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# *Industrial Hygiene Digest*

INDUSTRIAL HEALTH NEWS

LITERATURE ABSTRACTS

MEDICAL

ENGINEERING

CHEMICAL

TOXICOLOGICAL

LEGAL

MAY, 1966  
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INDUSTRIAL HYGIENE FOUNDATION

MELLON INSTITUTE

4400 FIFTH AVENUE - PITTSBURGH, PA. 15213

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NOVEMBER 1982

IN RE: AIR/AMIS

## INDUSTRIAL HYGIENE FEATURES

Abst. No. 438 surveys the behavioral aspects of safety.

Procedures and criteria for the examination and selection of personnel for work in underwater environment are presented in Abst. No. 439.

Abst. No. 441 discusses the concept of susceptibility to hearing loss.

Information on respiratory disorders in U.S. East Coast telephone men is given in Abst. No. 443.

The prognosis of patients with epilepsy is discussed in Abst. 447.

Abst. No. 448 reviews lung cancer and environment, a study of long-term exposure to motor fumes in tunnels.

Tick paralysis is investigated in Abst. No. 449.

Abst. No. 451 discusses a program for the prevention of tetanus.

Some food-borne bacterial toxins are described in Abst. No. 457.

Information on problems related to the use of food additives in the U.S. are discussed in Abst. No. 460.

Abst. No. 466 is concerned with vitamins in the treatment of chronic benzene poisoning.

Abst. No. 471 reports on three cases of mesothelioma associated with asbestosis.

Consult Abst. No. 485 for data concerning the assessment of industrial heat stress.

Abst. No. 486 examines the water requirements of humans.

Details on a more rational basis for air sampling programs are presented in Abst. No. 495.

A method for the determination of phosphine in air is given in Abst. No. 499.

Abst. No. 522 discusses sudden illness as a cause of motor vehicle accidents.

## FOUNDATION FACTS

NEW MEMBERS. The Foundation is happy to announce election of Eastman Kodak Company, and the reaffiliation of Metropolitan Life Insurance Company to membership.

ASSISTANCE TO FOUNDATION MEMBERS. Occupational medical and industrial hygiene studies have been carried out in support of several Foundation member companies. A number of toxicological studies have also been performed in the Foundation's laboratory and where merited, results are under consideration for publication.

### AWARDS TO FOUNDATION TRUSTEES.

Professor Theodore F. Hatch, Industrial Hygiene Foundation Treasurer, was presented the Adolph G. Kammer Merit in Authorship Award by the Industrial Medical Association on April 27. His paper "Broadened Objectives of Occupational Health in an Age of Chronic Diseases" published in the April 1965 issue of the Journal of Occupational Medicine was judged best publication in the field for the year September 1, 1964 to August 31, 1965. At the same time, honorary membership in the Industrial Medical Association was bestowed on Professor Hatch, making him the second person ever to be so recognized. Such membership is conferred upon individuals not members or Fellows of the Association who have contributed distinguished service to the objectives for which the Association stands.

Dr. Robert B. O'Connor, a Trustee of the Industrial Hygiene Foundation, was accorded the highest honor in the field of industrial medicine on April 27. The Industrial Medical Association conferred upon him the Knudsen Award which annually recognizes a physician who has attained distinction in the field of occupational medicine and hygiene.

ANNUAL MEETING PROGRAM. Finishing touches are being added to the tentative program for the Foundation's 31st Annual Meeting, which was approved by the Board of Trustees on May 10. The program will appear in the June issue of Industrial Hygiene Digest.

TRANSACTIONS of the 30th Annual Meeting of Industrial Hygiene Foundation, held in Pittsburgh last October and published in the April 1966 issue of the Archives of Environmental Health, have been mailed to members.

31st ANNUAL MEETING  
OCTOBER 18-19, 1966

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MMDB-0019876

IN RE: ABRAMS November 1966

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## EDITORIAL

DEATHS DUE TO CADMIUM OXIDE FUMES  
FROM SILVER SOLDER REPORTED

Acute illness with pulmonary inflammation and death from exposure to cadmium oxide fumes have been described repeatedly in the literature. Aristotle's observations were recorded in the fourth century B.C., but the history of occupational exposure to cadmium extends back more than 4,000 years into the antiquity of the bronze age. The toxicity of freshly generated cadmium fumes is so great that they are reported to have received consideration as a chemical warfare agent.

An Industrial Hygiene Digest abstract, 24:6 on p.13, June 1960 by G.H. Vance was entitled, "Cadmium Exposures in Silver Soldering Operations." It will thus come as no surprise to Digest readers that cadmium fumes from silver soldering may cause illness and death.

The California State Department of Public Health's Bureau of Occupational Health has just notified the Industrial Hygiene Foundation, in an unpublished report, of two such deaths (both substantiated by pathological investigation) and of the probable existence of other nonfatal cases. This notification of a death in California and another in Utah was confirmed by a press release from the Division of Occupational Health, U.S. Public Health Service, on March 1, 1966.

Symptoms of severe, acute poisoning from cadmium have been described as being almost identical to those which characterized metal fume fever generally, except that in the case of cadmium poisoning, there is usually chest pain, as well, within 24-36 hours; cough and dyspnea also occur within 20-30 hours. Physical examination of the chest is of little assistance in early diagnosis or prognostication, but chest X-rays may show scattered patchy infiltration of the lungs.

Because presence of cadmium in material being welded or soldered is often unknown, a high index of clinical suspicion is required to identify illness and death from cadmium fumes.

Of 20 deaths from acute cadmium poisoning which have been reported officially in the United States since 1900, only three have appeared in the medical literature since 1956. The report of two new deaths in 1966 suggests that use of brazing with silver alloy containing cadmium without adequate industrial hygiene controls may be increasing or that illnesses and deaths due to the alloy have previously been unrecognized. The first known incident involving this particular alloy was a nonfatal case reported in 1958. The State of California has taken steps to ensure proper labeling and education of workmen, particularly welders, on the extreme hazard involved and how to control it. Similar efforts are reportedly being made in several of the states, and the Division of Occupational Health, U.S. Public Health Service, Washington, D.C. is currently engaged in considering how best to implement recommendations in the Frye Report, "Protecting the Health of Eighty Million Americans. A National Goal for Occupational Health", concerning control of potential hazards to the public as a result of expanding utilization of industrial technology in home workshops, where there is no knowledge of industrial hygiene controls and complete reliance on product information supplied by the manufacturer. Interested parties may wish to contact Dr. Murray C. Brown, Chief, Division of Occupational Health, U.S. Public Health Service, Washington, D.C., for further information and guidance.

NOTE: A critical review of the literature on "Acute Occupational Cadmium Poisoning" now being prepared may be available soon to Foundation members upon request.

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INDUSTRIAL HYGIENE DIGEST  
Literature and News

NEWS ITEMS

419 Occupational Disease Claim for MDI.

A study was made of the first occupational disease claim for MDI (diphenyl methane diisocyanate or methylene bis 4-diphenylisocyanate) induced respiratory sensitivity in Pennsylvania. A sales demonstrator for a safety company sprayed the diisocyanate rigid polyurethane foam in mines and closed buildings over a four-year span throughout Pennsylvania and adjacent states. He was hospitalized four times over the past two years for progressive respiratory distress comparable to reported TDI asthma-like attacks. Personal negligence and "normal" respirator slipping on his face accounted for his initial exposure and present condition. Since his last symptomatic exposure late last year, he still suffers with shortness of breath on exertion. He is under his personal physician's care. His chest X-ray revealed pulmonary fibrosis. Treatment consists of intramuscular ACTH, bronchial expectorants, oral and intermittently inhaled bronchodilators with use of positive pressure breathing apparatus. The severity of his condition illustrates the peculiar respiratory sensitization of MDI comparable to the substantial number of TDI cases previously investigated. This salesman definitely is aware of the necessity for no further isocyanate exposure. -- Occ. Health News & Views, Pa. Dept. of Health, Div. Occ. Health, 4, No. 2, 3 (Spring 1966)

420 Manganese Study—A Summary.

In a study of manganese hazard in industry made by the Division of Occupational Health of the Pennsylvania Department of Health, urine manganese has been assayed on 83 exposed employees. Of these, 45 had high values. Of 62 manganese-steel industry workers, 35 had high values. Of 16 brick-industry workers, seven had high values. Of five dry-cell battery workers, three had high values. Sixty-three employees were examined for extra-pyramidal neurological signs, which occur in serious manganism. Thirty-six had some findings compatible with some degree of early manganism. Twenty-nine of 46 manganese-steel industry workers, one of five dry-cell battery workers, and five of 12 brick-industry workers had positive findings. There was a definite correlation of manganese air concentrations, urine manganese concentrations, and positive neurological findings. A more elaborate study probably would show even closer correlation. It is believed that a number of instances of significant manganese exposure have been found in this study. A continuous program of control and monitoring of the manganese hazard in Pennsylvania has been established. -- Occ. Health News & Views, Pa. Dept. of Health, Div. Occ. Health, 4, No. 2, 2 (Spring 1966)

421 Benzene in the Printing Industry.

In a recent series of inspections in the printing industry, it was discovered that about 30% of Pennsylvania plants inspected were still using a type wash containing benzene. There appeared to be no correlation between the size of the plant and the use of benzene; it was present in both small and large plants. One interesting contradiction was noted. Personnel of plants using benzene were sure that no other solvent could clean satisfactorily, while personnel of plants not using benzene stated that it is too strong, and tended to ruin the rollers. Most of the benzene users were not initially aware of its hazards, and have since attempted, usually with success, to find a satisfactory less toxic substitute. -- Occ. Health News & Views, Pa. Dept. of Health, Div. Occ. Health, 4, No. 2, 5 (Spring 1966)

422 Test Could Affect Many Occupations.

Workers in more than 50 types of occupations who are exposed daily to carbon disulfide may be aided by a new pretoxicosis test, according to the U.S. Public Health Service. These persons include those producing or working with pesticides, dry cleaning substances, paint, paint removers, rayon, rocket fuel, vacuum tubes, wax, optical glass, lacquer, iodine, glue, cellophane, explosives, cement, rubber, certain textiles, and various preservatives.

-- J. Am. Med. Assn. 195, 39 (March 28, 1966)

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423 Lead Toxicity and Virus.

Histologic studies of renal tumors induced in rats by ingestion of large amounts of lead acetate fail to support the theory that lead toxicity may activate an oncogenic virus, Peter Mao, M.D., and John Molnar, M.D., Albert Einstein College of Medicine, New York, report. "We are unable to demonstrate any virus or virus-like particles in the tumors," Dr. Mao told the American Association of Pathologists and Bacteriologists in Cleveland. "It is possible, however, that the lead compound itself, in high doses, acts as a carcinogen by inhibiting or interfering with the normal synthetic or regulatory mechanism in the cell."

-- J. Am. Med. Assn. 195, 35 (March 28, 1966)

424 Leaded Gasoline.

From a health point of view, lead needn't be eliminated from gasoline, according to Dr. Joseph C. Calandra, president of Industrial Bio-Test Laboratories. Emissions of lead from auto exhausts aren't creating a public health hazard. In fact, lead concentrations in the air from all sources are low—far below levels known to be safe for industrial workers, Dr. Calandra told the Lead Industries Association, meeting in St. Louis. Levels of lead in the air have been found to be very much lower than those considered safe for an occupational exposure of eight hours per day for a working lifetime. Dr. Calandra urges proper professional recognition of the large body of scientific data on lead toxicology until the completion of industry/government research programs that are gathering additional information on lead exposure.

-- Chem. Eng. News 44, 37 (April 11, 1966)

425 Health Physics Society.

The Eleventh Annual meeting of the Health Physics Society will be held June 27-30, 1966, at the Shamrock-Hilton Hotel in Houston, Texas. For information regarding the meeting write to O. L. Pirtle, Jr., Hastings Radiochemical Works, P.O. Box 60448, A.N.S., Houston, Texas.

-- Am. Ind. Hyg. Assn. J. 27, A-4 (Jan.-Feb. 1966)

426 Hygienic Guide Series.

The following additional Hygienic Guide Series are now available: Ethyl Ether (Ether, Diethyl Ether, Ethoxyethane, Diethyl Oxide, Ethyl oxide), and Chloronaphthalenes. They are given in the January-February AIHA Journal pp. 85-91 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, 85-91 (Jan.-Feb. 1966)

|               |
|---------------|
| COMING EVENTS |
|---------------|

- |     |                |                                                                                                                                                 |
|-----|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| 427 | June 6-10      | Medical Library Association, Boston, Mass.                                                                                                      |
|     | June 7-10      | Nutrition Society of Canada, Annual Meeting in Conjunction with the Meeting of the Canadian Federation of Biological Societies, Vancouver, B.C. |
|     | June 8-10      | Manufacturing Chemists' Association, Annual Meeting, White Sulphur Springs, W. Va.                                                              |
|     | June 9-11      | 1st Conference on Biomedical Engineering Materials, New York, N. Y.                                                                             |
|     | June 13-15     | American Neurological Association, Washington, D. C.                                                                                            |
|     | June 13-15     | Institute of Nuclear Materials Management, 7th Annual Meeting, Columbus, Ohio                                                                   |
|     | June 13-17     | American Nurses' Association, San Francisco, Calif.                                                                                             |
|     | June 13-17     | Society for Applied Spectroscopy, 5th National Meeting, Chicago, Ill.                                                                           |
|     | June 16-18     | American Rheumatism Association, Denver, Colo.                                                                                                  |
|     | June 20-22     | American Proctologic Society, Cleveland, Ohio                                                                                                   |
|     | June 20-22     | Endocrine Society, Chicago, Ill.                                                                                                                |
|     | June 20-23     | American Nuclear Society, Annual Meeting, Denver, Colo.                                                                                         |
|     | June 20-24     | Air Pollution Control Association, 59th Annual Meeting, San Francisco, Calif.                                                                   |
|     | June 23-24     | American Geriatrics Society, Chicago, Ill.                                                                                                      |
|     | June 23-25     | Society of Nuclear Medicine, Philadelphia, Pa.                                                                                                  |
|     | June 23-27     | American College of Chest Physicians, Chicago, Ill.                                                                                             |
|     | June 25        | Society for Vascular Surgery, Chicago, Ill.                                                                                                     |
|     | June 25-26     | American Diabetes Association, Chicago, Ill.                                                                                                    |
|     | June 25-26     | Society for Surgery of the Alimentary Tract, Chicago, Ill.                                                                                      |
|     | June 26        | American College of Legal Medicine, Chicago, Ill.                                                                                               |
|     | June 26-28     | Society for Investigative Dermatology, Chicago, Ill.                                                                                            |
|     | June 26-30     | American Medical Association, Annual National Meeting, Chicago, Ill.                                                                            |
|     | June 27-29     | Association for Research in Ophthalmology, Chicago, Ill.                                                                                        |
|     | June 27-30     | Health Physics Society, 11th Annual Meeting, Houston, Texas                                                                                     |
|     | June 29-July 1 | Conference on Sulfur Chemistry, Princeton, N. J.                                                                                                |

## LEGAL DEVELOPMENTS

428 Act 335 Passed by Pennsylvania Legislature.

The Division of Occupational Health has been assigned new responsibilities as a result of the passage of Act 335 by the Pennsylvania Legislature during December 1965. This Act is an amendment to the Occupational Disease Act and its provisions eliminate the previously existing status of limitations in claims for anthraco-silicosis, silicosis, coal workers' pneumoconiosis, and asbestosis. Thus payments are made available to many persons who previously were not eligible for this benefit. To date over 15,000 applications have been received by the Department of Labor and Industry under provisions of the new Act. The Department of Health has been given the assignment of establishing and supervising procedures for handling the medical evaluation of these applicants. This activity is now conducted by the Division of Occupational Health and has included the establishment of a list of certified radiologists and positions for applicant X-ray and examination, the receipt and interpretation of their reports, and liaison with the Department of Labor and Industry, the Board of Workmen's Compensation, and the Division for Administration of Occupational Disease Funds of the Commonwealth. -- Occ. Health News & Views, Pa. Dept. of Health, Div. Occ. Health, 4, No. 2, 1 (Spring 1966)

429 New Medicare Rules.

The new Medicare rules clarify the status of clinical laboratories operated by chemists. The "Conditions for Coverage of Services of Independent Laboratories" is now being circulated to state agencies on an informational basis and will soon be published formally in the Federal Register. They state that the director of a clinical laboratory qualified to participate in the Medicare program may be a physician certified by an appropriate accrediting board. Or he may be a person "who holds an earned degree of Doctor of Science or Doctor of Philosophy from an accredited institution with a chemical, physical, or biological science as his major subject" and who has been certified by an acceptable accrediting board. The American Chemical Society had been concerned that the wording of the Medicare bill might exclude laboratories run by clinical chemists. ACS's Committee on Clinical Chemistry has largely been responsible for clarification of this problem. -- Chem. Eng. News 44, 21 (April 11, 1966)

## BOOKS, PAMPHLETS AND NOTICES

- 430 Dangerous Properties of Industrial Materials. Second Edition. N. Irving Sax. AVAILABLE FROM: Reinhold Publishing Corporation, 430 Park Avenue, New York, N.Y. 10022. 1343 pp. (September 15, 1963). PRICE: \$25.00 (pre-pub price \$22.50 until October 30, 1963).

The purpose of this work is to provide a single source for quick, up-to-date, concise, hazard-analysis information about more than 10,000 common industrial laboratory materials. This information is set forth in Section 12, General Chemicals. This section, which comprises the body of the book, is designed to expedite the retrieval of hazard information by categorizing the data into: (1) General information about substances listed, such as synonyms, description, formula, and the physical constants. (2) Hazard analyses, which include toxicological description, and which are further broken down into allergic and radiological hazards, and fire and explosion hazards. There is also included in the hazard analyses some idea of what hazard might be produced when quantities of these materials become involved in a disaster such as fire, explosion, or flood. (3) Countermeasures, or what may be done to mitigate the effects of using a given material, for instance, shipping regulations, storage and handling, first aid measures for exposed individuals, fire-fighting measures, ventilation controls, and personnel protection.

-- Cond. from Preface

NOTE: Despite attempts to make this volume "the all inclusive and final authority" it suffers in comparison with Patty, for example (Industrial Hygiene Digest 29:2, pp. 6, Feb. 1965) from lack of bibliographic references and will thus be of limited usefulness to industrial hygienists. It will be especially appealing to non-technical persons concerned with understanding and application of shipping regulations and in the storage and handling of hazardous materials. It provides an encyclopedia of industrial materials for those supervising health and safety of employees in industry. With the help of this volume, it should be possible for supervisors to better identify potential health and safety problems, an essential step in obtaining competent industrial health and safety assistance in their solution.

-- RTP deT

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- 431 Current Medical Terminology. Third Edition. American Medical Association. AVAILABLE FROM: AMA, Circulation and Records Dept., 535 N. Dearborn St., Chicago, Ill. 60610. 969 pp. (1966). PRICE: U.S., U.S. possessions, Canada, & Mexico \$4.00; all other countries, \$4.50. Medical students, interns, and resident physicians only (U.S., U.S. possessions, Canada, & Mexico) \$3.00.

Current Medical Terminology (CMT) is a system of reference for the selection of preferred medical terms including certain synonyms, and generic terms with built-in arrangements to provide maximum convenience in usage, currency, and timely publication. All preferred terms are supported by concise definitions. The audience of CMT includes practitioners of medicine and the specialties, educators, investigators in fundamental and clinical medicine, medical students, interns, nurses, medical record librarians, professional personnel involved in health supervision of sports, pharmacologists, laboratory technicians, medical officers and technicians of the Armed Forces, claims agents of insurance companies, government and private agencies, attorneys, and science writers. CMT also offers interesting possibilities for applications in "computer medicine," notably programmed teaching and diagnosis and the study of patterns of disease, their statistical relationships and occurrences. The system for standardization of medical data is presented as a step in resolving the conflicts and discrepancies of terminology which greatly impair the value of records for retrieval, analysis, and communication. The first two editions of CMT were widely used. However, as would be expected of a new and different type of book, certain limitations were discovered, chiefly omissions. These discrepancies have been carefully considered and corrected.

-- Cond. from Foreword

NOTE: This medical classification reference will be invaluable to hospital medical record librarians. It should also be useful to those interested in improved recording and reporting of morbidity and mortality information on industrial populations. Improved standards of job classification are also needed to aid evaluation of potential adverse effects of environment on human health. As pointed out by Smith in Lanza's "Pneumoconioses" (Industrial Hygiene Digest 27: 5 pp. 4, May 1963) in the chapter on Asbestosis: "unfortunately the term 'asbestos worker' very frequently is used to denote a member of the asbestos workers union, a group of people whose chief occupation is the application of insulating materials. Many years ago asbestos was the only insulating material commonly used. Today mineral wool, glass fiber, magnesia, and a host of other products are used in the insulation industry but the applicators still are called 'asbestos workers' because of their union affiliation. ... Perhaps with more accurate reporting the alleged association of inhalation of asbestos fiber and other intercurrent disease conditions would be clearer today. ... The true relationship will remain obscure until responsible reporters can evaluate the relationship between agent and disease and not just job title and disease." -- RTP de T

- 432 Ultraviolet Radiation. Hygienic Information Guide No. 84. Pennsylvania Department of Health, Division of Occupational Health. AVAILABLE FROM: Pa. Dept. of Health, Div. Occ. Health, Harrisburg, Pa. 2pp. (1966). PRICE: Not Given.

This leaflet discusses ultraviolet radiation under the following headings: Properties, Sources, Uses, Medical Aspects, Exposure Limits, and Exposure Control. It is suggested that personnel exposed to ultraviolet rays should be required to wear eye and face shields, gloves and protective clothing for prevention of exposure of the entire body. The density or shade of eye protection is dependent on the intensity of the ultraviolet source. The intensity of ultraviolet radiation from electric welding arcs increases as the amperage of the unit is increased. Ventilation should be supplied to maintain exposures to ozone and oxides of nitrogen generated by ultraviolet to less than threshold limit values. For germicidal irradiation, indirect lighting fixtures should be used and positioned so that only the upper air of the area is treated. Walls and ceilings should have surfaces that have low ultraviolet reflective factors.

#### INDUSTRIAL MEDICAL PRACTICE

- 433 The Status of Medical Education: A Medical Student's Viewpoint. E. R. Smith. Can. Med. Assn. J. 94, 729-734 (April 2, 1966).

This relatively short paper attempts to deal with a topic about which much has been said and written. What is education? If learning is indeed a personal thing, occurring as an interaction between the student and his environment, is it possible for one individual to teach another? What is the best way to teach medical students? Obviously neither the lecture seminar, laboratory or clinical setting offers the whole solution. Should medicine be taught as individual specialist subjects or should the pathophysiology, the pathology, signs, symptoms, investigation, medical and surgical treatment and prognosis be provided to the student by persons unbiased by their small field of endeavour? How best may the student be examined and evaluated to detect those changes in behaviour which are essential to the development of the good physician? If more physicians

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received both clinical and basic science training, they could more effectively teach basic science to medical students without attempting to make basic scientists out of them. Clinical departments with their innate rivalry would be abolished. If clinical entities were taught, rather than the departmental aspects of a disease, the student would get a much firmer grasp of the subject. C. A. R. Rogers\* after a lifetime of teaching said, "It seems to me that anything that can be taught to another is relatively inconsequential, and has little or no significant influence on behaviour."

\* On becoming a person: a therapist's view of psychotherapy. Houghton Mifflin Company, Boston, 1961, p. 276.

- 434 Airborne Bacterial Contamination. H. R. Bernard, et al. Arch. Surg. 91, 530 (1965).

Shower bathing increases the number of bacteria shed from the skin of both men and women. The increase is most pronounced between ten and 15 minutes after showering and usually ceases within one to two hours. This increase is not lessened by the use of hexachlorophene soap. Bacteria arising from the nasopharynx constitute a small fraction of the total shed into the environment. The increase in bacterial shedding caused by shower bathing may be abolished by the application of 70% ethyl alcohol or lanolin to the skin or by clothing the subject in a one-piece suit of tightly woven fabric. Higher concentrations of bacteria are found near the perineum and on the face. With exercise of the lower extremities, more bacteria are liberated. Human beings are the principal source of the bacteria found in well-cleaned and ventilated operating rooms. With the increasing number of operations, attention to the showering and clothing of personnel becomes more important because bacterial infection may cause catastrophic failure. -- Can. Med. Assn. J. Absts.

- 435 The Pre-employment Physical Examination. Recent Experience at Massachusetts Institute of Technology. M. H. Rodman. J. Occ. Med. 7, 608-611 (Dec. 1965).

The pre-employment health surveys conducted at the Massachusetts Institute of Technology in a recent two-year period were found to serve little purpose in young people, particularly in women under 30 years of age. These young women, among whom the turnover rate approximates 50% per year, were also found to use the clinic facilities infrequently. On the basis of these findings, the current practice does not include a pre-employment physical examination for women under 30 who are not to be employed in potentially hazardous occupations. Screening laboratory tests and a chest x-ray continue to be performed in all cases. After one year of employment, a physical examination is offered on a voluntary basis.

-- Author's summary

Editorial Comment: Under the caption "The Iconoclast" (page 639) a portion of the editorial comment in the J. Occ. Med. on the above paper reads as follows: "The results of his studies have led Rodman to discontinue pre-employment examinations of young women applicants, except for those applying for certain critical occupations. His conclusion applies specifically to his own situation, in which the crucial factor is a high rate of turnover. Extrapolating to a broader generalization could be hazardous. At all times J. Occ. Med. stands willing to publish concepts contrary to current beliefs provided such concepts are backed up by intelligence and presented with persuasiveness. J. Occ. Med. will welcome expressions of contrary opinions to keep the icon from being totally shattered."

- 436 Medical Aspects of Invalidity Retirement Programs in Europe. II. L. Price. J. Occ. Med. 7, 630-635 (Dec. 1965).

The medical aspects of government disability programs have their basis in principles common to Europe and the United States. However, methods and details of operation vary considerably in different programs both in this country and abroad. Physicians play a uniformly important role in Europe in disability operations, inasmuch as medical care is a government function related to the social insurance system. In the United Kingdom, medical care and social insurance are highly integrated into a single national system. Germany, the first country to institute health insurance on a national basis, has a profusion of fragmented programs in medical care and social health insurance, with limited controls.

-- Author's summary

- 437 Psychiatric and Psychological Problems in Commercial Aviation. C. Blanc, E. Lafontaine, and R. Laplane. Aerospace Med. 37, 70-73 (Jan. 1966).

The frequency of neurotic depressive reactions and other neuroses (65%) was a rather striking finding in the study of 400 Air France employees of whom 148 were flying personnel. Fifty per cent of the personnel showed conflicts having no direct relationship to their professional activities. The importance of neuropsychiatric examinations as a part of the pre-employment evaluation is stressed.

-- Authors' abstr.

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- 438 The Behavioral Aspects of Safety. R.W. Anderson. *Am. Assn. Ind. Nurses J.* 14, 9-11 (April, 1966).

With the advent of interest in the field of safety and accident prevention, the health professions have been called upon increasingly to make their respective contributions. Initially, most of the responsibility for safe engineering was non-medical. Efforts were primarily directed toward reducing environmental hazards and educating people regarding safety practices. The physician was concerned with treating the injured victim after the accident. Today, however, the prevention of accidents has become a medical concern and physicians are assuming their responsibilities in the field of safety. As medical interest has grown, and as it has become evident that human behavioral factors are involved, psychiatrists, too, have endeavored to make a contribution. About 15% of all accidents appear to be fortuitous events where in the individual concerned has neither conscious nor subconscious control. It might be said that these are truly unavoidable accidents. Another ten to 15% of accidents occur in individuals wherein a permanent personality disorder may be discerned. The remaining 70% of accidents occur in individuals who are experiencing some temporary anxiety at the time of the accident. The anxiety factor is usually vague, ill-defined and related to personal worries or conflicts. The author discusses the ten to 15% group who seem to have the more permanent personality disorders. Studies in the military and in various industries have revealed that a majority of accidents tend to occur in a relatively small group. These small groups are not static, but have new persons moving in and out. The individuals making up the hard core of the accident groups seem to have the more serious, permanent personality disorders. In summary, human emotions are often involved in accidents—either as potentiating or causative factors. An increasing awareness of this fact by physicians, safety engineers and people in the ranks may be extremely useful in the promotion of safety.

- 439 Examination and Selection of Personnel for Work in Underwater Environment. C.F. Aquadro. *J. Occ. Med.* 7, 619-625 (Dec. 1965).

Procedures and criteria for selection of underwater workers have been discussed. For comparative purposes, some considerations in selection of personnel for participation in other specialized programs in the foreign environments of space and the antarctic were presented. Three types of underwater workers were defined; these frequently may have a close interrelation. Nevertheless, the same individual may not necessarily perform well in each role. Past personal and work effectiveness, motivation, and physiological and psychological capacity to perform in a stressful and relatively unknown environment are important factors in determining suitability for successful underwater work. The compatibility and continued effectiveness of the worker as a member of a group or crew is often as important as his individual capabilities. Cohesion of the group, particularly for prolonged periods in restricted quarters, is of considerable importance in effective team performance and successful accomplishment of its mission. There are 20 references.

-- Author's summary

- 440 Oculomotor Activity in Cosmonauts in Orbital Flight. I. T. Akulinichev, M. D. Emel'yanov, and D. G. Maksimov. *Federation Proc.* 25, Part II (Translation Supplement) T31-T33 (Jan.-Feb. 1966).

Electro-oculograms (EOG) were recorded from four Soviet cosmonauts (A. G. Nikolayev, P. R. Popovich, V. F. Bykovskii and V. V. Tereshkova) during orbital space flights. Analysis of the EOG revealed that none of the cosmonauts showed signs of persistently disturbed coordination of eye movements during the three to five days that they were in a state of weightlessness. Transient disturbances (asymmetry of oculomotor reactions and nystagmoid movements) were observed in two cosmonauts. The transient and slight nature of these disturbances pointed to an active process of adaptation to the unusual setting.

-- Authors' conclusions

- 441 The Concept of Susceptibility to Hearing Loss. W. D. Ward. *J. Occ. Med.* 7, 595-607 (Dec. 1965).

Susceptibility to acoustic trauma is a trait distributed normally, not dichotomously. Although a "general susceptibility" to lower-frequency sounds has been demonstrated, this general factor is weak, which implies the existence of several distinct susceptibilities. If susceptibility is to be measured by means of a fatigue test, we must use the same physical stimulus for all observers. The most efficient exposure stimulus is a broad band of noise with considerably more energy in the low frequency than in the high ones. It is not true that equal amounts of temporary threshold shift (TTS) in two persons imply equal susceptibility unless the subjects' resting thresholds at the frequency of the shift are also equal. Nor is it true that the existence of a slight hearing loss necessarily means that the ear is more susceptible than average. The two ears of a given observer may differ substantially in susceptibility, and the susceptibility may vary appreciably from test to test. However, this variability is not subject to control by manipulation of the physiological condition of the employee, as far as we know now. Therefore, the only certain way to reduce loss of hearing from noise is to require ear protection. There are 29 references.

-- Author's summary

- 442 Examination of the Color Sense in the Navy: The Chromatoscope. M. Munteanu.  
Rev. Intern. Serv. Sante Armee Terre Mer Air 38, 361-363 (May, 1965).

For the determination of color sense, the chromatoscope can be used to test color vision in navy personnel whose duty demands normal color recognition. The results obtained with the chromatoscope have been superior to those gained with pseudoisochromatic tables. The instrument may also be utilized to determine the color sense of aviators and personnel responsible for deciphering color signals in inclement weather.  
-- Aerospace Med. Absts.

- 443 Respiratory Disorders in United States East Coast Telephone Men. W. W. Holland and R. W. Stone.  
Am. J. Epidemiol. 82, 92-101 (July, 1965).

Investigations were carried out among employees of several Bell System Telephone companies to determine the prevalence of respiratory symptoms, the levels of ventilatory lung function and of sputum production. Washington, D.C., Baltimore, Md. and Westchester County, N.Y., were chosen as areas for the survey, partly for convenience but also because of the possibility of environmental differences. Nevertheless, levels of air pollution in these three places were found to be very similar and no significant difference in the prevalence of respiratory symptoms or lung function was observed between men examined in each location. The results have, therefore, been combined. The purpose of the study was to compare prevalence of respiratory symptoms in similar employee groups in the US and in the UK by using strictly comparable methods of sample selection, examination of subjects and evaluation of findings. The Medical Research Council of Great Britain Short Questionnaire for respiratory symptoms was used. It was found that while the level of respiratory symptom prevalence and of lung function was very similar in the three areas of the US, it was markedly lower than those found in men doing the same work in England. Also found was the role of tobacco smoking in the conditions studied. The importance of chronic respiratory disease in the US is also discussed.  
-- APCA Absts.

- 444 On the Mucus Flow-Rate in the Human Nose. G. Ewert. Acta Oto-Laryngol. Suppl. 200, 8-62 (1965)

Air pollution has become an increasing problem for the industrialized countries; tobacco smoking is considered to play an important role in the development of carcinoma of the lung and larynx and all over the world research is going on to identify and neutralize the noxious exhaust products from gasoline and oil combustion. Defending the respiratory mucosa against these and other agents, such as dust, soot, and bacteria, the mucous layer covering the epithelium also helps in conditioning the inspired air during its passage to the alveoli. Under normal conditions the greater part of the cleansing and conditioning process is performed by the nasal mucosa. To accomplish this the surface has to be wiped clean, for otherwise these particles might accumulate and even multiply in the mucous cover. This clearance is brought about by ciliary movement, dragging the viscous layer with its embedded material toward the pharynx from where it is disposed of by swallowing. Up to the present, conclusions about the working of human cilia have been drawn from animal and excised tissue experiments with the exception of a few *in vivo* studies on humans, many of these latter done under non-physiological conditions. In the current study a quantitative method was developed by the author for observation of the mucus flow-rate in the human nose. The technique was based on direct observation under magnification of the mucus flow, indicated by a tracer substance with exact measurement of the time and distance traveled by the substance and maintenance of physiological conditions.  
-- APCA Absts.

- 445 Roentgenographic and Physiological Study of the Heart in Athletes. V. V. Bulychev, V. A. Khmelevskii, and Yu. V. Rutman. Federation Proc. 25, Part II (Translation Supplement) T167-T171 (Jan.-Feb. 1966).

At rest, the roentgenographic volume and cardiac dimensions during diastole are greater in athletes than in normal non-athletic individuals. The cardiac enlargement observed in athletes is generally due to enlargement of both ventricles or to predominantly right ventricular enlargement. In order to assess the dimensions of each of the ventricles more accurately, it is advisable to combine roentgenographic examination with electrocardiography, which permits localization on the site at which the interventricular septum is projected on the chest wall, and with electrokymography. Intense physical exercise leads to dilatation of the right atrium and to a reduction in the size of the ventricles. Dilatation of the right atrium is due to an increase in the venous return to the heart; the reduction in the size of the ventricles is due to increased myocardial tonus and to the expulsion of residual blood from the ventricles into the general circulation. During the hour following intense physical exercise, the heart gradually returns to its original size. The roentgenographic dimensions of the left ventricle return to normal more promptly than those of the right ventricle. Tonogenic dilation of the ventricles during the late recovery period following intense physical exercise is the chief reason for the increase in the size of the heart in athletes as compared with normal non-athletic individuals.  
-- Authors' conclusions

03122128

- 446 Relationships Between Four Basic Types of Atherosclerotic Lesions in Human Aorta and Coronary Arteries (Planimetric Study). G.G. Avtandilov. Federation Proc. 25, Part II (Translation Supplement) T157-T160 (Jan.-Feb. 1966).

The evolution of atherosclerosis in the human aorta and coronary arteries is, in the majority of cases, characterized by quite definite general relationships between the extent of lipid patches, fibrous plaques, combinations of the two, and calcific lesions (the "usual type of morphogenetic pattern"). These general relationships between the structural changes in the atherosclerotic aorta were expressed (according to autopsy observations in Nal'chik) as follows: in the fourth decade of human life, the area of intima affected by fibrous changes was less than half the area affected by lipid patches; in the fifth decade, these two types of lesions were approximately equal in extent; in the sixth decade, the relative extent of these two types of lesions remained the same, but the extent of mixed lesions (combinations of the two) and the extent of calcific lesions increased by almost one-half; in the seventh decade, the area of fibrous plaques and destructive-dystrophic changes was almost double the area of lipid patch formation. The evolution of structural changes in the coronary arteries was, in general, characterized by the same regularities: the inter-relationships between the manifestations of atherosclerosis in the descending branch of the left coronary artery was almost exactly duplicated in the right coronary artery ten years later and in the circumflex branch of the left coronary artery almost 20 years later. Approximately one-third of cases studied showed significant deviation from the typical "age profile" established for the morphogenesis of atherosclerosis in these blood vessels; these variants consisted of instances in which the pathological morphology was dominated by one of the following processes: (1) lipid sorption (the predominantly "sorptive" type); (2) fibrous plaque formation (the predominantly "fibroplastic" type); or (3) formation of mixed and calcific lesions (the predominantly destructive-degenerative" type).

-- Author's conclusions

- 447 The Prognosis of Patients with Epilepsy. E.A. Rodin, R.J. Rhodes, and N.N. Velarde. J. Occ. Med. 7, 560-563 (Nov. 1965).

Long-term complete freedom from epileptic seizures has not been substantially achieved with the newer anticonvulsant medications. Only about one-third of the patients tend to become seizure-free for a minimum of two years. A follow-up study involving the reevaluation of 90 patients who had been seen initially at least five years earlier showed that seizures had become completely controlled for at least two years in 29 patients (32.2%); for five years, in 15 (16.6%) of the total group. To define the characteristics of patients whose seizures were arrested, as opposed to those who continued to have attacks, four different statistical procedures were performed: (1) intercorrelation of 155 clinical neurological, electroencephalographic, and psychological variables; (2) factor analysis of 50 variables in order to demonstrate groups of findings that form a pattern relating to seizure control; (3) tests of significance between means of findings in the controlled-seizure and noncontrolled-seizure groups; and (4) regression analysis in order to combine variables for the best prediction of seizure control. Patients with a long-standing seizure disorder which clinically showed temporal-lobe characteristics had not become completely seizure-free. The best outcome was in patients who were intellectually intact and neurologically normal on examination, had no evidence of organic disturbances on psychological tests, a relatively recent onset of their seizure disorder, and who did not have either temporal-lobe characteristics in their seizure patterns or focal minor motor seizures. The patient's employment status was found to be related to his intelligence level, the presence or absence of organic features on psychological tests, and his past schooling, rather than to the frequency of his seizures. There are 11 references.

-- Authors' summary

- 448 Lung Cancer and Environment: A Study of Long-Term Exposure to Motor Fumes in Tunnels. S.I. Kooperstein, A. Schiffrin, and T.J. Leahy. J. Occ. Med. 7, 626-629 (Dec. 1965).

No mortality or morbidity from primary lung cancer was found among a group of 97 retired tunnel police officers who had worked within the Holland and Lincoln Tunnels, and had been in retirement for at least ten years after 25 years of active service. No case of primary lung cancer was found among the 25 retired police officers studied who had died during this same retirement period. Among the 16 living nontunnel retired police officers included in this study, there is one with primary lung cancer successfully resected 11 years ago. The interval between initial exposure in the tunnels and the time of this study was at least 18 years and as long as 37 years; in 89.7% the interval was over 30 years. There are 40 references.

-- Authors' summary

03122129

- 449 Tick Paralysis. K. Adler. Can. Med. Assn. J. 94, 550-551 (March 12, 1966).

Tick paralysis is a disease of animals and man, characterized by an acute ascending flaccid motor paralysis. The wood tick (Dermacentor andersoni) and the dog tick (Dermacentor variabilis) have been responsible for most of the reported cases in the United States and Canada. The paralysis may terminate fatally unless the tick (or ticks) is found and removed before respiratory paralysis occurs. The exact toxic substance, which is believed to be derived from the tick's ova or saliva, or both, has not been isolated. Adult ticks have eight short legs but the larvae only have six. Before they feed they are not much bigger than a pin head but they gorge themselves with blood and swell to the size of a grape. Besides tick paralysis, ticks transmit many diseases such as Rocky Mountain spotted fever, relapsing fever, tularemia, Colorado tick fever, Q fever and various forms of virus encephalitis. To remove them, application of a few drops of alcohol, gasoline, kerosene, ether, ethylchloride, or petroleum jelly will often cause them to retract. Heat in the form of a hot needle or lighted cigarette applied to the back of the tick will occasionally cause it to withdraw. With any of these measures, a few minutes should be allowed for the tick to loosen its grip before removal is attempted. If the tick is well embedded, excision of the skin (either with a cutting needle or very small scalpel) to which the tick is attached is necessary. It is essential to remove intact the head with its hypostome, so that no further toxin from the salivary glands is expressed into the patient's blood stream. Although tick paralysis is more common in areas where certain species of ticks are endemic, all general practitioners and pediatricians should be aware of this disease. The diagnosis is easy, treatment is simple, and recovery is dramatic if the tick is removed before respiratory paralysis sets in.

- 450 Effect of Vitamin B<sub>12</sub> on Immunogenesis in Experimental Immunization with Tetanus Toxoid. F.R. Tashmukhamedov. Federation Proc. 25, Part II (Translation Supplement) T143-T145 (Jan.-Feb. 1966).

Subcutaneous injection of vitamin B<sub>12</sub> in a dose of ten micrograms/kg. every second day or 25 micrograms/kg. every fifth day substantially improved immunogenesis in rabbits with tetanus toxoid. The difference in the mean titers of antitoxin in rabbits which had received and those which had not received vitamin B<sub>12</sub> proved statistically significant at all periods of observation, starting the 20th day after the first inoculation. In rabbits not given vitamin B<sub>12</sub> the titers of antitoxin correlated with the concentration of vitamin B<sub>12</sub> in the blood serum. In the experimental animals, no correlation could be found between the titers of antitoxin and the vitamin B<sub>12</sub> level in the blood serum. At the early stages of observation, there was a clear connection between the titers of antitoxin and the vitamin B<sub>12</sub> content in the organs of the animals; subsequently no such connection could be discerned.

-- Author's conclusions

- 451 A Program for the Prevention of Tetanus. R.B. Windsor. Ind. Med. & Surg. 35, 171-175 (March, 1966).

In reviewing current problems in the prevention of tetanus, certain factors are to be emphasized: (1) There is no substitute for active immunization with tetanus toxoid prior to injury. Physicians and patients are mutually responsible for the completion of such a program. A system for carrying out the details is described. Overusage of tetanus toxoid may result in sensitivity reactions. Proper intervals for basic and booster injections are discussed. Proper care of the wound remains a vital factor in the prevention of tetanus and cannot be replaced by antitoxin and antibiotics. Human tetanus antitoxin is effective in preventing tetanus in the previously unimmunized. Sensitivity testing is unnecessary, because the dangerous and expensive complications seen with equine and bovine tetanus antitoxins do not occur. Even in the presence of negative sensitivity tests, there is danger with the animal tetanus antitoxins. They should be replaced by the human product. Ten references are listed.

-- Author's summary

- 452 Effects of Electromagnetic Heating on Internal Viscera. R.K. Gilchrist, et al. Ann. Surg. 161, 890 (1965).

As a preliminary to the treatment of human tumors, controlled moderate localized heating of lymph node metastases was carried out by hysteresis (the process by which magnetic material is heated in an alternating electromagnetic field). The target material was injected around the tumor, the primary and accessible nodes were resected, and if it seemed that, after pathological examination of the specimen, there was residual in remaining nodes, hysteresis was produced. In this way, it is hoped, that metastases just outside the field of resection may be sterilized. The target material used thus far is a ferrite magnetic form of FE-203 having a particle diameter of 0.05 to 0.10 micron. Strong 55-kilocycle electromagnetic fields do not affect the function of vital organs or raise the body temperature significantly. The authors estimate that if only one-half of the 30% of patients with involved but surgically inaccessible nodes are helped, the cure rate of breast, stomach and rectum cancer could be increased by 15%.

-- Can. Med. Assn. J. Absts.

## SKIN DISEASES AND BURNS

- 453 Optimum Temperature for Post-Burn Cooling. T.C. King and J.M. Zimmerman. Arch. Surg. 91, 656 (1965).

The process of cooling the surface of fresh burns is shown in this paper to change the course of the developing wound, in that edema is decreased by the resultant inhibition of changes in capillary permeability. The optimum temperature for this purpose was found to be about 5°C. (41.0°F.), with satisfactory degrees of inhibition at any temperature below 17°C. (62.6°F.). Cold compresses can be made by adding a few ice cubes to a pan of water from a cold water tap. Such a beneficial immediate treatment of burns should be stressed in first-aid teaching to lay personnel.

-- Can. Med. Assn. J. Absts.

- 454 Hospital Isolation System for Preventing Cross-Contamination by Staphylococcal and Pseudomonas Organisms in Burn Wounds. B.W. Haynes, Jr., and M.E. Hench. Ann. Surg. 162, 641 (1965).

Although antimicrobial agents provide an effective means of combating infection, the most significant factor in the control of wound infection is prevention by means of asepsis. Acknowledging this, an attempt was made to isolate patients in an inflated plastic bag with a console that provided pumps, filters, passage-ways for sterile transfer into and out of the isolation system. The isolation, after 149 patient-days' experience, proved an effective barrier against cross-contamination, using Staph. aureus, coagulase-positive, as the indicator organism. The device proved both workable and tolerable for the patient. This technique is suggested as a way of investigating the problem of self-infection in man. It is postulated that the gastrointestinal tract is an important repository for Pseudomonas aeruginosa, and that it is possible to prevent wound infection by this organism by intestinal antisepsis and total isolation.

-- Can. Med. Assn. J. Absts.

## CHEMICAL HAZARDS

- 455 Naturally Occurring Toxic Factors in Plants and Animals Used as Foods. F.M. Strong. Can. Med. Assn. J. 94, 568-573 (March 19, 1966).

Toxic substances occurring naturally in various foods and feeds have been listed, with particular reference to lathrogens, pressor amines, azoxy glycosides, labile sulfur compounds and a few others. The possible deleterious effects of such substances on man and animals have been pointed out and the relationship between the consumption of foods containing these compounds and the use of monoamine oxidase-inhibiting drugs has been emphasized. Considering the myriad chemical substances consumed by human beings in their everyday diets and in view of the complex inter-related metabolic mechanisms required to handle these compounds in such a way as to benefit the body and to protect it from harm, it seems obvious that a great deal of investigation will be needed in the future before it can be said with certainty that a given food is safe under all conditions. Furthermore, it is quite possible that, with expanding knowledge in this area, an understanding of the cause of some previously mysterious diseases may be forthcoming. There are 39 references.

-- Author's summary

- 456 Toxic Factors of Mould Origin. (Toxic Factors in Foods). A.J. Feuill. Can. Med. Assn. J. 94, 574-581 (March 19, 1966).

The chemistry and effects of mycotoxins associated with human and animal food stuffs are reviewed. The aflatoxins, metabolites of Aspergillus flavus, have been implicated in fatal diseases of farm stock fed on infected peanut cake. Muscarine and the phalloidins are the causative agents in mushroom poisoning. Lysergic acid alkaloids are involved in ergotism. "Yellow rice" toxicity arises from infection with Penicillium islandicum, the active principles being islanditoxin and luteoskyrin. Various species of Penicillium, Aspergillus and Fusarium have been linked with other mycotoxicoses and their metabolites characterized. Several fungal metabolites are active hepatotoxins or carcinogens, and the possible etiological significance of moldy foods is briefly considered, especially in relation to the high incidence of tropical liver disease. Better agricultural practices and more stringent testing to control and detect fungal contamination are advocated. There are 51 references.

-- Author's abst.

- 457 Food-Borne Bacterial Toxins. F.S. Thatcher. Can. Med. Assn. J. 94, 582-590 (March 19, 1966).

Food poisoning caused by the ingestion of preformed bacterial toxins is considered in relation to comparative symptoms, procedures for extraction and purification of the causal toxins, their chemistry, serology, assay procedures, and pharmacology, in so far as these are known. The

bacteria discussed in this context are Clostridium botulinum, C. perfringens, Staphylococcus aureus, Bacillus cereus, and Vibrio parahemolyticus. The possible roles of the enterococci, Proteus, E. coli and of unknown species, in relation to production of non-antigenic toxic substances, are discussed briefly. Requirements for prevention of the various forms of bacterial food poisoning are outlined. There are 76 references.

-- Author's abst.

- 458 Radionuclides in Foods. P.M. Bird. Can. Med. Assn. J. 94, 590-597 (March 19, 1966).

Levels of strontium-90 and cesium-137 in Canadian milk during the period 1960-64 were consistently higher than those in the United States or the United Kingdom, but levels in humans, while also higher, did not reflect the differences observed in milk. Annual dose rates of 27 millirads to bone and four millirads to the whole body correspond to the highest average concentrations of strontium-90 and cesium-137 so far observed. Levels of cesium-137 in the urine of residents of the Canadian North were found to increase with the increasing consumption of caribou or reindeer. Whole body counting of a few northern residents showed cesium-137 levels as high as 1,000 nanocuries. It is concluded that protective actions are not needed but that studies in the North should be emphasized to provide a better basis for evaluating that particular situation. Ten references are given.

-- Author's abst.

- 459 Problems Related to the Use of Pesticides. O.G. Fitzhugh. Can. Med. Assn. J. 94, 598-604 (March 19, 1966).

Potential and additive effects of pesticides are considered major problems in the determination of safe daily intakes of these chemicals. Examples of potentiation between two organophosphates, such as ethyl-p-nitrophenyl benzene thionophosphonate (EPN) and malathion, delnav and malathion, and guthion and dipterex are considered. Although this type of potentiation could give rise to acute accidents, the most important point in evaluation centers on the possible effects of small amounts of potentiating compounds in the daily diet. Likewise, certain drugs of the phenothiazine type potentiate the toxic effects of organophosphates. A review of the data for both types of potentiation indicates that the consumption of raw agricultural products containing pesticides at tolerance levels constitutes a minimal hazard. A two-year rat-feeding investigation using a combination of eight flavoring agents and six pesticides, at use levels and higher, did not cause a significant alteration of toxicity in comparison with the toxicity of the individual substances. There are 30 references.

-- Author's abst.

- 460 Problems Related to the Use of Food Additives in the United States. B.L. Oser. Can. Med. Assn. J. 94, 604-608 (March 19, 1966).

Major problems encountered by enforcement agencies and by regulated industries, respectively, in implementing and conforming to recent food additive laws are reviewed. Decisions as to which substances fall within the broad terms of the legal definition, and which escape by virtue of "generally recognized as safe" (GRAS) status, are often difficult and complex. Distinctions cannot be made solely on the basis of whether substances are old or new, natural or synthetic. Registration of pesticides on a "no residue" basis and establishment of "zero tolerances" for food additives have created an anomalous situation as a result of improvements in sensitivity of analytical techniques which revealed the presence of minute amounts of substances where none were believed to exist. A solution has been recommended by a specially appointed committee of the National Academy of Sciences—National Research Council (USA). Enforcement of the new food additive laws warrants revision of present labeling requirements to provide for designating chemical ingredients by functional categories rather than by confusing chemical terminology. Ten references are given.

-- Author's abst.

- 461 The Detection of Polycyclic Aromatic Hydrocarbons in Liquid Smoke and Some Foods. W. Likinsky and P. Shubik. Toxicol. & Pharmacol. 7, 337-343 (March 1965).

Samples of liquid smoke, several smoked foods, vegetable oils, and drinking water were examined for the presence of polycyclic aromatic hydrocarbons. Fats and oils were studied because of an earlier finding that solvents—which are used in processing fats and oils—have been found to contain the hydrocarbons. Samples of tap water in Chicago were examined in order to explore the possibility that polycyclic aromatic hydrocarbons occurring in air pollution, were falling into Lake Michigan in the area from which the water supply for the city was taken. In the study the aromatic materials were concentrated by extraction and solvent partition, the polycyclic aromatic hydrocarbons were separated by chromatography and identified and estimated by absorption spectrometry. Polycyclic aromatic hydrocarbons were found to be absent from the drinking water and vegetable oils but were present in bacon, smoked salmon, smoked haddock, and liquid smoke at concentrations of the order of ppb. Traces of the carcinogen benzo(a)pyrene were present in smoked salmon and smoked haddock but no carcinogens were detected in bacon or in the two samples of liquid smoke examined.

-- APCA Absts.

- 462 Benzo(a)pyrene and Other Aromatic Hydrocarbons Extractable from Bituminous Coal. R. Tye, A. W. Horton, and I. Rapien. *Am. Ind. Hyg. Assn. J.* 27, 25-28 (Jan.-Feb. 1966).

Other investigators have shown that carcinogens in combination with particulate matter are effective in producing lung cancer in experimental animals. Since coal dust does not appear to be effective in producing cancer, the presence of carcinogens in an extractable state in coal shows that the biological availability of carcinogens in atmospheric dusts must be an important factor in their hazard to man. There are 17 references. -- Author's summary

- 463 The Epidemiological Approach in Estimating MAC Values. With Special Reference to Medico-Sociological and Statistical Methodology. R. Cederlöf, L. Friberg, and E. Jonnson. *Nord. Hyg. Tidskr.* 46 (1) 33-43 (1965).

The decisive factor from the medical point of view in estimating "maximum allowable concentration" (MAC) values is the effect or response which a substance or combination of substances elicits from the normal individual. This effect, in turn, depends upon the circumstances of the stimulus situation—i.e., the exposure conditions—and the receptivity and tendency to react of the individuals subjected to the stimuli. A number of factors are involved in the planning, execution, and evaluation of epidemiological research. This paper is, however, restricted to some medico-sociological and statistical aspects. In epidemiologic investigations aimed at estimating symptom frequencies among exposed and nonexposed individuals, the registration procedure—i.e., the questioning of the individuals themselves—might be subject to serious errors. To avoid these and to make those who study the reports on such investigations able to form a well-founded opinion as to the reliability of the results a series of seven points are outlined. The question of what statistical methodology should be used is also discussed including some of the difficulties encountered in random sampling and the seriousness of sampling errors. -- APCA Absts.

- 464 Histological and Chemical Studies in Man on Effects of Fluoride. R. A. Call, et al. *Public Health Repts.* 80, 529-538 (June, 1965).

The presence of elevated concentrations of fluorides in the atmosphere has been associated with changes in certain plants and an increase in the fluoride content of forage in certain areas in Utah. Long-term ingestion of such forage by some animals has produced changes characteristic of fluorosis in some of them. It seemed important to determine if man was also being adversely affected. In this investigation, 127 human bodies were autopsied and studied for gross, histological, and chemical evidence of fluoride intoxication. Eighty-eight of these deceased persons came from geographic areas known to have had elevated fluoride levels in the atmosphere and forage. Analyses for fluoride, calcium, phosphorus, and ash were made on the calvarium, sternum, rib, iliac crest, and lumbar vertebrae. Determinations for fluoride and dry matter were made on the brain, heart, lungs, thyroid, aorta, liver, spleen, pancreas, and kidney. The highest fluoride levels were observed in older adults showing the end-stage kidney of bilateral pyelonephritis and polycystic disease. Average levels were found in subjects with unilateral pyelonephritis and in subjects with pyelonephritis with only slight to moderate disease. The highest fluoride levels found, in subjects with the most severe kidney disease, were within the normal range, and no disease associated with fluorides was evident. Because the number of cases of chronic renal disease in this series was limited, further studies seem advisable. Data accumulated in this study indicate that the levels of fluorides to which Utah residences in the area studied had been exposed were not responsible for gross or histological changes in soft tissues or bones. -- APCA Absts.

- 465 Induction of Tumors of Liver, Kidneys and Lungs in Rats with n-Nitrosodimethylamine. I. N. Shvemberger. *Federation Proc.* 25, Part II (Translation Supplement) T85-T87 (Jan.-Feb. 1966).

Administration of n-nitrosodimethylamine to rats via a gastric catheter over various periods of time to a total of 10-60 mg. per rat caused the development of both benign and malignant tumors of the liver, kidneys and lungs. Tumors could be induced by a total dose of 10-20 mg. of the carcinogen per rat, given a period of one to two weeks. -- Author's conclusions

- 466 Vitamins in the Treatment of Chronic Benzene Poisoning. Ethel Browning. *J. Occ. Med.* 7, 554-559 (Nov. 1965).

The evidence for a direct therapeutic effect of any of the vitamins in the treatment of benzene poisoning cannot at present be entirely accepted, but in view of some of the favorable accounts presented here, further research is indicated, especially since at present no other remedies for chronic benzene poisoning, save complete cessation of exposure, are available. There are 45 references. -- Author's conclusion

03122133

- 467 Inhibition of Oxidation of Benzene by Certain Antioxidants. Zh.I. Abramova and I.D. Gadaskin. Federation Proc. 25, Part II (Translation Supplement) T91-T92 (Jan.-Feb. 1966).

Experiments with liver homogenate *in vitro* showed, that several antioxidants (propyl gallate, cystamine, cystine, methionine) inhibit the oxidation of benzene. Experiments *in vitro* with liver homogenates of rabbits receiving methionine revealed depression of the oxidation of benzene. Experiments *in vitro* with homogenate of livers from rabbits with subacute benzene poisoning, receiving methionine and cystamine at the same time, revealed inhibition of benzene oxidation. Excretion of bound sulfur and glucuronides was reduced in rabbits with subacute benzene poisoning receiving sulfur-containing compounds at the same time. -- Authors' conclusions

- 468 Factors Influencing Hazards in Isocyanate Foam-Spraying. K.E. Grim and R.E. Knox. Am. Ind. Hyg. Assn. J. 27, 62-67 (Jan.-Feb. 1966).

Controlled foam-spraying experiments conducted in a sealed, unventilated room were designed to evaluate the influence of formulations and application techniques on atmospheric contamination with isocyanates. The conditions for sampling the atmosphere during application of formulations involving TDI (toluenediisocyanate) and MDI (methylenediisocyanate) are described in detail. The Elastomers Laboratory spray gun, which mixes the chemicals internally, is compared to a conventional external-mix spray gun. Equipment for quantitative measurement of TDI and MDI retained by activated charcoal canisters is described, and results are given. Recommendations of the safest method of foam-spraying based on information acquired, and safety precautions, including the use of operator protection equipment, are discussed. Nine references are given. -- Authors' abst.

- 469 Ethanol Potentiation of Halogenated Aliphatic Solvent Toxicity. H.H. Cornish and Julita Adefuin. Am. Ind. Hyg. Assn. J. 27, 57-61 (Jan.-Feb. 1966).

Ethanol potentiation of toxicity could be readily demonstrated in rats exposed 18 hours later to carbon tetrachloride or trichloroethylene vapors, but not in those exposed to perchloroethylene or 1,1,1-trichloroethane. Serum enzyme levels and histopathologic studies served as a measure of toxic response. Subsequent exposure of ethanol-treated rats for eight hours to 25 or 50ppm of carbon tetrachloride or to 100ppm of trichloroethylene failed to affect serum enzyme levels. However, ethanol potentiation of carbon tetrachloride toxicity could be demonstrated after as slight an exposure as two hours at 100ppm, and potentiation of trichloroethylene toxicity was apparent after a four-hour exposure to 5,000 ppm. Ten references are given. -- Authors' summary

- 470 Epoxy Hazards in Industry. The Hazards and Their Control. W.E. Broughton. Ann. Occ. Hyg. (London) 8, 131 (1965).

The main components of the epoxy resins in commercial use in England over the past two decades and their attendant hazards are identified. It is reported that no systemic intoxication of any significance has been associated with epoxy resins, but that both uncured resins and hardeners can produce dermatitis and occasionally a sensitization after repeated contact with the skin. Hardening agents containing amines are said to be more irritating than uncured resins, which become increasingly inert as their molecular weight and viscosity is increased. The experience of several large plants manufacturing resins and the tabulated incidence of dermatitis at one of them over a period of approximately seven years are presented. Proper personnel selection, the use of protective clothing and devices, instruction of employees on the nature of the hazard and proper work techniques, good plant layout, and adequate ventilation are the main points included in a description of means by which effective control of the hazards may be achieved.

-- J. Occ. Med. Absts.

#### INDUSTRIAL DUSTS

- 471 Mesothelioma Associated With Asbestosis. A Report of Three Cases. R.H. Mann, J.L. Grosh, and W.M. O'Donnell. Cancer 19, 521-526 (April, 1966).

A study of 54 autopsies of patients dying with pulmonary asbestosis disclosed three cases of peritoneal mesothelioma, one of which was complicated by a mesothelioma of the pleura. In two of the three patients there was an occupational exposure history of 20 and 34 years in an asbestos textile plant. Although the remaining patient had classical asbestosis of the lungs at autopsy, there was no known history of industrial exposure to asbestos. The authors think asbestos can produce mesothelioma of either peritoneum or pleura; they present three cases to support the concept of a causal relationship. The increased utilization of asbestos material and the recent demonstration of asbestos bodies in the lungs of urban dwellers may have significant implications for cancer epidemiology in the future.

-- Authors' abst.

- 472 Fog Fever and Farmer's Lung. Anonymous. *Lancet* 2, 224 (July 31, 1965).

Fog fever in cattle has some resemblance to farmer's lung but with rather more complex pathological changes. In relation to fog, and possibly to air pollution, the name is a misnomer. Characteristically the condition is to be seen in animals which have been brought on to a lush second growth of grass in the early autumn. The word "fog" refers to the name of this grass (as in "Yorkshire fog" or *Holcus lanatus*) and has no relation to atmospheric conditions. This short discussion of farmer's lung deals with its relation to the dusts of exposure to moldy hay. At first this was thought to be a simple infective process, following exposure to the fungus. Later it was thought that the symptoms were a response to the mechanical irritation of the bronchioles by small vegetative particles. More recently, studies by Pepys and Jenkins have indicated it to be an allergic reaction to a fungus, particularly *Thermopolyspora polyspora*, often found in moldy hay. The possibility is suggested that respiratory diseases in other animals—for example, broken wind in horses—may be due to some similar allergic cause. -- APCA Absts.

- 473 Farmer's Lung Scheduled as a Prescribed Occupational Disease in Great Britain. A. Meiklejohn. *J. Occ. Med.* 7, 580 (Nov. 1965).

On June 24, 1963 the Ministry of Pensions and National Insurance of Great Britain formally referred to the Industrial Injuries Council the question of whether the complaint known as "farmer's lung," which was indicated as being "due to exposure to the dust of moldy hay, moldy straw or similarly contaminated agricultural produce, should be prescribed under the Act, and if so, for what occupations." The Council organized an inquiry, through their industrial diseases sub-committee. The Council's report, including conclusions and recommendations, was presented to the Minister and then to Parliament, and the disease was duly added to the schedule of Prescribed Disease. In accordance with the established practice of defining the medico-legal requirements for the purposes of disablement benefits (formerly workmen's compensation), the description of the disease was given and the occupations covered. The legislation became effective on June 21, 1965, and the completion of claims was assigned to medical boards constituted from the Pneumoconiosis Medical Panels under the Ministry of Pensions and National Insurance. -- APCA Absts.

- 474 The Ratio Between Projected Area Diameter and Equivalent Diameter of Particulates in Pittsburgh Air. F. Stein, R. Quinlan, and M. Corn. *Am. Ind. Hyg. Assn. J.* 27, 39-46 (Jan.-Feb. 1966).

A horizontal elutriator was designed, fabricated, and calibrated with clouds of spherical polyvinyl-toluene latex and styrene divinylbenzene particles. It was used to sample Pittsburgh air and deposit particles from 2.0 to 16 microns equivalent diameter on glass slides. By assuming a parabolic velocity profile between plates approaching infinite width, a theory of deposition was developed which agreed well with experimentally determined particle deposits. The authors measured deposited particle projected area diameter with a calibrated microscope reticle. The ratio between particle projected area diameter (dp) and equivalent diameter (de) varied from 0.5 to 2.8 for almost all particles, but was as high as 6.5 in extraordinary cases. Stress is placed on the need for specifying dp or de based on the application of sizing data. There are 17 references. -- Authors' abst.

- 475 Theoretical Limits of Errors Due to Anisokinetic Sampling of Particulate Matter. V. Vitols. *J. Air Poll. Control Assn.* 16, 79-84 (Feb. 1966).

Theoretical estimates of errors in calculated concentrations of particulate matter, sampled with aspirated nozzles under conditions of anisokinetic flow, were based on computed trajectories of particles in fluid streams. In the trajectory determinations gravitational effects on the particles were neglected and the fluid flow patterns approximated by those of a frictionless ideal fluid. The equations of motion were derived considering inertia as the predominant mechanism in the collection of the particulate matter by an aspirated nozzle. The particles were assumed to be spherical in shape, monodisperse, and experiencing drag force as in a real fluid. The equations of motion were solved by a procedure combining an analog and a digital computer. The theoretical error estimates for anisokinetic sampling were compared with experimental data available on investigations with spherical test dust. There are 20 references. -- Author's abst.

- 476 Selection and Preparation of Standard Calibration Dust. W. F. Todd, et al. *Air Water Poll. Intern. J.* 9, 673-683 (Nov. 1965).

Examination of a number of finely divided dusts resulted in the selection of pulverized limestone as a standard calibration dust. The characteristics of the dust make it ideal for use with a Bahco classifier for particles ranging from 1-40 microns in diameter. The dust characteristics as

reported include specific gravity, size distribution, and chemical composition. The size distribution was determined and confirmed by several different particle sizing methods in different laboratories. The data should be useful for comparing types of particle sizing equipment not involved in the present study, and should provide a standard for calibrating large capacity equipment. -- APCA Absts.

### PHYSICAL ASPECTS OF THE ENVIRONMENT

- 477 Alternobaric Vertigo—A Diving Hazard. C. E. G. Lundgren. Brit. Med. J. 2, 511-513 (Aug. 28, 1965)

Results obtained from a questionnaire sent to 550 members of the Swedish Association of Sports Divers are reported. The questionnaire was designed to elucidate the frequency of vertigo, the conditions under which it might occur, the possibility that it might interfere with the diver's performance, etc. In an additional inquiry 15 subjects who had vertigo (including some of the most serious cases) were asked to relate their experiences of vertigo on land. Differences in pressure between the middle-ear cavity and the surrounding structures were of paramount importance in the development of diver's vertigo. Since most subjects had vertigo on the way up to or upon reaching the surface it seems that a relative overpressure in the middle ear is an important factor. These conclusions are supported by two observations made by several subjects: (1) that stopping the ascent, and preferably descending again, rapidly alleviated the vertigo; and (2) that the subjects could produce vertigo on dry land by forcing air into the middle ears by blowing against the clamped nose. Vertigo is sufficiently common among divers and potentially dangerous enough to deserve wider recognition. It is suggested that it should be known as alternobaric vertigo. Preventive and therapeutic measures are discussed. -- Aerospace Med. Absts.

- 478 Effect of Immersion on Intrapulmonary Pressure. A. S. Jarrett. J. Appl. Physiol. 20, 1261-1266 (Nov. 1965).

Pressure-volume relaxation curves have been determined for relaxed, breath-holding subjects lying and sitting in air and water. Immersion in water resulted in a marked increase in intrapulmonary pressure, the whole pressure-volume curve appearing to be shifted along the pressure axis. From the regression equations of the four curves the pressures at normal relaxed chest volume were calculated, and the center of pressure of the immersed chest shown to lie 19cm. below and 7cm. behind the sternal angle. The significance of this to the positioning of a diver's demand valve is discussed. -- Aerospace Med. Absts.

- 479 Deep Diving and Short Decompression by Breathing Mixed Gases. H. Keller and A. A. Bühlmann. J. Appl. Physiol. 20, 1267-1270 (Nov. 1965).

A series of test dives carried out by 14 subjects in depths between 130 and 1,000 feet for periods varying between five minutes and two hours revealed that changes of inert gas in the breathing mixture (oxygen and nitrogen) permit a considerable shortening of the decompression time. The physical and physiological basis of the methods is discussed. -- Aerospace Med. Absts.

- 480 Participation of the Central Nervous System in Decompression. I. Rozsahegyi and B. Roth. Ind. Med. & Surg. 35, 101-107, 110 (Feb. 1966).

The central nervous system displays a great vulnerability in decompression sickness. It may be damaged, not only in cases of manifest caisson disease of neurological form, but very often without clinical neurological signs and symptoms or without any mark of decompression sickness at all. It could be demonstrated that in cases without manifest clinical signs of decompression sickness, a lasting damage of the nervous system may start (similar to the chronic osteoarthropathy of caisson workers, i.e., aseptic necrosis of bones) and the probability of permanent lesion increases in a high degree, when signs of decompression sickness of any (not only neurological) form are present. If the recompression in the medical lock is not effective, the possibility of recovery is very poor. An improvement of neurological function can be seen in most cases, but a complete recovery is unlikely. In lesions of the brain-stem, which is very often damaged, psychological changes of organic origin arise. Considering the very serious, stationary consequences, which cannot be seen in all their dimensions beforehand, the preventive measures in decompression obtain a new accentuation. The special importance of the curative recompression and of the correct effective therapy is stated by the demonstration of the possible latent damage of nervous tissue. The gravity of the chronic clinical appearance demands a perseverance in the treatment until complete recovery without residual symptoms. In prevention it is worth while to consider reduction of time spent in compressed air, to prevent saturation of so-called "slow tissues", such as the white matter of the nervous system. -- Authors' summary

- 481 Altitude and Athletic Performance. L. G. C. E. Pugh. *Nature* 207, 1397-1398 (Sept. 25, 1965).

The decision to hold the 1968 Olympic Games in Mexico City at an altitude of 7,500 feet above sea level has aroused interest in the effects of altitude on athletic performance. The performances of runners in the 1955 Pan American Games in Mexico City were compared with those of runners in the 1956 Olympic Games held in Melbourne. The times of the first three competitors in the finals of each event were averaged, and the differences between the altitude and the sea-level results were plotted against distance on a one-way logarithmic scale. The results reveal a linear relation between decrement in performance at altitude and log distance. Time increases ranged from 2.62% over 800 meters to 14.9% in the 10,000 meter event. Times at altitude were better than at sea level over 100 meters and 400 meters, but not over 200 meters. It was predicted that increase in time taken for a race lasting six minutes would be about 8%. The results in this study are in accord with the predicted value.

-- Aerospace Med. Absts.

- 482 Plasma Catecholamines at High Altitudes. F. Moncloa, Maria Gómez, and A. Hurtado. *J. Appl. Physiol.* 20, 1329-1331 (Nov. 1965).

High altitude native residents and newcomers to a low ambient pressure (36 hours after arrival) have normal plasma levels of adrenaline and noradrenaline in the fasting condition. Thirty minutes after the intravenous injection of insulin the high-altitude residents show increase of epinephrine greater than in men living at sea level. These results are interpreted as a consequence of the lower glucose values observed at high altitudes.

-- Aerospace Med. Absts.

- 483 Some Responses of Humans to Thermal Radiation. C. W. Suggs. *J. Appl. Physiol.* 20, 1000-1005 (Sept. 1965).

The effects of thermal radiation on heart rate, ventilation rate, and oxygen consumption rate were investigated at various conditions of dry-bulb temperature, air velocity, and exercise. Ventilation rate and oxygen consumption rate were essentially independent of thermal radiation under all the environmental conditions investigated. However, heart rate increased appreciably with increases in thermal radiation provided the environment was already warm or hot. In the range between 70 and 100°F. dry bulb, a 7° increase in mean radiant temperature was found to elicit the same average increase in heart rate as a 1°F. increase in dry bulb. For a cool environment the response tended to be reversed with the heart rate decreasing as the environment was made more comfortable by the addition of thermal radiation. Exercise shifted the point at which this reversal occurred toward lower temperatures.

-- Aerospace Med. Absts.

- 484 Skin and Subcutaneous Temperature Changes During Exposure to Intense Thermal Radiation. J. A. J. Stolwijk and J. D. Hardy. *J. Appl. Physiol.* 20, 1006-1013 (Sept. 1965).

Radiometric measurements have been made of the skin temperature changes occurring during irradiation of the body by high-intensity thermal radiation with square-wave pulses. A quartz lamp bank provided a source color temperature of 2,650°K. and a uniform (about 5%) irradiance of 0.16 cal./sec. per sq. cm. over areas of 40 x 30 cm. A spring-operated focal-plane shutter controlled exposure times from 2-120 sec. with a rise time of 0.01 sec. The radiometer, mounted between the quartz lamps so as to view the skin from normal incidence, had a 96% response time of 0.1 sec. and a precision of about 0.1°C. When corrections were made to allow for far infrared radiation reflected from the skin, the radiometer gave accurate measurements of skin temperature during the periods of irradiation. Experimental values of skin temperature rise were compared with those calculated by the finite differences method for various skin layers using the best available values for optical and thermal properties of each skin layer. During the initial 10-15 sec. of irradiation, theoretical and experimental values were in agreement, indicating passive response of the skin to thermal radiation. Subcutaneous temperatures, calculated from surface temperature data, indicated a high degree of penetration of the radiation 0.2-0.4 mm. below the skin surface.

-- Aerospace Med. Absts.

- 485 Assessment of Industrial Heat Stress. A. Henschel, et al. *Am. Ind. Hyg. Assn. J.* 27, 13-16 (Jan.-Feb. 1966).

The problem of assessing the thermal impact of an industrial situation is complex because of the multiplicity of other stresses which may be present in the environment. To define the problem requires, as a minimum, data on the climatic environment of the work, the demands of the job, the daily work-rest regimen, the heat exposure history, the health and nutritional status, the state of body hydration, and the non-working physical environment and activities of the individuals. A study of industrial heat stress conducted by the Division of Occupational Health, U.S. Public Health Service incorporated a simple standard laboratory type heat-work test along with an exhaustive study of the men at the work site. The physiological responses of the men to the standard tests were significantly correlated with the responses on the job and reflected the magnitude of the on-the-job environmental stress.

- 486 The Water Requirements of Humans. N.B. Strydom, C.H. VanGraan, and L.D. Holdsworth. *J. Occ. Med.* 7, 581-587 (Nov. 1965).

After scanning the literature on water requirements, several useful recommendations may be made about survival practices in arid or desert regions. The loss of significant amounts of body water and its accompanying deleterious, even fatal, effects should be avoided in all circumstances. The following recommendations are offered for such survival situations. If lost or stranded in hot arid or desert regions, people should remain where they are. Search parties are bound to be sent out to find them. Make the best use of any available material to erect a shelter against the sun and wind. The sensible and insensible sweat losses of a man exposed to the direct rays of the sun are at least twice as high as those of a man in shade. The same holds true for wind exposure. Hot, dry winds can dehydrate any individual within hours. Never shed any clothing. Men fully clothed lose less sweat and pick up less heat from the sun and surrounding radiation than scantily clothed or nude men. Clothes will also protect against sun and wind burns. If moving is essential, this should be done at night, i.e., after 10 p.m. Never lie down in the sun, but sit up or stand. The body surface area exposed to direct solar radiation is at its maximum when a man is lying down, less when sitting, and least when standing. The water in the radiator of a truck or car is usually safe as drinking water. It may not taste good, but it may save a life. It is inadvisable to drink strong saline water such as sea water. Even rinsing the mouth with such waters may have deleterious effects, as part of the rinse remains in the mouth. The most economic way in which to use available potable water is to take it in small amounts frequently during the heat of day. It is wrong to limit or postpone the drinking of available water until complete exhaustion is reached or to take large amount of water after long intervals. This procedure results in a significant wastage of water, since the body will then only excrete more urine, being unable to absorb all the water in the tissues at once. Provided that a person is acquainted with indigenous flora, he can supplement his water rations by squashing the juice from their leaves, stems, or roots. There are 40 references. -- Cond. from authors' conclusions

- 487 Thermal Transients to 205°C. (400°F.) Biochemical and Hematological Effects in Human Subjects. R.H. Murray. *Aerospace Med.* 37, 11-15 (Jan. 1966).

In order to evaluate the hematological and metabolic effects of brief, intense, thermal stress, six clothed human subjects were exposed to thermal transients 20 minutes in duration, wall temperature rising 28°C. (50°F.)/minute to peaks of 205°C. (400°F.) with subsequent passive wall-cooling. There was no evidence of hemolysis, and blood cellular elements showed only non-specific "stress" and hemoconcentration effects. There were no significant changes in serum electrolytes, blood sugar, total protein or protein electrophoresis. There was an increase in tidal volume without an increase in respiratory rate, an example of heat hyperpnea, causing an increase in blood oxygen and a fall in carbon dioxide values with consequent increase in pH. Lactic acid rose slightly and a small amount of excess lactate was generated. Lactic dehydrogenase activity decreased although there was no demonstrable change in the LDH isozymes. -- Author's abst.

- 488 Ten Years of Hearing Protection in the Royal Netherlands Air Force. G. Jacobs and A. Westerlaan. *Ned. Militair Geneesk. Tijdschr.* 18, 212-218 (July, 1965). Dutch.

Results of noise protection measures in the Royal Netherlands Air Force applied for the past ten years are surveyed together with new developments in the field. Several tables show the number of personnel involved, the age differences, the hearing losses, and the improvement realized in the course of ten years. Next to noise-research and the definition of acoustical criteria, audiometric control, indoctrination of personnel in noise hazards, and personal noise protection are the chief areas of concern of the Air Force Hearing Conservation Program.

-- Aerospace Med. Absts.

- 489 The Effect of Digitoxin on the Circulatory Response of Rats to Microwave Irradiation. T.L. Pinakatt, A.W. Richardson, and T. Cooper. *Arch. Intern. Pharmacodyn.* 156, 151-160 (July, 1965).

Anesthetized rats stressed by total body microwave irradiation show significant increases in cardiac output, heart rate, stroke volume and mean arterial blood pressure at a body temperature of 40.5°C. Pretreatment of rats with various doses of digitoxin before irradiation did not prevent the rises in heart rate or blood pressure. Stroke volume increases were less than those shown by untreated animals. The cardiac glycoside alone produced significant increases in cardiac output and stroke volume in doses of 0.04 to 0.1 mg./kg. without inducing signs of toxicity.

-- Authors' summary

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| RADIOACTIVITY AND X-RADIATION |
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- 490 Distribution of Cs-137 After Endotracheal Administration. G. K. Korolev.  
Federation Proc. 25, Part II (Translation Supplement) T95-T98 (Jan. -Feb. 1966).

Following entry of Cs-137 into the respiratory organs, rapid absorption of the isotope takes place. During the first 24 hours almost 90% of the injected isotope is removed from the lungs. The absorption of Cs-137 from the lungs obeys an exponential rule. Of the total amount of isotope, 84% has a half-life period of 43 minutes, 15.5% a half-life period of two days, and 0.5%—of 30 days. The largest amount of Cs-137 is deposited in the muscles (about 46% of the injected dose). The liver follows in second place (about 10%). The maximal concentration of the isotope during the first 24 hours is found in the kidneys, liver and heart. In the remaining organs the accumulation of isotope is approximately uniform. In the subsequent period no significant differences between the Cs-137 concentration in the internal organs can be found. On the 10th day after endotracheal injection of Cs-137 in a dose of 0.4 microcurie/g. (absorbed dose 161 rad.), extensive hemorrhages, perivascular edema and degenerative changes develop in the lungs in the endothelium of the blood vessels, the epithelium of the bronchi and the muscles. Subsequently, these inflammatory and degenerative changes are replaced by proliferative processes.

-- Author's conclusions

- 491 Metabolism of Sr-90 in Rats Fed High-Calcium Diet. L. A. Buldakov and R. A. Erokhin.  
Federation Proc. 25, Part II (Translation Supplement) T99-T102 (Jan. -Feb. 1966).

Under conditions of long-term administration of Sr-90 by the gastric route of rats on a high-calcium diet, the content of the isotope in the skeleton is increased for 150 days to a level of  $351 \pm 43.2\%$  when the diet includes 2.4% calcium, or  $639 \pm 71\%$  when the diet includes 1.4% calcium, of the daily dose of isotope. When the calcium content of the diets is high (2.4%), accumulation of Sr-90 in the skeleton on the 200th day is greater in males than in females. After long-term administration of the isotope, accumulation of Sr-90 in the skeleton of periodically pregnant and lactating rats on the 200th day was 30% higher in pregnant rats. The Sr-90 content in the muscles of pregnant and nonpregnant females did not exceed  $5.23 \pm 7.4\%$  of the daily dose; its concentration was only 1/150 - 1/300 that in the skeleton.

-- Cond. from authors' conclusion

- 492 Ergogenic Effects of Breathing Artificially Ionized Air. H. A. DeVries and C. E. Klafs.  
J. Sport Med. (Torino) 5, 7-12 (March, 1965).

An experimental design was constructed to evaluate the breathing of negative ions as a practical ergogenic aid, when used immediately preceding an all-out physical performance involving the factors of muscular endurance, cardio-respiratory endurance, and motivation. Forty-five subjects (21 male and 24 female) each acted as his own control in that he was tested on different days following 15-minutes exposure to each of the following conditions: (1) breathing negatively ionized air, (2) breathing positively ionized air, (3) placebo (breathing air from a dummy machine), and (4) control (breathing normal ambient room air). Statistical treatment of the data by analysis of variance techniques indicated that although differences in mean bench-stepping time were observed, they did not achieve significance at the .05 level. The mean differences observed for the 24 women subjects were in the direction of the hypothesis that exposure to negative ions would improve physical performance, but also did not achieve significance at the .05 level of confidence. The authors suggest that further experimentation should be undertaken and outline the areas they deem particularly important.

-- Aerospace Med. Absts.

- 493 Changes in Blood Serotonin Level in Animals Exposed to Ionizing Radiation and Dynamic Factors of Space Flight. V. V. Parin, et al.  
Federation Proc. 25, Part II (Translation Supplement) T103-T106 (Jan. -Feb. 1966).

In the animals investigated (monkeys, dogs, guinea pigs, rats and mice), two types of changes were observed in the serotonin concentration in the blood in acute radiation sickness following whole-body gamma-ray irradiation from C0-60. In dogs, monkeys and guinea pigs the disturbance of the blood serotonin concentration was very marked and depended on the severity of the radiation sickness, whereas in rats and mice the fall in the serotonin concentration was less marked and independent of the severity of the radiation sickness. In the animals of the first group a clear hemorrhagic syndrome developed in the course of the radiation sickness; no hemorrhages were observed in those of the second group. The main cause of the fall in the blood serotonin level in radiation sickness is disturbance of its formation in the alimentary tract. The serotonin concentration in the blood of mice and dogs flying on the (Russian) satellite-spaceships four and five (determined by a biological method on the isolated segment of rat's intestine) 24 and 48 hours

after landing showed a decrease of 87-90% (in mice) and 71-90% (in dogs) from the control level (0.12-0.2 microgram/ml.). On the 10th day after landing, the blood serotonin concentration of the animals had returned to normal. Investigation of the blood of dogs at late periods (80-240 days) after their return from space showed normal blood serotonin values. In mice and guinea pigs exposed to the action of vibration at 35 and 70 cycles/sec. for 15 minutes, with an acceleration of 10xg. and an amplitude of 0.4 mm. a fall of the blood serotonin concentration was observed during the first 48 hours, followed by its return to normal. Vibration may be one of the factors responsible for the lowering of the blood serotonin level of animals undertaking cosmic flight.

-- Authors' conclusions

- 494 Uptake of Radioactive Fission Products by Field Crops. Report I: Accumulation of Radioactive Fission Products by Grain and Oil-Bearing Crops. G.V. Il'ina and S.G. Rydkii. Federation Proc. 25, Part II (Translation Supplement) T123-T127 (Jan.-Feb. 1966).

That uptake of radioactive fission products by plants from the soil begins at an early age is indicated by the high activity of the seedlings. The plant accumulates radioactive fission products (strontium-90) during the growing period, and accumulation of these products increases with age. The various plant organs differ in their ability to take-up radioactive fission products: the leaves are the most active in this respect, the seed the least. Different crops differ widely in their ability to accumulate radioactive fission products. In the authors' experiments the highest content of radioactive substances (strontium-90) per unit dry matter was seen in buckwheat, mustard and sunflowers. The removal of radioactive fission products with the harvest of the crops studied was low. In the sunflower, which in this respect exceeded the other plants, removal was 0.05% of the amount added to the soil.

-- Authors' conclusions

#### ENVIRONMENTAL MEASUREMENTS

- 495 A More Rational Basis for Air Sampling Programs. S.A. Roach. Am. Ind. Hyg. Assn. J. 27, 1-12 (Jan.-Feb. 1966).

There are real difficulties in designing sampling procedures that assure compliance with the present hygienic standards for air contaminants. A reasoned and consistent system of sampling is developed, based on the assurance that a critical body burden is not exceeded. It is shown that the duration of the sampling should be proportional to the biological half-time of the substance. A large safety margin is obtained by making the duration one-tenth of the half-time. The sampling results are then summarized in the formula, Average + Range/(n-1)<sup>1/2</sup>. When the resulting figure is less than the American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value, a favorable report can be given. There are 21 references. -- Author's abst.

- 496 Charcoal Sampling Tubes for Organic Vapor Analysis by Gas Chromatography. C.L. Fraust and E.R. Hermann. Am. Ind. Hyg. Assn. J. 27, 68-74 (Jan.-Feb. 1966).

Variation in efficiency of recovery of organic vapors collected on activated charcoal and desorbed into carbon disulfide, was studied with respect to certain parameters of the process. Chemicals used were methylethyl ketone, toluene, trichloroethylene, butyl acetate, 2-methylcyclohexanol, and styrene. Analyses were performed with a gas chromatograph. The effects of charcoal mesh size, sampling rate, volume collected, and vapor concentration were considered. Mesh sizes of carbon granules studied were 10/20, 20/30, 30/40, and 40/50. Also, a special vapor adsorption charcoal, 60/80 mesh was used. Effects of sampling rate were determined over a 100 ml./min. to 1,000 ml./min. range. From 0.5 to 1.5 liters of sample were collected for experiments dealing with volume collected. In studying the effect of varying concentration, a range of one Threshold Limit Value (TLV) to 5TLV was employed. Nine references are given. -- Authors' abst.

- 497 The Determination of Chlorinated Hydrocarbons in the Atmosphere by Activation Analysis. D.J. Morgan and G. Duxbury. Ann. Occ. Hyg. (London) 8, 253-256 (July, 1965).

The air sample containing about 10mg. of chlorinated hydrocarbon is drawn through a small charcoal pack by means of a battery operated air sampler. The charcoal is then placed in a neutron flux and the Cl-38 formed is determined by gamma spectrometry. The results of an operational investigation are described.

-- APCA Absts.

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- 498 Gas Chromatographic Analysis of Polynuclear Aromatic Hydrocarbons With Packed Columns. Application to Air Pollution Studies. L. DeMaio and M. Corn. Anal. Chem. 38, 131-133 (Jan. 1966).

A method utilizing gas chromatography for the analysis of polynuclear aromatic hydrocarbons has been suggested for general use. The method was developed for use in analyzing polycyclic hydrocarbons associated with particulate matter in air. The primary advantages of this method, when compared to methods now used, are ease of performance and time differential. A table shows the arithmetic mean air concentrations of four polycyclics analyzed by gas chromatography in Pittsburgh, also of the same four polycyclics in other cities where analyses were by ultraviolet spectrophotometric procedures. -- Cond. from APCA Absts.

- 499 Determination of Phosphine in Air. R. Dechant, G. Sanders, and R. Graul. Am. Ind. Hyg. Assn. J. 27, 75-79 (Jan.-Feb. 1966).

Phosphine generated from aluminum phosphide tablets is used extensively in granaries and warehouses as a fumigant. In connection with some field studies done in the San Francisco area, a simple, sensitive and accurate method was needed for rapid determination of phosphine in the range of 0.1 to 1 ppm. The method consists in collecting air in a fritted-glass bubbler containing silver diethyldithiocarbamate reagent. The generation of phosphine, the preparation of dilute phosphine in air mixtures, and the calibration of silver diethyldithiocarbamate reagent with a primary phosphate standard are described. At a sampling rate of 0.5 liter/min. in the range of 0.6 to 4.1 ppm phosphine, the average collection efficiency is 86%. Sensitivity of 0.05 ppm can be achieved. Nine references are listed.

- 500 An Evaluation of Selected Methods of Collection and Analysis of Low Concentrations of Ozone. R.H. Hendricks and L.B. Larsen. Am. Ind. Hyg. Assn. J. 27, 80-84 (Jan.-Feb. 1966).

The recent position statement of the U.S. Public Health Service, Division of Occupational Health, stated that ozone in its health effects is radiomimetic and recommended that unnecessary exposure to ozone in any concentration, however small, be avoided. Thus the analysis of low ozone concentrations becomes important. The industrial hygienist faces a dilemma in the selection of a procedure for the collection and analysis of ozone. A literature survey of analytical procedure for ozone gives a confused picture of methods that are either nonspecific, lack sufficient sensitivity, are of uncertain stoichiometry, are unsatisfactory in calibration, or are suitable primarily for research purposes under controlled conditions. This study was undertaken to assist the investigator with limited resources in his selection of methods for use in the industrial environment. Seven analytical methods for ozone are evaluated. Equipment used for generating the ozone is discussed. Information concerning methods of collection of ozone is presented. Potassium iodide, phenolphthalein, sodium diphenylamine sulfonate, and fluorescein methods are either nonspecific for ozone or lack sensitivity. The dimethoxystilbene method, in the hands of the authors, lacked sensitivity and posed reagent difficulties. The nitrogen dioxide-equivalent method is an excellent research procedure and is the method of choice for field investigations where fluctuating nitrogen dioxide concentrations are not encountered. The rubber-cracking procedure is empirical, but, as an indicator method, its speed, specificity, and simplicity make this procedure attractive to the industrial hygienist, especially for preliminary surveys. There are 17 references.

- 501 The Metal Content of Urban Air. L. Dubois, T. Teichman, J.M. Airth, and J.L. Monkman. J. Air Poll. Control Assn. 16, 77-78 (Feb. 1966).

Previous attempts to measure heavy metals in air are discussed with particular reference to lead. A polarographic method was developed for lead in air samples taken on glass fiber sheet. Using this method, the distribution of lead across the glass fiber sheet was investigated, and within experimental error, found to be uniform. Air samples from 18 Ontario cities, previously analyzed for benzo(a)pyrene content were analyzed. -- Authors' abst.

- 502 Continuous Monitoring of Methane and Other Hydrocarbons in Urban Atmospheres. A.P. Altshuller, G.C. Ortman, B.E. Saltzman, and R.E. Neligan. J. Air Poll. Control Assn. 16, 87-91 (Feb. 1966).

Continuous measurements of total hydrocarbons (and other organic substances) and of methane were made in Cincinnati and Los Angeles for three-month periods. Some of the measurements were made during episodes of photochemical air pollution. Two instruments, one for measurement of total hydrocarbons and the other for methane, were operated in parallel. Both incorporated flame ionization detectors having greater sensitivity than commercial flame ionization instruments. The flame ionization analysis for methane was made specific by use of an adsorbent carbon column

preceding the analyzer to retain all organic substances except methane. Subtracting the methane concentration values from those for total hydrocarbons gave nonmethane hydrocarbon concentrations. The data showed diurnal patterns of concentrations of methane and nonmethane hydrocarbons in the atmosphere. Average hourly values for methane were strikingly similar in Los Angeles and in Cincinnati (2.6 and 2.4 ppm, respectively); those for nonmethane hydrocarbons were four times as high in Los Angeles (3.0 and 0.8 ppm, respectively). A bimodal frequency distribution pattern of the concentrations suggested that atmospheric ventilation was either good or poor, with less than a random amount of time in intermediate stages. The width of the methane frequency distribution peak was about half the width of that for nonmethane hydrocarbons, indicating a different and more constant source for the former. -- Authors' abst.

- 503 Airborne Particulates in Pittsburgh. Association With p,p'-DDT. P. Antommarchia, M. Corn, and L. DeMaio. *Science* **150**, 1476-1477 (Dec. 10, 1965).

The DDT associated with samples of airborne particulates was measured by gas chromatography. After chromatographic analysis of two of the samples, the remainder of the benzene extract was evaporated under vacuum, recrystallized from hot ethanol, filtered, and made up to 100ml. with isooctane. Absorbences at 216 to 320 millimicrons by the sample were determined with a Beckman DB spectrophotometer with cells of 40-mm. path length. Results of the analysis are shown in a table. Because of the vaporization of p,p'-DDT that occurs during the sampling period, the concentrations reported here must be regarded as minimum values, and only demonstrate that airborne DDT can exist in a heavily industrialized urban area. -- APCA Absts.

- 504 Emissions of Polynuclear Hydrocarbons from Automobiles and Trucks. R. P. Hangebrauck, R. P. Lauch, and J. E. Meeker. *Am. Ind. Hyg. Assn. J.* **27**, 47-56 (Jan.-Feb. 1966).

As a part of a screening survey to determine the origin of benzo(a)pyrene found in the urban atmospheres in the United States, emission rates of several polynuclear hydrocarbons, including benzo(a)pyrene, were measured on several automobiles and trucks powered by gasoline engines. The vehicles were roadtested over typical driving routes. The total exhaust was sampled by passing it through a multiplate condenser followed by large high-efficiency filters. Operating and emission data are given. The combined effects of vehicle-model age and mileage on polynuclear emissions are discussed, as are the relationships between polynuclear hydrocarbon emissions and the emissions of other products of incomplete combustion. There are 28 references. -- Authors' abst.

- 505 Mechanical Co-Factors in Olfactory Stimulation. E. Bocca, A. R. Antonelli, and O. Mosciaro. *Acta Oto-Laryngol.* **59**, 243-247 (Feb.-April, 1965).

The importance of mechanical stimulation of the olfactory epithelium as a co-factor in the odorous sensation, which had been previously demonstrated by the authors in animals, has been confirmed in the course of the present investigation on human subjects. It appears that mechanical stimulation makes odorous perception possible even for subliminal concentrations of the odorous substance in the mucus and that, on the contrary, in the absence of a mechanical stimulus, no odorous sensation arises, however high the concentration may be. -- APCA Absts.

#### PREVENTIVE ENGINEERING

- 506 To Cut Down Accidents—Design for Safety. G. A. Peters and F. S. Hall. *Prod. Eng.* **36**, 125-128 (Sept. 13, 1965).

Discusses the elimination of possible hazards of equipment by the analysis of design, development, fabrication, test, installation, maintenance and operation of complex man-machine systems; an eleven-step analytical evaluation is presented as hazard analysis table; a mathematical model of system safety aimed at determining overall probability of hazards is given.

-- J. Am. Soc. Safety Eng. Absts.

- 507 Evaluation of Protective Clothing and Equipment for Operations in Oxygen-Rich or-Deficient Atmospheres Approaching -100°F. E. E. Plumb, E. L. Mendenhall, and M. C. Robbins. *Am. Ind. Hyg. Assn. J.* **27**, 29-38 (Jan.-Feb. 1966).

The paper summarizes an investigation conducted to evaluate protective clothing and equipment for personnel who might be required to work up to 90 minutes in the Saturn S-IC booster interstage prior to launch at temperatures approaching -100°F. (-73.3°C.). Because the environment might be either oxygen-rich or-deficient, the selected material must be compatible with liquid oxygen.

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Tests of clothing and equipment have been conducted in environments to -100°F. temperature. Subjects wore various types of arctic clothing and respiratory equipment. In the cold environment they performed tasks simulating those which would be required in the booster interstage. The exposure times were varied from 15 to 57 minutes. The limiting parameters appear to be communications, visibility, and satisfactory respiratory protection at this temperature.

-- Authors' abst.

- 508 Use of Packed Beds for Separation of Entrained Particles and Fumes from an Air Stream. J.S. Eckert. J. Air Poll. Control Assn. 16, 95-98 (Feb. 1966).

This paper deals with packed beds in discussion of separation of entrained particles and fumes from an air stream. Packed beds develop between the gas and liquid a maximum of contact in order to get maximum mass transfer from a gas to a liquid phase, and they are considered to be one of the better methods of scrubbing contaminants from a gas stream.

-- Author's abst.

- 509 Guidelines to Safe Laser Welding. R.G. Daniels. Welding Engr. 50, 62 (April, 1965).

Laser beam energy radiation presents serious health hazards which are listed and described: reflections and scatter from beam are dangerous; electric shock and fire hazards require fail-safe protection; occupational vision program includes thorough eye examination; a general control program for safe operation is presented.

-- J. Am. Soc. Safety Eng. Absts.

### COMMUNITY AIR HYGIENE

- 510 A Rapid Actinometer for Photochemical Air Pollution Studies. J.N. Pitts, Jr., J.M. Vernon, and J.K.S. Wan. Air Water Poll. Intern. J. 9, 595-600 (Oct. 1965).

Absolute and relative measurements of sunlight intensities in the lower atmosphere are an essential part of investigations of photochemical air pollution. Various physical and chemical actinometers have been designed and developed to measure the radiant energy received from the sun or from artificial light sources. The o-nitrobenzaldehyde actinometer, when used in photochemical air pollution studies has unique advantages: (1) the actinometer could be used in a solid, solution, vapor, or a colloidal dispersion system, (2) the absorption spectrum of o-nitrobenzaldehyde has an absorption onset at about 4000Å which coincides with the wavelength threshold for the photo-dissociation of NO<sub>2</sub> into NO and O atom. If a standard source of known emissions at a particular wavelength is available, the o-nitrobenzaldehyde actinometer could be calibrated for any given solution or filter paper conditions to enable absolute measurements of the short wavelength intensity of sunlight received at any point.

-- APCA Absts.

- 511 Air Pollution Impacts to Some Important Species of Pine. G.H. Hepting. J. Air Poll. Control Assn. 16, 63-65 (Feb. 1966).

In the past, many species of pine have been severely damaged by acute forms of air pollution associated with ore smelting. More recently, damage to ponderosa pine in the state of Washington has been associated with atmospheric fluoride, and this species in particular has also suffered smog damage in southern California. In the East, white pine has been declining in the vicinity of certain soft-coal-burning power plants, and in one case downwind from an oil-burning power plant; also throughout the East, an atmospheric oxidant of unknown source has caused a type of needle blight on white pine. Trash burners and city dump combustion has led to the killing of certain pine species, leaving other intermixed pine species unharmed. Localized damage to white pine from automobile exhaust has been observed. Differences in the susceptibility of neighboring trees of the same species to a given air pollutant have been observed repeatedly. There are 15 references.

-- Author's abst.

- 512 Development of an Air Pollution Control Program at Cominco's Kimberly Operation. A.F. Snowball. J. Air Poll. Control Assn. 16, 59-62 (Feb. 1966).

During the concentration of lead and zinc sulfides from Cominco's Sullivan Mine at Kimberly, British Columbia, there is also produced an iron sulfide concentrate as a byproduct. A portion of these iron concentrates is roasted and the resulting calcine is treated in electric furnaces to produce 300 tons of pig iron per day. The sulfur dioxide produced in the roasting process is used to make sulfuric acid which is employed in the manufacture of ammonium phosphate fertilizers. Problems in the control of air pollution resulting from the iron sintering, iron smelting, and fertilizer operations at Kimberley are discussed, including those arising as a result of almost continuous expansion of these facilities since their establishment 12 years ago.

-- Author's abst.

- 513 The Role of the Computer in Air Pollution Control. W. J. Stanley.  
J. Air Poll. Control Assn. 16, 100-101 (Feb. 1966).

This paper contains a brief description of the historical development of Chicago's Department of Air Pollution Control, and how the growth of urban population and industrialization have dictated the needs for rapid analyzation and reporting of accurate, precise information to deal effectively with one of the nation's most important urban problems. It describes how the computer can be effectively utilized in a systems and data processing program to solve these problems, thus providing more time for professional and technical personnel to devote to investigation and enforcement of the ordinance of a huge municipality. In addition, it demonstrates how the federal government and a local municipality can co-operate in the solution of a mutual problem affecting the health and economy of our nation. Lastly, it is a vivid example of the application of scientific and technological advancement in an area where it best serves the needs of all segments of the public.

-- Author's summary

- 514 Agricultural Burning. C.S. Brandt. J. Air Poll. Control Assn. 16, 85-86 (Feb. 1966).

Open fires for the disposal of any of the wastes resulting from man's activities, including agricultural waste, may be an expedient and an economical practice. From the standpoint of our use of the air, such a practice is often costly and inefficient. The use of open fires to dispose of waste simply because the waste is of agricultural origin is never justifiable. In the development of local regulations designed to control open burning of waste, there is no need to give blanket exemption to all agricultural waste. In some areas, the use of fire for land management practices and for open burning of specific types of agricultural waste must be permitted simply because efficient alternatives are not presently available. Such use of open burning need not be unregulated; it should preferably be controlled burning. Some flexibility in timing and extent can be utilized to minimize the air pollution problems that arise. Regulations can be highly specific as to permissible practices, and the decision as to timing and extent of burning to be permitted under any given set of circumstances should be left to a designated competent authority. Regulations must provide for the prompt use of open burning whenever necessary for disease or pest control or other emergency use, but protection against its abuse must also be provided. The best interests of agriculture can be served by using open burning only when necessary and by regulating the necessary burning to minimize air pollution. Efforts to find effective agricultural waste disposal practices that do not involve burning must be encouraged and supported, and most important, these practices must be utilized when developed. There are 15 references.

-- Author's conclusion

- 515 Polynuclear Aromatic Hydrocarbons Associated with Particulates in Pittsburgh Air.  
L. DeMaio and M. Corn. J. Air Poll. Control Assn. 16, 67-71 (Feb. 1966).

Pittsburgh air was sampled continuously at one site for 336 hrs./ sample at 45cfm with a high volume sampler equipped with a horizontal elutriator as a first stage of separation, and a MSA 1106B glass fiber filter as a final particulate collection stage. The horizontal elutriator was designed to simulate the particulate deposition characteristics of the human respiratory tract. Samples were collected during the period June 1964 to February 1965. Respirable and non-respirable particulate samples were analyzed for polynuclear aromatic hydrocarbon content by a new technique which utilized dual column, flame ionization gas chromatography. It was possible to quantitatively analyze a concentrated benzene extract of the particulate sample for the following individual components: 1, 2 benzanthracene; chrysene; pyrene; 3, 4 benzofloranthene; 1, 12 benzoperylene. It was not possible to distinguish between 3, 4 benzopyrene, 1, 2 benzopyrene and perylene; only the total quantity of these compounds present was detected. This analytical technique is comparable in sensitivity to formerly reported, more time-consuming methods and is very rapid, requiring less than one hour to perform after benzene extraction. Amounts of the above compounds associated with the two particulate fractions collected are reported and discussed. There are 21 references.

-- Authors' abst.

- 516 Air Pollution. V.H. Sussman. Penna. Med. J. 68, 51-52 (May, 1965).

Following the passage of the Air Pollution Control Act of 1960, there was created in Pennsylvania an Air Pollution Commission which then granted powers to the Pennsylvania Department of Health to enforce the orders of the Commission, to investigate complaints of pollution, to conduct surveys and testing programs, and to make observations of conditions which might cause air pollution. The Department then created the Division of Air Pollution Control, staffed with engineers, meteorologists, and chemists. The Commission consists of five Government and six non-Government members. It is empowered to adopt rules and regulations and to hear and adjudicate cases involving violations. In matters of enforcement, the Division and the Air Pollution Commission give priority to the control of air pollution sources which threaten health and well-being. The

first regulation by the Commission was adopted to control the operation of coal refuse disposal areas which often catch fire and emit sulfur dioxide, hydrogen sulfide, and other gases. Burning coal refuse fires are major air pollution problems in anthracite and bituminous regions of Pennsylvania. Two other statewide regulations adopted by the Commission relate to open burning of refuse and industrial open burning and to the installation of incinerators, boilers, and other combustion units. Also a year ago, the Division installed three towers (two, 146ft. high and another 75ft. high) in Johnstown as part of an air pollution meteorology research project to determine the effects of weather conditions on the build up of pollutants in a community. It is hoped that this research can lead to a reliable system for predicting high pollution potentials and to institute a warning system.

-- Cond. from APCA Absts.

Editors Note: A fourth regulation controls the emission of particulate matter from industrial and domestic sources of pollution. It limits the amount of suspended particulate matter and particle fall from a source. Copies available by June 10. Write to: Division of Air Pollution Control, Pennsylvania Department of Health, P.O. Box 90, Harrisburg, Pa.

- 517 Public Awareness and Concern with Air Pollution in the St. Louis Metropolitan Area. Jane Schusky. *J. Air Poll. Control Assn.* 16, 72-76 (Feb. 1966).

The public attitudes survey involving St. Louis City, St. Louis County, and Madison and St. Clair Counties, Illinois, was completed and published in the fall of 1964. A total of 1,002 respondents gave needed information for the development of an acceptable abatement program. Substantial proportions from the study area expressed the view that they have had some negative reaction to the quality of the air. These respondents indicated that air pollution meant, primarily, odor and smoke with residents of some localities indicating other significant elements. The interviewed persons felt that factories and businesses were the prime causal agents in the existence of air pollution. Over 90% of all respondents felt that some governmental agency should do something about air pollution in the St. Louis area, with some bi-state metropolitan agency being the principal choice. The residents also expressed a willingness to pay minimal tax support for such a program. Indications as to the significance of air pollution in a general problems context, difference in attitudes between sub-sections of the study area, and more detailed analysis of the problem, its causes, and possible cures are contained in the study report.

-- Author's abst.

- 518 On the Determination of Odor Thresholds in Air Pollution Control—An Experimental Field Study on Flue Gases from Sulfate Cellulose Plants. R. Cederlöf, Marie-Louise Edfors, L. Friberg, and T. Lindvall. *J. Air Poll. Control Assn.* 16, 92-94 (Feb. 1966).

From the hygienic point of view, not only the health hazards caused by air pollutants but also the odor from emitted flue gases should be reduced to a minimum. An effective control of the risk of odor at ground level presupposes knowledge of the source concentration of the odoriferous gas as well as its odor threshold. This threshold has to be estimated empirically, as the flue gases often contain a complex mixture of different odoriferous substances, the odor thresholds of which are in most cases unknown. For this purpose a method has been developed for estimating the odor thresholds of flue gases emitted from different industrial processes. The method, a field method, is based on an exposure procedure, a number of subjects compare different concentrations of the flue gas with samples of fresh air and decide at what concentration the flue gas is no longer noticeable. The gas samples used are neither compressed nor absorbed or heated before the exposure test. The method has been used in two studies on gases from Swedish sulfate cellulose plants. In order to estimate the effect on the odor threshold of different deodorizing measures, gas samples were taken not only from the stack but also from different phases in the production process. The results and a brief discussion on the practical applications of the method are given.

-- Authors' abst.

#### MANAGEMENT ASPECTS

- 519 Alertness Management in Industry. J. A. Moody and B. C. Duggar. *Am. Ind. Hyg. Assn. J.* 27, 17-24 (Jan.-Feb. 1966).

Alertness management is of interest in industry because of its criticality to production rate, quality control and operator safety. Alertness management includes: (a) elimination of factors conducive to alertness decrement, (b) addition of conditions or procedures which enhance alertness, (c) reduction of the consequences of alertness decrements, and (d) personnel monitoring when necessary. The criteria for evaluating the controlling elements in the task, physical environment, social environment, and procedures which may lead to decrements in alertness are discussed. Monitoring procedures are described and recommendations suggested which should lead to improved alertness management in the industrial situation. An alertness checklist is presented for use in analyzing particular job situations. There are 35 references.

-- Authors' abst.

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- 520 Shedding Light on Night-Shift Problems. W. H. Richardson.  
Chem. Eng. 72, 148, 150, 152, 154 (June 21, 1965).

To prevent night-shift problems, all instructions should be written, an inventory of production should be taken on each shift, and night-shift operators should be occupied constructively; shift supervisors must be told what to do and whom to contact when emergency maintenance work must be done.

-- J. Am. Soc. Safety Eng. Absts.

### ACCIDENTS AND PREVENTION

- 521 Agricultural Injury Prevention. L. W. Knapp, Jr. J. Occ. Med. 7, 545-553 (Nov. 1965).

Agricultural industries in this country directly utilize the services of 7.1 million workers. In addition, 10 million other workers are engaged in ancillary activities such as the transportation and marketing of agricultural products. Agriculture yearly leads to more fatalities than any other pursuit and to a higher number of nonfatal accidents. The causes of agricultural accidents are by no means unique, but in no small part they relate to farm machinery and equipment. There are many circumstances that mark the agricultural worker as dissimilar to the usual industrial employee. The same principles of accident prevention that are applicable to industry in general apply to agricultural activities, but some distinct measures are requisite. Various features of appropriate agricultural-safety programs are presented. There are 11 references.-- Author's summary

- 522 Sudden Illness as a Cause of Motor Vehicle Accidents. B. Herner, B. Smedby, and L. Ysander. Brit. J. Ind. Med. 23, 37-41 (Jan. 1966).

Forty-one of the 44,255 road accidents reported to the police in one region of Sweden during 1959-1963 were, or probably were, caused by sudden illness in the driver of a motor vehicle. All 41 were males. The illness was most often due to epilepsy or myocardial infarction. Eight drivers died at the wheel from their disease. No other persons were killed in the 41 accidents. Only in 19 out of the 41 cases was there any possibility of a previous medical examination having indicated that the man was unfit to drive. In view of this, and the extremely small proportion—about 1 in 1,000—of accidents caused by sudden illness at the wheel, there is little point in providing for general measures such as periodic medical examination to prevent these accidents. Attention should be directed to other types of accidents and other groups of drivers. -- Authors' abst.

- 523 Aeromedical Factors of Titan II ICBM Support. A Summary of Two Years' Operational Experience. C. H. Sawyer, E. J. Sobieski, and B. Jay. Aerospace Med. 37, 167-172 (Feb. 1966).

Aeromedical procedures developed to support the lead Titan II Intercontinental Ballistic Missile Wing composed of 18 dispersed complexes are discussed. Mishap experience including a serious nitrogen tetroxide burn with associated chemical pneumonitis is reported. Human factors in combat missile crew duty with emphasis on fatigue, noise and nutrition are discussed. Propellant transfer experience with the USAF Rocket Fuel Handlers Clothing Outfit is summarized. The results of 2,939 preplacement and periodic propellant handler physicals are included. Experience gained in this missile program is referenced to future Titan II medical support requirements as well as other advanced weapon system developmental programs. -- Authors' abst.

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## ADDRESSES OF JOURNALS ABSTRACTED

Acta Oto-Laryngol.  
Acta Oto-Laryngologica  
Almqvist & Wiksell, P.O. Box 47  
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