engineering students</u>	
		personality and cognitive characteristics	123
<u>Cadmium, hypertension in rats</u>	160	<u>Environmental biology (bk. rev.)</u>	111
<u>Calcium disodium</u>		<u>Euglobulin, estimation</u>	152
nephrosis in rats		<u>Eye</u>	
edetate	154	fiberglass conjunctivitis and keratitis	181
versenate	154	irritation response	153
<u>Cancer</u>		<u>Ferrous sulfate intoxication</u>	
lung, in New South Wales	141	treatment by chelation	162
of bladder from smoking	139	<u>Fiberglass conjunctivitis and keratitis</u>	181
skin, macroscopic appearance of malignant melanoma	149	<u>Fire protection guide on hazardous materials (bk. rev.)</u>	117
<u>Carcinogenesis</u>		<u>Furniture polish, pneumonitis in rats</u>	168
estimation of euglobulin	152		
<u>Carcinogens</u>		<u>Gadolinium oxide, toxicity for mice</u>	164
in cracked petroleum residuum	151	<u>Gamma globulin, passive immunization</u>	131
<u>Chemicals</u>		<u>Graphite</u>	
behavioral implications of exposure to	125	pneumoconiosis of electrotypers	177
<u>Cholinesterase</u>			
blood activity determination	174	<u>Health</u>	
<u>Chromate(s)</u>		economic estimates of job disruption	121
intradermal versus patch testing	150	examinations, developments and practices	120
<u>Chromatography</u>		<u>Hearing loss, long-term study</u>	192
estimation of euglobulin	152		

MWB-0020083

<u>Heart</u>		<u>Operating rooms, ultra-clean</u>	189
disease		<u>Ophthalmology</u>	
absentee rates and		eye irritation response	153
parental histories	136	fiberglass conjunctivitis and keratitis	181
serum lipids	135		
urban factor and angina pectoris	134	<u>Petroleum</u>	
rate		carcinogens in cracked residuum	151
indices as substitutes for respiratory		<u>Pipe insulators, occupational hazards</u>	183
calorimetry	126	<u>Pleural calcification</u>	
<u>Human engineering</u>		as sign of silicatosi	186
indices of heart rate for respiratory		<u>Pneumoconiosis</u>	
calorimetry	126	electrotypers from graphite	177
<u>Immunization, with gamma globulin</u>	131	<u>Pneumonitis, from hydrocarbons in rats</u>	168
<u>Industrial medicine</u>		<u>Poisoning of industrial origin</u>	155
closed-circuit television	119	<u>Poland</u>	
<u>Influenza</u>		cancer of bladder from smoking	139
responses of elderly persons to vaccines	130	<u>Psychiatry</u>	
<u>Insecticides</u>		behavioral implications of exposure to	
concentrations in human blood and rat	171	industrial chemicals	125
degradation of human and rat liver	173	personality characteristics of engin-	
determination in blood cholinestrase		eering students	123
activity	174	psychiatric patient at work	124
toxicity		suicide and weather	122
of aldrin and dieldrin	170	<u>Psychology</u>	
methoxychlor	172	economic estimates of job disruption	121
<u>Iron-59 oxide</u>		<u>Pulmonary</u>	
deposition and fate of inhaled in rats	187	edema, metabolism of phospholipids	132
<u>Iron intoxication</u>		main functions of circulation	132
treatment by chelation	162	<u>Radiation (ionizing, nuclear, x-rays, etc.)</u>	
<u>Israel, teaching occupational health</u>	118	civil defense: planning for survival and	
		recovery (bk. rev.)	112
		effect(s)	
<u>Jewelry molding process</u>		detection of	196
mercury poisoning	166	on	
		learning ability	194
<u>Kerosene, pneumonitis in rats</u>	168	supersonic transport	198
<u>Kidneys, prevention of urolithiasis</u>	137	evaluation of risks	197
		standard man in internal radiation dose	
<u>Lanolin dermatitis</u>	146	concepts	195
<u>Lead</u>		<u>Radium dial painters</u>	
as noise barrier	200	chromosome studies in women	193
determination by atomic absorption	163	<u>Rare earth(s)</u>	
<u>Lead tetraethyl</u>		toxicity of gadolinium oxide for mice	164
intoxication in the rat	165	<u>Respiratory, cytodynamics of cells in</u>	
<u>Lung(s)</u>		respiratory tract	128
functions of pulmonary circulation	132	<u>Rubber</u>	
<u>Mercury poisoning</u>		identification in roadway dust	179
in jewelry molding process	166	<u>Safety</u>	
<u>Methoxychlor (DMDT) toxicity</u>	172	barehand live wire working	207
<u>Methyl bromide</u>		off-the-job, making it pay	206
hazards during fumigations	167	<u>Sanitation, maintenance in building</u>	113
<u>Mineral seal oil, pneumonitis in rats</u>	168	<u>Silicatosi, pleural calcification as sign</u>	186
<u>Molybdenum</u>		<u>Smoking</u>	
determination by atomic absorption	163	cancer of urinary bladder	139
<u>Nephrosis in rats</u>		respiratory infections in nurses	140
calcium disodium versenate	154	<u>Sodium dodecylbenzene sulfonate</u>	
<u>New South Wales, lung cancer</u>	141	subacute oral toxicity	175
<u>Nitrogen dioxide</u>		<u>Sodium in drinking water</u>	158
evaluation of efficiency of sampling		<u>Solvent cleaning, application of cleanli-</u>	
for atmospheric	199	ness meter (bk. rev.)	115
<u>Noise control and reduction</u>		<u>Suicide and weather</u>	122
lead as noise barrier	200	<u>Talc, granulomas of the skin</u>	145
<u>Occupational health, teaching in Israel</u>	118	<u>Television</u>	
		closed-circuit for industrial medicine	119
		<u>Tellurium</u>	
		determination in biologic materials	157

IN RE: ABRAMS November 1992

MWBB-0020084

<u>Thesaurosis</u>	
pulmonary function studies in beauticians	180
<u>Threshold limit values</u>	
discussion of the interpretation	176
<u>Toluene</u>	
encephalopathy from inhalation	169
<u>Toxicity testing</u>	
reproducibility of single oral dose	156
<u>Toxicology</u>	
poisoning of industrial origin	155
<u>Trace elements</u>	
determination of lead, chromium, and molybdenum	163
<u>Trauma, hand and arm injuries</u>	127
<u>Tuberculin screening</u>	
low-cost for large populations	129
<u>Urban solid-waste management</u>	208
<u>Urolithiasis, prevention</u>	137
<u>Waste disposal</u>	
bacterial air pollution from activated sludge units	202
urban solid-waste management	208
<u>White rooms</u>	
adaptability of laminar air flow	191
applying "down-flow" to dust control	190
cleanliness meter and its application to solvent cleaning (bk. rev.)	115
microbiological studies in laminar down-flow clean room (bk. rev.)	114
ultra-clean operating rooms	189
work station requirements, Fed. Std. No. 209a (bk. rev.)	116
<u>Yokkaichi, air pollution and asthma in</u>	204

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