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# *Industrial Hygiene Digest*

INDUSTRIAL HEALTH NEWS

LITERATURE ABSTRACTS

MEDICAL

ENGINEERING

CHEMICAL

TOXICOLOGICAL

LEGAL

APRIL, 1960  
(Vol. 24, No. 4)

INDUSTRIAL HYGIENE FOUNDATION  
MELLON INSTITUTE  
4400 FIFTH AVENUE -- PITTSBURGH 13, PA.

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## INDUSTRIAL HYGIENE FEATURES

Data on the relationship of weight and height to survival are presented in Abst. No. 320.

See Abst. No. 321 for a discussion on the head-tilt method of oral resuscitation.

The topic of Abst. No. 322 is the emergency management of thoracic trauma.

Abst. No. 324 is concerned with tuberculosis in medical students.

Details on cardiovascular disease among physicians are given in Abst. No. 326.

An evaluation of the cardiac patient for work capacity is the topic of Abst. No. 328.

Consult Abst. No. 330 for a consideration of industrial back prevention.

An interesting description of the disease called "wildfire" is given in Abst. No. 335.

Metal fume fever as an immunological disease is considered in Abst. No. 345.

Abst. No. 347 is concerned with the toxicological aspects of kerosene.

For the origin of the term anthracosis consult Abst. No. 368.

Considered in Abst. No. 369 are the hazards of underwater activities.

Clothing for cold conditions is the topic of Abst. No. 375.

Information on horizontal flat-plate sampling of solid particles in the atmosphere is presented in Abst. No. 384.

The design, operation and industrial hygiene features of a petrochemical benzene plant are described in Abst. No. 391.

The subject of Abst. No. 393 is eye irritation and air pollution.

## FOUNDATION FACTS

### SILVER ANNIVERSARY MEETING

October 26-27, 1960

Plans are progressing for the 25th annual meeting which will be held at Mellon Institute, Pittsburgh, Pa., the Foundation's headquarters. The Legal Committee is meeting in New York City on April 18, the Engineering, Medical, and Chemical-Toxicological Committees will meet April 26-27, in Rochester, N. Y., at the time of the Industrial Health Conference, to develop programs for their respective Conferences.

Please let us have your suggestions regarding subjects you would like to have discussed.

NEW MEMBER. The Foundation welcomes to membership the Alan Wood Steel Co.

DR. GROSS HONORED. Dr. Paul Gross, Research Pathologist of I-H-F has been appointed Adjunct Professor of Industrial Disease Pathology in the Graduate School of Public Health, University of Pittsburgh, for a one-year term.

NEW REPRINT. "The Pulmonary Response to a Proteinaceous Dust", P. Gross, M. L. Westrick and J. M. McNerney. A. M. A. Arch. Ind. Health 20, 477-488 (Dec. 1959).

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INDUSTRIAL HYGIENE DIGEST  
Literature and News

NEWS ITEMS

302 National Industrial Health Conference.

Recent developments affecting the health of American workers will be under discussion when approximately 3,000 occupational health specialists convene for the 15th National Industrial Health Conference to be held in Rochester, New York, April 25 to 30, 1960. General conference chairman is Herbert T. Walworth, director of industrial hygiene for the Lumberman's Mutual Casualty Company of Chicago. Papers by well-known authorities will cover such subjects as heart disease in industry, cancer, radiation, mental health, industrial dentistry, noise, industrial nursing, air pollution, and toxicology of various substances related to industrial health. Approximately 100 scientific exhibits will depict problems in worker health.

303 Cincinnati Welcomes Air Pollution Control Association.

More than 400 air pollution officials, research workers, and industrial representatives are expected to attend the 53rd annual meeting of the Air Pollution Control Association, May 22 to 26, 1960 at the Netherland-Hilton Hotel in Cincinnati. The program of the meeting, announced by Charles W. Gruber, chief of the City of Cincinnati's Air Pollution and Heating Control Bureau and Conference Chairman, will consist of an intensive review of all aspects of the nation's air pollution problems. In all, 69 technical papers will be delivered in 18 sessions on specific air pollution problems. Among the subjects to be dealt with are community air pollution surveys, auto exhaust research, industrial air pollution control, agricultural research, and zoning, planning, and administration for air pollution control. One afternoon will be devoted to tours of industrial plants and research installations in the Cincinnati area doing outstanding work in air pollution control. Industrial exhibits also will be shown in an adjoining hall at the hotel. Requests for registration information should be addressed to APCA Annual Meeting, 2400 Beekman Street, Cincinnati 14, Ohio.

304 Air Pollution Symposium.

The ACS Division of Water and Waste Chemistry will sponsor a symposium at the national ACS meeting in New York, September, 1960, in participation with the ACS Committee on Air Pollution. Principal themes will be "Generation, Measurement, and Physicochemical Properties of Aerosols" and "Free Radical Mechanisms". Titles and abstracts of papers on the first subject should go by June 1 to Dr. James P. Lodge, Taft Sanitary Engineering Center, 4676 Columbia Parkway, Cincinnati 26, Ohio; on the second, to Dr. Leslie A. Chambers, Air Pollution Control District, 434 South San Pedro, Los Angeles 13, California, and abstracts of general papers covering new research on air pollution should be submitted to Dr. Richard D. Hoak, Mellon Institute, 4400 Fifth Avenue, Pittsburgh 13, Pennsylvania. -- Chem. Eng. News

305 National Fire Protection Association.

Leading fire protection authorities from all over the world will meet in Montreal in May to discuss how to make people and their property safer from fire. Topics ranging from industrial plant protection and fire department equipment to school fire problems and

community fire safety education will be among those covered at the week-long 64th annual meeting of the National Fire Protection Association. The meeting, opening on May 16, 1960 at the Queen Elizabeth, will be the first held in this Canadian city. It is expected to be attended by close to 2,000 persons. Among the many fire subjects to be discussed during the five-day meeting will be modern timber construction, chemical processing safety, developments in extinguishing agents, flammable liquid hazards, storage of gases, aircraft fueling procedures, and cutting and welding hazards. Other topics will be a report on a study of fatal fires, improved safety in school buildings, hospital operating room fire hazards, and methods to improve fire protection for libraries and museums.

### 306 Association of Food and Drug Officials.

This organization will hold its 64th annual national conference June 5 to 9, 1960 at the Baker Hotel, Dallas, Texas. Dr. Arthur S. Flemming, Secretary of Health, Education and Welfare, will head the list of speakers. Discussions will be held on narcotics problems in the various states, on current developments in food additives and color amendments, and on hazardous chemicals and frozen foods. Also featured will be the fifth annual presentation of the Harvey W. Wiley Award.

-- Chem. Eng. News

### 307 International Acetylene Association.

This group will hold its 1960 meeting at the St. Francis Hotel in San Francisco, May 9 and 10. Sessions will feature speakers from various participating companies as well as public officials and representatives from the educational field. Some of the topics to be covered are acetylene for chemicals, cryogenics, and safe practices in the use of oxyacetylene processes and equipment.

-- Chem. Eng. News

## COMING EVENTS

- |               |                                                                                                    |
|---------------|----------------------------------------------------------------------------------------------------|
| 308 May 2-4   | Chamber of Commerce of the United States, Annual Meeting, Washington, D. C.                        |
| May 3-4       | Association of American Physicians, Atlantic City, N. J.                                           |
| May 7-8       | Academy of Psychoanalysis, Atlantic City, N. J.                                                    |
| May 8-12      | Radiation Research Society, Annual Meeting, San Francisco, Calif.                                  |
| May 9-10      | International Acetylene Association, Annual Meeting, San Francisco, Calif.                         |
| May 9-11      | Aerospace Medical Association, Bal Harbour, Fla.                                                   |
| May 9-12      | American Petroleum Institute, Division of Refining, Midyear Meeting, Detroit, Mich.                |
| May 9-13      | Instrument Society of America, Instrument-Automation Conference and Exhibit, San Francisco, Calif. |
| May 11-13     | American Association for Thoracic Surgery, Miami Beach, Fla.                                       |
| May 11-13     | American Material Handling Society, Los Angeles, Calif.                                            |
| May 11-13     | Synthetic Organic Chemical Manufacturers Assoc., Shawnee-on-Delaware, Pa.                          |
| May 15-20     | National Tuberculosis Association, Los Angeles, Calif.                                             |
| May 16-17     | Chemical Specialties Manufacturers Association, 46th Midyear Meeting, Chicago, Ill.                |
| May 16-18     | American Trudeau Society, Los Angeles, Calif.                                                      |
| May 16-20     | National Fire Protection Association, Annual Meeting, Montreal, Quebec                             |
| May 17-20     | American Association of Plastic Surgeons, Milwaukee, Wis.                                          |
| May 22-26     | Air Pollution Control Association, Cincinnati, Ohio.                                               |
| May 23-25     | TAPPI Coating Conference, 11th Annual Meeting, Chicago, Ill.                                       |
| May 30-June 2 | American Orthopaedic Association, Hot Springs, Va.                                                 |
| June 12-15    | American Nuclear Society, National Meeting, Chicago, Ill.                                          |
| June 12-15    | 2nd Annual National Industrial Pharmaceutical Research Conference, Land O'Lakes, Wis.              |

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|            |                                                                                       |
|------------|---------------------------------------------------------------------------------------|
| June 13-15 | Chemical Institute of Canada, 43rd Annual Conference and Exhibition, Ottawa, Ontario. |
| June 13-17 | American Medical Association, Annual Meeting, Miami Beach, Fla.                       |
| June 13-17 | Gordon Research Conferences, Lipide Metabolism, Meriden, N.H.                         |
| June 15-17 | American Physical Society, Montreal, Quebec.                                          |

## OCCUPATIONAL DISEASE STATISTICS

## 309 Occupational Disease Statistics. (Cases reported to the respective Health Departments.)

|                            | Colo.<br>Feb. | Conn.<br>Jan. | Ind.<br>Jan.-Feb. | Pa.<br>Feb.-Mar. | Total |
|----------------------------|---------------|---------------|-------------------|------------------|-------|
| Carbon monoxide poisoning  | 1             |               |                   |                  | 1     |
| Dermatitis                 | 20            | 32*           | 2*                | 40               | 94    |
| Fumes (unidentified)       |               |               |                   | 5                | 5     |
| Hearing loss               | 1             | 1             |                   |                  | 2     |
| Lead intoxication          |               |               |                   | 1                | 1     |
| Lead poisoning             |               | 1             |                   | 6                | 7     |
| Metal fume fever           | 1             |               |                   |                  | 1     |
| Nitrogen oxides            | 1             |               |                   |                  | 1     |
| Parathion poisoning        | 9             |               |                   |                  | 9     |
| Pneumoconiosis             | 1             |               |                   | 30               | 31    |
| Pneumoconiosis (suspected) |               |               |                   | 31               | 31    |
| Pneumonitis (suspected)    |               |               |                   | 1                | 1     |
| Respiratory infection      |               |               |                   | 1                | 1     |
| Respiratory irritation     |               |               |                   | 3                | 3     |
| Silicosis                  |               |               | 1                 | 12               | 13    |
| Silicosis (suspected)      |               |               |                   | 18               | 18    |
| Solvents (poisoning)       | 1             |               |                   |                  | 1     |
| Miscellaneous              | 6             |               |                   |                  | 6     |
| Total                      | 41            | 34            | 3                 | 148              | 226   |

\* Causes are listed as follows:

Connecticut: Oils, fats and waxes, 12; solvents (N.O.C.), 5; chemicals (N.O.C.), 4; synthetic resins and chemicals, 3; undetermined, 3; abnormalities of temperature, cyanides, inorganic dust, dyes and inks, and soap solutions, glue, etc., 1 each.

Indiana: Chromic acid, 1; cause not stated, 1.

## LEGAL DEVELOPMENTS

## 310 Uniform Hazardous Substance Act. Effective January 1, 1960. (Illinois Rev. Stat. Ch. 111 1/2, Sections 251-266).

Perhaps the most important provision of the Uniform Hazardous Substance Act is contained in Section 11 which states that: "It is unlawful for any person to distribute, sell or offer for sale within the State or deliver for transportation or transport in intrastate commerce

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or between points within this State through any point outside this State any of the following: any hazardous substance intended or suitable for household use, unless there is affixed to the container, a label bearing: (a) The name and address of the manufacturer, packer, or distributor. (b) The common or usual name, or the recognized generic name (not trade name only) of the hazardous substance or of each component which contributes substantially to its hazard. (c) One of the following words: DANGER, WARNING or CAUTION. The word "Danger" to be used for substances which are highly toxic, extremely flammable or corrosive. The word "Warning" or "Caution" to be used on all other hazardous substances. (d) An affirmative statement of the principal hazard, such as "flammable", "vapor harmful", "causes burns", "absorbed through skin", or similar wording description of the hazard. (e) Precautionary measures describing the action to be followed or avoided. (f) Instructions, when necessary, for the first-aid treatment in case of contact or exposure, if the substance is hazardous through contact or exposure. (g) Instructions for handling and storage of packages which require special care in handling or storage. (h) A statement, "Keep out of reach of children", or its practical equivalent. (i) The word "Poison" for any hazardous substance which is highly toxic." "Any person violating any of the provisions of this Act is guilty of a misdemeanor, and, upon conviction, shall be fined not less than \$100 nor more than \$1000 or imprisoned in the county jail for a term of not more than one year, or both."

-- Cond. from Illinois Labor Bull.

### 311 Silicosis—Waiver—Insurer and Insurance—Date of Disablement—Statute Construed.

The commission properly held that the defendant's insurer was not on the risk during the period of the employee's "last injurious exposure" to silica dust so as to impose liability on the carrier. The decedent, a stonecutter, was employed by the defendant from November 4, 1950 to September 29, 1951. The defendant was insured up to July 16, 1951. The decedent worked up to September 29, 1951. He died on November 22, 1951 from silicosis and possible tuberculosis. The court rejected the defendant's contention that the testimony of a doctor fixing the date of disablement also fixes the time of last injurious exposure as July 5, 1951. The court held that the period of last injurious exposure was the last thirty days of the decedent's employment while exposed to silica dust, because the decedent worked for the same employer as much as thirty days in a period of seven months. An employee is capable of further injury so long as there is any sound tissue in the lungs to be scarred by the cutting particles of dust and reduced to a fibroid state. The decedent was capable of further injury from silicosis up to and including September 29, 1951 because he still lived and breathed. The statute created an irrebuttable presumption that the last day of work was the date of disablement and the last thirty days of work was the period of last injurious exposure. Affirmed on the defendant's appeal. Reversed on the carrier's appeal. Fetner v. Rocky Mount Marble & Granite Works. North Carolina Supreme Court. No. 257. November 18, 1959.

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### 312 Occupational Disease—Pulmonary Tuberculosis—Causal Connection.

The plaintiff sued his employer for damages incident to having contracted pulmonary tuberculosis while employed as a laborer, cleaning steel castings. The plaintiff contended that he had to work in close proximity to castings that were being cleaned by cleaning brushes, chipping hammers, etc. The castings were coated with silica, sand and other deleterious substances. On January 9, 1953 the plaintiff had an x-ray taken which showed a beginning infiltration in the plaintiff's upper lungs with suspicion of tuberculosis. A fifth x-ray taken on March 8, 1954, showed an extension of the lesion of the lung, and the plaintiff was pronounced as having moderately advanced bilateral tuberculosis. The plaintiff was forced to quit his work on April 30, 1954. The plaintiff contended that the defendant failed to provide the plaintiff with a safe place to work in that he failed to install blowers, fans or other devices to withdraw the impure substances from the air, and refused to provide the plaintiff with respirators or other devices then available. The court rejected the defendant's contention that the plaintiff's cause of action was barred by the one year statute of limitations and that the trial judge erred in excluding the testimony of the defendant's witness who made a test at a time the factory was not in operation. The court ruled that the one year statute of limitations was not applicable for two reasons. First, the plaintiff did not definitely know that he had

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tuberculosis until the examination on May 11, 1954, which resulted in a positive finding of tuberculosis. Second, that the statute would not start in operation until the day of work done last by the plaintiff who quit work April 30, 1954, since this was a continuing tort. Since the plant was not in operation the conditions were in no way similar to those prevailing when the plaintiff was working as a cleaner; hence the testimony of the defendant's witness was properly excluded. The court held that the verdict of \$10,000 was not so excessive as to warrant a finding of passion, prejudice or caprice. Affirmed. Lenoir Car Works v. McCloud. Tennessee Court of Appeals, Eastern Section, January 20, 1960.

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# BOOKS, PAMPHLETS AND NOTICES

- 313 Sixth Technical Progress Report. W. L. Faith and N. A. Renzetti. Report No. 30, Air Pollution Foundation, 2556 Mission St., San Marino, Calif. 81 pp. (Mar. 1960). \$3.00.

In this report the authors review not only work sponsored by the Air Pollution Foundation during 1959, but also other pertinent studies. Chapter I is essentially a resume of their Report 29, which detailed their project at Stanford Research Institute on the photo-oxidation of hydrocarbons. Chapter II reviews Report 28, in which the Franklin Institute Laboratories reported on their study of the catalytic treatment of motor vehicle exhaust gases. The work on the use of foamed metals to deactivate lead in exhaust gases, done for the Foundation by the Bjorksten Research Laboratories, is also included. The results were negative. The authors review in some detail the status of commercial exhaust control devices and other proposed methods of reducing contaminants in motor vehicle exhaust. In Chapter III the important field of atmospheric photochemistry is brought up-to-date by reviewing the work of various laboratories. Chapter IV is essentially a discussion of California's new ambient air and motor vehicle exhaust standards. A selected bibliography of the most important air pollution publications of 1959 is appended.

-- Cond. from authors' foreword

- 314 Controlling Noise Hazards. Bulletin 207. U. S. Dept. of Labor, Bureau of Labor Standards. 6 pp. (1959). For sale by Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. 10 cents.

This government bulletin contains valuable information on noise. Noise is not a new problem in industry, but recognition that loss of hearing, due to working in a noisy industrial environment is an occupational disease, has focused attention on noise. The bulletin discusses the characteristics of sound in terms of frequency and intensity and enumerates factors that determine the harmful effect of noise. It explains how a noise survey can be made and suggests ways of controlling noise.

- 315 Health Statistics from the U.S. National Health Survey. Series B-No. 12. Chronic Respiratory Conditions Reported in Interviews. United States July 1957 - June 1958. U.S. Dept. of Health, Education and Welfare, Public Health Service. PHS Publication No. 584-B12. 32 pp. (Dec. 1959). For sale by Supt. of Documents, U.S. Government Printing Office, Washington 25, D.C. 30 cents.

This report presents statistics on the prevalence of chronic respiratory conditions and associated disability by age, sex, medical attention, and type of condition. The subject is discussed under the following headings: the prevalence of chronic conditions, source and classification of data on chronic conditions, asthma and hay fever, chronic sinusitis, chronic bronchitis, other chronic respiratory conditions, and disability due to chronic respiratory conditions.

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- 316 Health Statistics from the U.S. National Health Survey. Series B-No. 13. Heart Conditions and High Blood Pressure Reported in Interviews. United States July 1957 - June 1958. U. S. Dept. of Health, Education and Welfare, Public Health Service. PHS Publication No. 584-B13. 36 pp. (Feb. 1960). For sale by Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. 30 cents.

This publication gives statistics on the prevalence of heart conditions and high blood pressure and days of disability due to these conditions by age, sex, and medical care status. The data were collected by means of household interviews. They measure the levels of the above diseases in terms of cases which the people interviewed have been made aware of, have remembered, and considered sufficiently important to report.

- 317 Health Statistics from the U.S. National Health Survey. Series C-No. 2. Veterans Health and Medical Care. United States July 1957 - June 1958. U. S. Dept. of Health, Education and Welfare, Public Health Service. PHS Publication No. 584-C2. 52 pp. (Jan. 1960). For sale by Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. 40 cents.

During the survey year July 1957 - June 1958 the questionnaire used by the U. S. National Health Survey included a series of questions on veteran status. A group of tabulations was designed which used this series of questions to divide all males age 15 or over into two groups—veterans and non-veterans. In some tabulations the veterans were further divided according to the war in which they served. The data thus collected are presented in this report. A large part of the report is devoted to selected health characteristics of veterans and non-veterans and to the extent to which these two groups utilize the services of hospitals and physicians. This major section of the report is followed by detailed tables for a number of health characteristics and then by a short section on veterans classified in three groups: the Korean conflict, World War II, and World War I combined with the Spanish-American War. Three appendices of the report present details of the survey including the sampling errors, definitions and concepts, and the questionnaire. -- Cond. from author's introduction

- 318 Health Statistics from the U.S. National Health Survey. Series D-No. 1. A Study of Special Purpose Medical-History Techniques. U. S. Dept. of Health, Education and Welfare, Public Health Service. PHS Publication No. 584-D1. 27 pp. (Jan. 1960). For sale by Supt. of Documents, U. S. Government Printing Office, Washington 25, D. C. 30 cents.

The purpose of this report is to describe a methodological study preliminary to the development of a medical-history questionnaire and appropriate interviewing techniques for use in a health examination survey of adults in general population samples. The research was conducted by the Survey Research Center of the University of Michigan under contract with the U. S. National Health Survey of the Public Health Service. The questionnaire to be developed was to be used for two general purposes: (1) To obtain information about symptoms and illnesses which would assist in arriving at diagnostic conclusions in physical examinations of persons included in survey samples. (2) Together with the physical examination, to obtain certain data for statistical analysis the frequency of symptoms and illnesses and related variables of a cross-section sample of the population.

#### INDUSTRIAL MEDICAL PRACTICE

- 319 A Morbidity Study on a Working Population. G. A. Sinclair. Med. Bull. (Std. Oil N. J.) 20 1-15 (Mar. 1960). This paper was published originally in Can. Med. Assn. J. 8, 407-410, (Feb. 20, 1960)

In summary, this paper presents the following: (1) The sickness absentee rates for one year of a company population (13,599 persons) widely dispersed in Canada and engaged

in all phases of the oil industry. (2) The incidence of occupational and non-occupational dermatitis in refinery workers and a control group. The experience of the author shows no increased incidence of occupational dermatitis in employees working with petroleum products. (3) A review of periodic health examinations and preplacement examinations. Under selected diseases, the frequency of each is shown, and it is sub-divided into—those not known to the employee before examination, and those that have been previously recorded. The latter reflects to a certain degree the effect that health counseling and medical guidance has, by influencing employees to seek treatment earlier than they might otherwise have done. (4) A review of employees with limited work capacity who are able to do an effective job when suitably placed. Every effort is made in a modern company to keep the amount of sickness absence of employees to a minimum, by supporting an active health program. Those employees having chronic illness or disability and the will to do productive work may have little or no loss of time from work when placed at jobs within their capabilities. An appropriate definition of employee health is: "The state of well-being that exists when an employee is able and willing to fulfill regularly the requirements of his job."

- 320 Tables of Average Weight and Height of Americans Aged 65 to 94 Years. Relationship of Weight and Height to Survival. A. M. Master and R. P. Lasser. J. Am. Med. Assn. 172, 658-662 (Feb. 13, 1960).

A table of average weight at each inch of height, for persons of each sex, in 5-year age groups, has been presented for the population between 65 and 94 years of age. This is the first table to be constructed for this group. The current study involved apparently healthy subjects in the United States. The data should prove valuable in research on the relationship of weight to disease and as a guide for weight control in the older population. Weight increases with increasing height, as the bony frame becomes larger and heavier. After 65 years of age mean weight decreases progressively with advancing age in both sexes at every inch level of height. This decrease is due to loss of body substance and to reduction in the proportion of overweight subjects by a relatively higher mortality. From the age of 65 to that of 94 years, overweight men decrease from 30 to only 10% of the population, while underweight men increase in frequency from 20 to 50%. At the same ages, overweight women decrease from 40 to 10%, while underweight women increase from 20 to 55%. This emphasizes the favorable survival rate of underweight persons. In the older age group  $\pm 20\%$  variation from the mean is too broad a criterion for normal; only a  $\pm 10\%$  variation in weight should be considered healthy. There is little or no change in average height in persons aged from 65 through 94 years. Tall persons seem to have as satisfactory a survival rate as shorter ones.

-- Authors' conclusions

- 321 Head-Tilt Method of Oral Resuscitation. J. O. Elam, et al. J. Am. Med. Assn. 172, 812-815 (Feb. 20, 1960).

Mouth-to-mouth and mouth-to-nose methods of artificial respiration are simplified and made more effective if the patient's neck is extended by the procedure here described. With the patient in the supine or semilateral position, the rescuer uses one hand to tilt the patient's head as far back as possible. He uses his other hand to pull the patient's chin upward. Circumstances determine whether the rescuer will apply his mouth to the mouth or the nose of the patient. The use of adjuncts like tubes and masks by untrained laymen in order to avoid direct contact is not recommended.

-- Editor's summary

- 322 Industrial Trauma. 2. Emergency Management of Thoracic Trauma. H. T. Ransdell. J. Occ. Med. 2, 100-102 (Feb. 1960).

(See IHD Abst. 121, Feb. 1960). The essentials of the emergency management of chest trauma are outlined. The diagnoses and emergency management of the commoner entities using these principles are discussed. The use of facilities and materials available to the average physician is described. Use of many of the principles and methods of treatment often will be required for the same patient and perhaps, simultaneously.

-- Author's summary

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- 323 Occupational Disorders of Dentists. C. Parma.  
Z. ges. Hyg. u. ihre Grenzgebiete 5, 152-175 (May-June 1959). German.

This is a detailed paper in which there is an analysis of information obtained by questionnaire and by sickness reports on the illnesses and disabilities suffered by members of the dental profession in Czechoslovakia. The questionnaire was answered by 2,785 persons (2,302 men and 483 women) who worked in the cities and provinces of the republic. The prevalence of the different types of illness in dentists is compared with that recorded in other occupations. The conditions which, as a result of this work, are considered to be occupational diseases of dentists are: (1) teno-synovitis, neuritis and arthritis of the upper extremity; (2) eczema and dermatitis of the hands; (3) infections resulting from increased risk of droplet infection such as inflammations of the upper respiratory passages and the eyes and also some general infections such as diphtheria and scarlet fever; and (4) accidents involving the hand and the eye. Conditions which are brought to light or made worse by dental work are: (1) flat feet; (2) varicose veins; (3) kyphoscoliosis; and (4) spondylitis. -- Cond. from Bull. Hyg.

- 324 Tuberculosis in Medical Students. J. R. Karns. Am. Rev. Tuberc. 79, 746 (1959).

A tuberculosis control program has been in operation at a large American medical school since 1934. In this 23-year period, 2,302 students have been adequately studied while in school. During this period, the number of students giving a positive tuberculin reaction at matriculation and graduation has diminished greatly, the lowest number of reactors occurring since 1950. This indicates that there is less risk of tuberculous infection in medical school now than in previous years. Seventeen cases of clinically significant tuberculosis developed in the students while in school; 16 of them before June 1950, and only one between 1950 and 1957. This recent low morbidity has come about without the use of BCG vaccination. It appears to be the result of early diagnosis and treatment, improved methods of treatment, and management of tuberculosis as a contagious disease. The patch test was positive in all cases of clinically significant tuberculosis at the time of diagnosis. In a group of 53 students the patch test was found to be as accurate as first-strength purified protein derivative (PPD). The author considers that medical students still run a greater risk of tuberculosis infection than other student populations and that continued vigilance is still necessary.

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

- 325 Effects of Muscular Work and Heat on the Cardiovascular System. L. Brouha.  
Ind. Med. & Surg. 29, 114-120 (Mar. 1960).

The cardiovascular system reacts to muscular work and to heat exposure by an increased cardiac output and a redistribution of the blood flow according to the needs of the various organs. When no heat stress is involved, most of the blood is available to transport oxygen to the working muscles. Individual maximum oxygen intake and maximum performance are attainable. When heat stress is present, an important portion of the total blood volume must be used for thermoregulating purposes and maximum oxygen intake can no longer be achieved. Maximum heart rate and cardiac output are reached sooner and the working capacity is reduced as the environmental temperature increases. Heart rate is influenced by high ambient temperatures during the performance of various grades of exercise and during the recovery period. Measuring cardiac work cost and cardiac debt is an accurate way for assessing the physiological strain. Utilizing heart rate recovery curves to evaluate the effects of muscular work, heat and individual fitness is a simple and useful method in field research. When a job has been recognized as producing high reactions either because of the work load, or heat exposure, or both, various improvements can be made. They must be evaluated in terms of physiological values until a satisfactory solution is found. In many industrial operations heat remains the main factor of stress and low productivity. Adequate measures to combat it are available and should be adopted.

-- Cond. from author's summary

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IN RE: ABRAMS November 1960

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- 326 Cardiovascular Disease Among Physicians. N. Reitman.  
J. Med. Soc. New Jersey 56, 673-676 (Nov. 1959).

A questionnaire concerning the incidence of hypertension, obesity, stress and strain, diet, and diabetes in association with cardiovascular diseases was sent to 427 physicians in New Jersey. This sample group was selected at random, taking every 11th physician listed in the state. Two hundred sixty replies were received, 247 from male and 13 from female doctors. There were 25 cardiacs (10%) and 235 non-cardiacs (90%). The cardiovascular diseases were rheumatic in 3 respondents, hypertensive in 7, arteriosclerotic in 13, aortic coarctation in 1, and thyrotoxic disease in 1. Hypertension was present in 28% of the 25 cardiac physicians, obesity in 10%, stress and strain in 92%, dietary restriction in 52%, and diabetes in 8%. In the non-cardiac group, the frequencies were: hypertension in 8%, obesity in 48%, stress and strain in 97%, dietary restriction in 34%, and diabetes in 1%. It appears that hypertension and diabetes are statistically significant factors in the incidence of cardiovascular disease in this sampling of New Jersey physicians. Comparing the data obtained in this survey with the results of other studies on the subject, the author also concludes that mortality from heart disease among physicians in New Jersey is almost exactly the same as in the rest of the United States. There is a statistically significant increase in physician mortality from heart disease (66%) as compared with the incidence (53%) in the general population. New Jersey cardiac physicians are somewhat less obese and follow dietary restrictions more strictly than their non-cardiac colleagues. Although stress and strain occur in a vast proportion of all physicians throughout the nation, no statistical evidence supports the popular concept that coronary artery disease is the doctor's disease. Coronary disease occurs more frequently among business executives of the same age group as physicians.

-- J. Am. Med. Assn. Absts.

- 327 Heart Disease and Motor Vehicle Accidents. H. Brandaleone.  
J. Occ. Med. 2, 76-79 (Feb. 1960).

The importance of the physician in motor vehicle accident prevention is stressed. Heart disease may be an important factor in the etiology of motor vehicle accidents. Each cardiac driver must be individually evaluated by a physician to determine the likelihood that he can drive with safety. The role of the industrial physician has been presented. Specific recommendations are given to assist the examining physician to evaluate the ability of a cardiac patient to drive with safety.

-- Author's summary

- 328 Evaluation of the Cardiac Patient for Work Capacity. J. G. Benton.  
J. Am. Med. Assn. 172, 790-793 (Feb. 20, 1960).

The relative importance of physical activity and emotional stress among the occupational factors leading to heart disease has been difficult to determine from a review of the published data. There is also a lack of reliable tests for evaluating the work capacity of cardiac patients. In order to assess the strain of a given job, it is necessary to consider not only the average energy requirements, but also the peak loads. Experience has shown, however, that workers who return to properly selected employment after recognition of their cardiac disability have at least as good a prognosis as those who do not return and that with respect to efficiency, regularity of attendance, freedom from accidents, and adaptability they compare favorably with other groups of workers.

-- Editor's summary

- 329 Return to Work of Patients with Angina Pectoris and/or Myocardial Infarction. R. S. Green and Erna L. Borousch. J. Am. Med. Assn. 172, 783-789 (Feb. 20, 1960).

In the experience of the authors it has never been necessary to resort to surgical procedures to relieve a patient of anginal attacks. Considerations here outlined have led to a program for building up collateral circulation in the coronary vessels in anticipation of eventual coronary occlusions or excessive demands on the myocardium. It is insisted that the patient be underweight. Factors inducing anginal attacks must be eliminated, and nitroglycerine must not be misused simply to escape the penalties of overburdening the heart.

During subsequent rehabilitation the patient should be concerned more about returning to his job than to his advocations. In 13 years of experience with the type of patients here specified, relief from the symptoms of angina, even of the so-called intractable type, has been achieved in all patients who adhered to the plan, and most of them have returned to their former occupation.

-- Editor's summary

- 330 Industrial Back Prevention. C. Rombold. J. Occ. Med. 2, 132-136 (Mar. 1960).

An effective program is described for the prevention of back injuries among the field crews of a public utility company. The essential components of the program are: (1) rejection of applicants with roentgenographic or other evidence of predisposition to back injury; (2) reduction of strenuous physical labor through mechanization; (3) intensive safety training for foremen, who are required then to give close attention to back injury prevention; and (4) sympathetic determination on the part of the company and its physicians to get injured workers well.

-- Author's summary

- 331 Extradural Osseous Lesions Simulating the Disk Syndrome. H. R. Walker. J. Am. Med. Assn. 172, 691-694 (Feb. 13, 1960).

Seven patients with complaints and physical findings suggesting a diagnosis of herniated intervertebral cartilage (disk syndrome) were found, on more thorough study to have neoplastic disease of the bone. Roentgenographic examinations were done to show the vertebrae in better detail than before and to survey bones other than the vertebrae. In three patients the neoplastic process involved lumbar or sacral vertebrae, but in three others it involved the pelvis and in the seventh it involved the femur. In cases of supposed disk syndrome a thorough study of the rest of the skeleton should be done before elective surgery is attempted on the vertebral column.

-- Editor's summary

- 332 Lung Cancer in Coal Miners. R. A. Smith. Brit. J. Ind. Med. 16, 318-323, (Oct. 1959).

In a study of coal miners suffering from lung cancer two features of special interest are recorded. The difficulties in diagnosis are illustrated by case reports. The two-year survival rate after surgical removal of the tumor is significantly better in coal miners than in non miners. After operation 87% of coal miners were alive two years later, compared with only 36% of other patients operated upon. It is suggested that the rate of spread of the tumor to the mediastinal structures, lymph glands, and blood vessels is retarded by the effects of pre-existing dust disease in the lungs. This factor explains the good results in a group of patients selected for surgery.

-- Author's abst.

- 333 Severe Allergic Reactions to Insect Stings. H. L. Mueller. New Eng. J. Med. 261, 374 (1959).

Severe reactions to insect stings occur more commonly than is generally supposed. Death may take place very rapidly and be mistaken for a fatal cardiac attack without suspicion of the true nature of the etiological factor. This study of 84 patients with systemic allergic reactions to insect stings (wasp, hornet, yellow jack and bee) indicates that identification of the insect is usually unreliable. Seventy-five per cent of the group gave a strong family history of allergy and 38% had other important allergies. Intracutaneous testing with whole-insect extracts indicated that multiple sensitivities were usually present. Scratch tests were of no value. Intracutaneous sensitivity was often very extreme in degree. Treatment should be carried out with a mixed whole-insect extract of bee, wasp, hornet and yellow jack, starting with the lowest dilution giving an intradermal reaction in the individual patient. Dosage should be gradually increased to a maintenance level of 0.2 to 0.3 ml of 1:100 dilution. This maintenance dose should be continued for three years, being administered every six weeks except during the summer when the interval should be shortened to four weeks. Of 76 patients treated, 40% had subsequent stings. Only one systemic reaction occurred, milder than had been experienced before treatment.

-- Can. Med. Assn. J. Abst.

## SKIN DISEASES AND BURNS

- 334 Primary Irritation of the Skin: Observations on Threshold Reactions. J. B. Haberlin, Jr. and J. M. Fox. *A.M.A. Arch. Dermatol.* 80, 690 (Dec. 1959).

It has been well documented that primary irritation can lead to an eczematous dermatitis. In addition, there is experimental and practical clinical evidence to show that the primary irritant reaction can engender an allergic eczematous contact dermatitis. Numerous factors appear to influence the primary irritant reaction; thus in an effort to clarify some of these points which are not distinctly known, the authors undertook a series of experiments to delineate primary irritant reactions. Guinea pigs were exposed to varied concentrations of two primary irritants, croton oil and chrysarobin, before, during, and after an induced irritant dermatitis. Observations made on the exposed animals indicated that the presence of a massive dermatitis may increase the irritability of the skin in other locations. In another experiment, the influence of ultraviolet irradiation and stripping of the stratum corneum on the threshold of primary irritation of the skin was studied on 10 white male students. From this experiment the authors concluded that the thickness and integrity of the horny layer may have considerable influence on the reactions of the skin to threshold concentrations of primary irritants.

-- J. Occ. Med. Absts.

- 335 The Disease Called "Wildfire". C. E. Counter. *A.M.A. Arch. Dermatol.* 80, 391-397 (Oct. 1959).

The author reports on 47 consecutive patients with a disease closely resembling exfoliative pemphigus, who were admitted to the Pemphigus Hospital of Mato Grosso, Brazil. The Brazilian expression "fogo selvagem", applied to this endemic disease of central South America, literally means uncontrolled fire, in much the same way that the word "wildfire" brings to mind a fire that has got out of control in dry grass. The patients experienced a burning feeling that continued uncontrolled for days and months; only when they were completely quiet did they get any degree of relief. The patients were between the ages of 10 and 30 years when the symptoms began, and the disease might last 15 years or longer. Typically, the first lesion was a vesicle on the central part of the face or on the upper part of the chest; other vesicles and bullae soon developed over the face and upper trunk; often lesions involved the whole trunk and the extremities and even the scalp. Mucous membrane surfaces lining the various orifices were not involved. As the bullous lesions became more numerous and extensive, an exfoliative dermatitis developed. There was a distinct odor of dried serum, which was the distressing repulsive feature of the disease. Of the 47 patients, the disease was subacute in 2, chronic in 43, and ill-defined in 2. In the 43 patients with chronic disease, the disease was further classified as bullous exfoliative in 24, pustular and ulcerative in 5, intensively foliaceous in 9, herpetiform in 2, verrucous in 2, and hyperpigmented in 1. Treatment of this odd disease with quinacrine hydrochloride and a tar preparation is described. Hydrotherapy was also applied.

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

- 336 Clinical Features of Contact Dermatitis due to Neomycin: Report of Cases. H. Reynolds, J. F. Hildebrand, C. S. Livingood and R. P. Fosnaugh. *A.M.A. Arch. Dermatol.* 80, 455-460 (Oct. 1959).

The authors report on 10 male and 18 female patients, between the ages of 5 and 65 years, in whom a diagnosis of contact dermatitis due to neomycin was made. With the exception of 3 patients, the development of neomycin sensitivity was an insidious process. In these 3 patients there was a definite correlation between the use of a neomycin-containing preparation and the onset of an acute exacerbation. Most of the other patients were suspected of neomycin sensitivity because of a gradual progression of their eruption and failure to respond

to what would be considered adequate therapy. In this group there was no clear-cut relationship between the use of a neomycin-containing preparation and progression of dermatitis. The use of neomycin did not cause an acute exacerbation. An analysis of the primary sites of involvement, including feet, ears, hands, axillas, eyelids, and perianal region, would seem to support the clinical impression that sensitization may be more apt to occur if the involved site is an intertriginous area, or subject to maceration. However, the predominance of otitis externa (in 9 of the 28 patients) may only be a reflection of the widespread use of neomycin-containing topical steroids in this situation and chronicity of the problem. It is felt that neomycin contact sensitivity is not common. In all the patients, symptoms and signs regressed promptly after withdrawal of neomycin. -- Cond. from J. Am. Med. Assn. Absts.

- 337 **Ionizing Radiations in Industry.** P. M. Crossland.  
A.M.A. Arch. Dermatol. 80, 427 (Oct. 1959).

Present-day applications and use of ionizing radiation in industry are growing with exceeding rapidity. Because of the interest which dermatologists have in the field of radiation, they should know of the existing and growing potentials so as to be able to detect radiation injury when present in a patient. The physician also has an obligation to assist local, state, and federal public health authorities in handling the present, and exploring the potential problems associated with ionizing radiations in industry, agriculture, and medicine. Numerous uses of radiation sources are reviewed. Maximum permissible dose of radiation is stressed, and the current concepts of external and internal hazards from radiation sources are covered in detail.  
-- Cond. from J. Occ. Med. Absts.

#### CHEMICAL HAZARDS

- 338 **The Comparative Toxicity of Certain Lithium Compounds in Acute Experiments on Animals.**  
V. I. Neretin. Pharmacol. & Toxicol. 21, 419 (July-Aug. 1958).

Solutions of lithium compounds were injected subcutaneously or given orally to white mice, and the comparative toxicity of the compounds was determined on the basis of survival and general condition. Toxicity was found to decrease in the following order: lithium hydroxide, lithium carbonate, lithium chloride, lithium acetate. The clinical picture of acute lithium poisoning was identical for all compounds. At autopsy pronounced vascular disorders, specifically polyemia and perivascular and pericellular edema, were observed.  
-- J. Occ. Med. Absts.

- 339 **The Determination of Fluoride in Human Urine.** T. Kwasnoski. Wash-1023. (pp. 7-20)  
Oak Ridge Gaseous Diffusion Plant, Tenn. 14 pp. Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C.

A calorimetric Eriochrome Cyanine R method is described for determining fluoride in urine samples after distillation in an automatic distillation unit. The apparatus used is illustrated photographically and the sensitivity of the method is discussed.  
-- Nuclear Sci. Absts.

- 340 **Determination of Fluoride in Soil.** G. S. Golden and J. Pauroso. Wash-1023. (pp. 21-28)  
Combustion Engineering, Inc. (Nuclear Div.), Windsor, Conn. 8 pp. Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C.

A procedure is described for the determination of fluorine in soil samples by photometric determination of fluoride after direct distillation.  
-- Nuclear Sci. Absts.

- 341 A Continuous Gas Titration Analyzer for Fluorine. C. W. Weber.  
Anal. Chem. 32, 387-391 (Mar. 1960).

A reliable automatic fluorine analyzer has been developed to meet the need for precise continuous monitoring and control of complex gas systems. Based upon pneumatic detection of the reduction in molar flow as fluorine reacts with sulfur dioxide, the analyzer is precise to plus or minus 1% fluorine. Excellent on-stream performance is achieved in the presence of uranium hexafluoride, hydrogen fluoride, and oxygen. With proper selection of reagents and reactor conditions, the principles of the instrument could be applied to the analysis of other gases.

-- Author's summary

- 342 Arsenic Toxicology and Biochemistry. B. L. Vallee, D. D. Ulmer and W. E. C. Wacker.  
A.M.A. Arch. Ind. Health 21, 132-151 (Feb. 1960).

Exposure to toxic quantities of arsenic remains a risk both in and outside industry in this country. The gradual abandonment of medical therapy utilizing arsenicals has alleviated much of the danger of these products, but accidental ingestion of insecticides and rodenticides continues to claim many lives. Arsine generation remains the only major industrial risk from this element, and prevention lies largely in awareness of the problem. Skin irritation to solid arsenicals, although occurring frequently, is controllable in much the same way as other industrial irritants. Certain aspects of the metabolism and biochemistry of the arsenical compounds are now well understood. Application of this knowledge has led to a rational basis of therapy for cases of poisoning with solid arsenic, and it might be hoped that arsine toxicity could be similarly controlled. It is improbable that arsenic plays a significant role in the genesis of cancer. There are 182 references in the bibliography.

-- Authors' summary

- 343 Gravimetric Determination of Bismuth with Dimethylglyoxime. P. F. Lott and R. K. Vitek.  
Anal. Chem. 32, 391-393 (Mar. 1960).

A gravimetric method has been developed for the determination of bismuth in the presence of aluminum, arsenic, barium, cadmium, calcium, cobalt, copper, lead, magnesium, mercury, nickel, palladium, platinum, silver, strontium, tungsten, and zinc. From 50 to 500 mg. of bismuth were determined by precipitation of bismuth with dimethylglyoxime at pH 11.0 to 11.5. (Ethylenedinitrilo) tetraacetic acid and potassium cyanide were employed as masking agents in the procedure. The formula and physical properties of the precipitate and the effect of pH and foreign anions on the reaction were studied.

-- Authors' summary

- 344 The Bone Marrow in Industrial Lead Poisoning. A. David.  
Arch. Gewerbepathol. Gewerbehyg. 17, 329-338 (1959). German.

Examination, hematological and cytochemical, was made of the bone marrow of 35 persons with chronic lead poisoning, and the effect upon it of administration of calcium versenate. The bone marrow was generally hyperplastic, with increased erythropoiesis. In a few cases, where the poisoning was subacute, after short exposure, this increase was present without a correspondingly high degree of anemia. Intravenous injection of 3 g. of calcium versenate was followed by a complete return to normal in 4 of 7 persons; in the remaining 3, where severe symptoms had necessitated a higher dosage, sternal biopsy showed a hypoplastic marrow, which the author attributes to a possible inhibitory effect of the versenate on the bone marrow. The apparent depression of the bone marrow in a few cases after calcium versenate therapy indicates that care should be taken in its administration.

-- Cond. from Bull. Hyg.

- 345 Metal Fume Fever as an Immunological Disease. C. P. McCord.  
Ind. Med. & Surg. 29, 101-107 (Mar. 1960).

Metal fume fever has been presented as industrial toxicology's major scientific enigma. The minor clinical state has been described. Experimental metal fume fever as

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investigated has been reviewed. On a speculative basis, metal fume fever has been categorized as an immunologic disease. The bizarre phenomena of metal fume fever have been accounted for on the assumption of the formation of dual groups of antibodies with activities in conflict.

-- Author's summary

- 346 Reticuloendothelial Response to Pentane. Z. T. Wirtschafter and Margaret G. Bischel. *A.M.A. Arch. Ind. Health* 21, 152-159 (Feb. 1960).

The effect of a single minimal injection of pentane was observed in the rat marrow, spleen, lymph node, thymus, and peripheral blood. The experiment showed that the reticuloendothelial response persisted in the marrow, spleen, and lymph node at termination, three weeks later. Blood. A moderate neutropenia, together with a moderate monocytosis, persists throughout the three-week observation period. Liver. - Liver imprints do not deviate from the normal cytological characteristics. Thymus. - Reticuloendothelial cells are not increased; occasional macrophages and a rare plasmacyte are present in the early periods. Spleen. - Plasmacytes are only increased throughout the first 48-hour period. An increase of cells of reticuloendothelial origin is already evident 30 minutes after a single injection of pentane. The total number of reticuloendothelial cells is 10 to 12 times the normal value during the experimental period. Lymph Node. - The imprints evidenced a marked increase of plasmacytes, proplasmacytes, mature macrophages, with a concomitant increase of lymph type reticuloendothelial cells. Bone Marrow. - Cells of reticuloendothelial origin increase in numbers twofold over the normal mean value even at one hour after an injection of pentane. They appear in augmented numbers throughout the experimental period (three weeks), reach the peak at one week, and at the end of the experiment are twofold the normal value. Although this numerical change occurs, there is no evidence of morphological change of boundaries or characteristics.

-- Cond. from authors' summary

- 347 Toxicological Studies on Hydrocarbons: 5. Kerosene. H. W. Gerarde. *Toxicol. & Appl. Pharma.* 1, 462 (Sept. 1959).

In an attempt to form a rational basis for the treatment of clinical kerosene intoxication, the mechanism of the pneumonitis following kerosene ingestion was studied. Animals were dosed by various routes of administration, and the rate of absorption and elimination of kerosene hydrocarbons from the blood, the effects of various diluents on these processes, and the gross and microscopic pathological changes are reported. Large doses are tolerated by gastric intubation, subcutaneously and intraperitoneally, but less than 1 ml. instilled directly into the trachea or aspirated from the mouth into the lungs caused pulmonary edema, hemorrhage, and death in rats. Aromatic hydrocarbons are absorbed into the blood from the gastrointestinal tract. Absorption is promoted by mineral oil and delayed by olive oil. Since pneumonia is apparently the result of aspiration and not absorption into blood from the gastrointestinal tract, the induction of vomiting is contraindicated, also, antiemetics which tend further to depress the central nervous system. Recommended measures are oxygen, antibiotics prophylactically, and vegetable oils, if the patient is conscious.

-- J. Occ. Med. Absts.

- 348 Pneumonopathies from Kerosene. R. F. Ruiz and R. R. Iribarren. *Med. Bull. (Std. Oil N.J.)* 20, 35-63 (Mar. 1960). Spanish.

With a view of arousing interest on the problem of kerosene poisoning and its most important sequel—the pneumonopathies—the authors present a study based on 8 cases of patients of infantile and pre-school age and one case concerning an adult which was due to an industrial accident. The aspects of the problem related to the agent and to the pathogenesis of the lesions are brought out, with emphasis on the bronchogenic theory. Data concerning the individual and his environment are analyzed, taking into consideration the economic factors of the kerosene market. The authors set forth the need of detailed medical histories of the accidents and systematic medical examinations. In studying therapeutic procedures they emphasize the advisability of preventing vomiting and avoiding gastric lavage as well as measures

which might tend to pass the kerosene into the respiratory system. Gerarde and Guertin's method of determining the aromatic hydrocarbons is recommended because of its facility. The study includes a summary of the medical histories and x-ray studies of the cases involved.

-- Cond. from English summary

- 349 The Effect of Carbon Tetrachloride on Isolated Perfused Rat Liver Function. G. L. Plaa and C. H. Hine. *A.M.A. Arch. Ind. Health* 21, 114-123 (Feb. 1960).

The applicability of the isolated, perfused rat liver to the study of hepatotoxicity has been demonstrated. Using bromsulphalein (BSP) extraction, it was possible to detect dysfunction one and one-half hours after the administration of carbon tetrachloride *in vivo*. Peak dysfunction occurred at a time when microscopic alterations were minimal. From the available data, the lag in clearance by damaged livers appears to be in the initial extraction of the dye from the perfusate rather than in the excretion into the bile. The rate of synthesis of p-aminohippuric acid (PAHA) from p-aminobenzoic acid (PABA) did not consistently parallel histologic evidence of hepatic derangement. PAHA synthesis was found to be a less sensitive means of detecting the minimal liver damaged produced in this study. Alteration of the metabolic environment by nitrogen, dinitrophenol, fluoroacetate, cyanide, and iodoacetate seemed to indicate that normal clearance of BSP is dependent, directly or indirectly, upon a source of cellular energy.

-- Authors' summary

- 350 Carbon Disulfide Poisoning in Artificial Silk Manufacture. L. Magos, Ilona Batskor and L. Csenkey. *Egeszsegstudomany (Budapest)* 2, 228-237 (1958).

An investigation has been made of the effects of exposure to carbon disulfide on workers in an artificial silk factory. Mean air concentrations as high as 2,933 mg./cu.m. were observed in certain working situations, together with mean concentrations of hydrogen sulfide up to 32.6 mg./cu.m. Conjunctivitis was frequently encountered, with 207 cases in 1955 with a loss of 396 working days. Determination of the concentration of carbon disulfide in the blood was carried out on 35 workers who had been exposed for 2 years; concentrations of 41 to 80 microg./liter were found in 11, and of 201 to 500 microg./liter in 6 instances; 20 complained of headaches and 12 of anorexia. On neurological examination only 8 workers showed no signs of nervous involvement; the remainder suffered from cerebral vascular disorders of varying extent and 10 from hypertension.

-- Bull. Hyg.

- 351 The Toxicology and Biochemistry of the Mono-Cyclic Aromatic Hydrocarbons. H. W. Gerarde. *Med. Bull. (Std. Oil N.J.)* 20, 74-90 (Mar. 1960).

This paper reviews research conducted in the past 5 years by the author on the mono-cyclic aromatic hydrocarbons. This class of hydrocarbons is of great interest to the industrial physician, toxicologist, and hygienist because they are used extensively in industry as: (1) Solvents for paints, plastics, pesticides and protective coatings. (2) As constituents of aviation and automotive gasoline. (3) As starting materials and intermediates for synthesis in the chemical industry. This investigation was undertaken because of the lack of toxicity information, the anticipated extensive industrial use of these chemicals, and the increasing concern that they might possess the property which makes benzene a dangerous industrial chemical—myelotoxicity. The results of this study showed that: (1) The alkyl derivatives of benzene are not myelotoxic agents. (2) The toxicity and central nervous depressant activity of the mono-n-alkylbenzenes decreases with chain length beyond two carbon atoms. (3) The toxicity is also decreased by multiple alkylation. (4) The toxicity is increased by chain branching and unsaturation. (5) The alkylbenzenes are partly eliminated from the lung—the extent depends on vapor pressure in addition to chemical structure. (6) they are eliminated principally as renal products consisting of conjugated alcohols and carboxylic acids following side chain oxidation. (7) A blue, as yet unidentified metabolite is formed from 1,2 and 1,3 diethylbenzene. (8) The name phenylalkanes rather than alkylbenzenes is suggested to the industrial physician to dis-associate these compounds from benzene which differs toxicologically, pharmacologically and biochemically from the alkyl derivatives.

- 352 Ascending Paralysis following Malathion Intoxication. J. K. Healy.  
Med. J. Australia 1, 765-767 (June 1959).

A short review of some of the literature on the toxicology of organic phosphate insecticides introduces a report of a case of poisoning by malathion in a boy aged 18 months. The case is of interest for the following reasons: (1) Poisoning by malathion is less common than is poisoning with other readily available members of the group. (2) An ascending paralysis developed some weeks after the acute symptoms appeared and this has not previously been observed after malathion poisoning, and (3) Hypertension and glycosuria developed and these had interesting characteristics. During the 6 weeks before admission to the hospital the boy was exposed daily to malathion which was used as a garden spray. In addition to the amount absorbed through the skin and by inhalation, some malathion was also ingested by eating buds of plants which had been sprayed. Soon after spraying began the child became irritable and lost appetite. Within a week he was feverish. After 6 weeks he had lost 7 pounds in weight, had developed polydipsia and was seen to drag his legs when walking and to fall over easily. His clinical condition on admission to the hospital is described. In the next few days his state progressed to a complete flaccid paralysis of the lower limbs which spread to the trunk and upper limbs. He remained febrile, anorexic and irritable. The systolic blood pressure was 210 mm. of mercury. Therapy by hypodermic doses of atropine given every 3 hours (1.2 to 2.4 mg. daily) was then begun and continued for some weeks at a daily dosage of 1.2 mg. without side effects. There was some immediate response to the first doses of atropine and ultimately motor power was restored. The general condition returned to normal in 4 weeks.

-- Cond. from Bull. Hyg.

#### INDUSTRIAL DUSTS

- 353 Population Studies of Chronic Respiratory Disease. A Comparison of Miners, Foundryworkers and Others in Staveley, Derbyshire. I. T. T. Higgins, A. L. Cochrane, J. C. Gilson and C. H. Wood. Brit. J. Ind. Med. 16, 255-268 (Oct. 1959).

The scope of this investigation, originally concerned with foundryworkers, was considerably enlarged by the wide variety of occupations represented in Staveley. The main objects were: (1) To compare the prevalence of respiratory symptoms and chronic bronchitis, and the ventilatory capacity in coal miners, foundry, chemical, and railway workers with men who had worked only in dust-free occupations. (2) To measure the prevalence of respiratory symptoms and chronic bronchitis in their wives. (3) To assess the consistency between two doctors in recording answers to questions about respiratory symptoms and measuring the indirect maximum breathing capacity. (4) To assess the etiological significance of dust, tobacco smoking, and past respiratory illnesses.

- 354 "Farmer's Lung", an Acute Pulmonary Disease due to Threshing Moldy Grain. B. Uyterlinde. Ned. Tijdschr. Geneesk. 103, 457-459 (Feb. 28, 1959). Dutch.

A case of acute farmer's lung is described. The patient was an agricultural worker aged 66 who was admitted to a hospital in Rotterdam in October 1957 with pyrexia of unknown origin of 16 days duration. The onset was acute, with rigors and pyrexia to 40°C, and took place 3 days after the patient had threshed moldy corn in a barn, a procedure which produced so much dust that visibility was reduced to a few inches. There was some dyspnea and a slight cough, and auscultation of the chest revealed vesicular breathing. X-ray examination showed many small opaque areas scattered over both lung fields. There was no sputum. *Candida albicans* and *C. pseudotropicalis* were isolated from the stomach contents. The patient was given 1 g. of potassium iodide 3 times daily and the temperature returned to normal. On out-patient examination after 2 months the patient was symptom-free and had regained full working capacity.

-- Bull. Hyg.

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- 355 Dust Concentration during Threshing Work and Investigation of the Microflora of the Dust. J. Freytag, W. Nicewicz and W. Pleszczyński. Arch. Hyg. u. Bakteriologie. 143, 321-333 (Aug. 1959). German.

In a large number of agricultural activities such as threshing, harrowing, seed sowing, application of chemical fertilizers and the preparation of animal foodstuffs, the workers are often exposed to heavy concentrations of dust in the atmosphere. In this paper the authors consider particularly the dust which arises during threshing. Some of the literature on the inorganic and organic constituents of threshing dusts, the sizes of the dust particles and their concentration in the atmosphere is described. In the medical examination of 7 women (aged 17 to 22 years) and 4 men (aged 20 to 22 years) who were exposed to threshing dusts in their work, it was found that all suffered from marked catarrh of respiratory mucous membranes with muco-purulent discharge. The symptoms were cough, pains in the chest, some difficulty in breathing, noises in the ears, a burning feeling in the eyes and loss of appetite. Most of the paper is devoted to a description of the results of mycological examination of the dusts and of swabs from nose and throat of the workers. There is a classification of the isolated organisms and a few photographs. A total of 139 strains belonging to 22 genera of the "fungi imperfecti" group were isolated.

-- Bull. Hyg.

- 356 Febrile Disease in Carpenters in a Carpentry Works through Inhalation of Moist Air Contaminated by Molds. C. Pestalozzi. Schweiz. med. Wochschr. 89, 710-713 (July 4, 1959). German.

This paper contains an account of the investigation of a mysterious illness which was affecting, with increasing frequency, the workers in the carpentry workshop of a large machine factory. The chief symptoms and signs of the illness were extreme lassitude with cough and breathlessness and at night high fever, rigors and profuse sweating. By next day the patients were usually well enough to resume work. This condition occurred most frequently on Mondays but never during holidays. The work was carried out in a large, airy workroom the atmosphere of which was kept moist by an aerosol apparatus which is described. Some details are given of the investigations carried out at the Dermatological Clinic of Zurich University. Scratch tests on the workers with dusts from the workroom and with an Aspergillus strain were negative but mycological examination of the water from the humidifier showed the presence of various kinds of Penicillium, Aspergillus, Mucor, Scopulariopsis, Cephalosporium and Tricoderma. At a later date 14 of the workers were given an intradermal inoculation of a mixed extract of these molds with the result that although there was no immediate skin reaction most of the workers suffered from the typical symptoms of the general illness. When the aerosol apparatus was adequately cleaned and sterilized no further cases of this illness occurred. The similarity of this disease (which is here called Befeuchterfieber) to threshers' disease and others which are considered to be caused by allergic reaction to molds is discussed.

-- Bull. Hyg.

- 357 Lung Changes in Hard Metal Workers. G. Moschinski, A. Jurisch and W. Reinl. Arch. Gewerbepathol. Gewerbehyg. 16, 697-720 (1959). German.

The total population in 4 factories processing hard metals was investigated clinically and radiologically. Of 326 people examined, there were 20 who showed the earliest radiological changes of pneumoconiosis, 38 showed slight changes, and there was 1 with severe lung fibrosis. Most of the subjects with pneumoconiosis were molders or mixers; only a few were sinterers. Lung disease appeared to be associated with the processes which precede sintering of the hard metal. There were also 3 cases of slight pneumoconiosis in titanium workers. Environmental studies of the dust content in the factories were made with gravimetric and volumetric dust sampling instruments. Air-borne dust concentrations in the respirable size range were estimated separately for the various phases of processing the hard metals. A high incidence of bronchitis is claimed for hard metal workers. An allergic-hyperergic reaction to hard metal is suggested.

-- Cond. from Bull. Hyg.

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IN RE: ABRAMS November 1992

- 358 Studies on the Nature and Etiology of Respiratory Disability in Witwatersrand Gold Miners Free of Radiological Silicosis. Margaret R. Becklake, S. Zwi and W. Lutz.  
Brit. J. Ind. Med. 16, 290-296 (Oct. 1959).

In an investigation into the cause of symptoms in gold miners who have no radiological silicosis, the relationship of dyspnea and physiological disturbances to dust exposure was examined. Forty-five subjects, aged 41 to 45 years, with normal chest radiographs and long service underground were chosen for study from the population of miners past and present. Thirty-four men only were tested, but the validity of the sample was checked by comparison with a similar group of miners reported previously. Each individual's dust exposure was estimated in "particle-hours". A detailed history, including smoking habits, was followed by a clinical examination and a battery of lung function tests in each case. No significant relationship was found between dyspnea and dust exposure or smoking. However, a negative correlation was observed between dust exposure and effort tests, implying that exercise capacity appeared best in those men whose dust exposure was greatest. Possible reasons for this finding are discussed. On the other hand, dyspnea did not correlate with airway obstruction and hyperventilation on effort, indicating a physiological rather than a psychological basis for the symptoms. Further, the higher incidence of cough, sputum, and rhonchi in the more disabled subjects suggested that chronic bronchitis might be the basis of their symptoms, but the cause of the bronchitis remains to be identified. It seems that dust exposure alone was not the cause, but the findings do not exclude the possibility of its being related to the occupation of mining with stresses such as inhalation of fumes and rapid changes in temperature, humidity, and altitude.

-- Authors' abst.

- 359 The Effect of Different Concentrations of Silicic Acid and Silica Dust on the Biosynthesis of Collagen in Tissue Cultures. M. Chvapil and E. Holeckova.  
Brit. J. Ind. Med. 16, 286-289 (Oct. 1959).

Tissue cultures of fibrogenic cells which form collagen *in vitro* are a valuable model for quantitative study of the mechanism of this cellular function as well as of problems relevant to pneumoconiosis. The authors have found a pronounced stimulation of collagen formation in tissue cultures of embryonic chicken lung by silicic acid in a concentration of 0.005 M in the medium. Higher concentrations (0.01 M) were inhibitory as were quartz dust particles of 50 to 70 mg. per culture tube, which, during the 8 days of incubation, liberated silicic acid in concentrations of an inhibitory order into the culture medium. A low concentration (0.001 M) of silicic acid or silica dust (5 mg.) was ineffectual as was an inert dust (titanium dioxide) in a high concentration (50 mg.). Evidence is presented that the stimulatory effect of silicic acid is due to a direct stimulation of postulated enzymatic systems taking part in fibrogenesis. Estimation of dioxynucleic acid in the cultures indicated that the number of cells was similar in controls and in cultures with increased and reduced collagen content. -- Authors' abst.

- 360 Nodular Muscular Hyperplasia in the Lungs of South African Miners. C. B. Chatgidakis.  
A.M.A. Arch. Ind. Health 21, 160-164 (Feb. 1960).

The presence of an unduly high incidence of nodular muscular hyperplasia in the lungs of South African miners has been reported. The significance of this phenomenon is not clear, but an etiological relationship to dust exposure is suggested. The origin of the smooth muscle has not been determined with certainty, but the features suggest a close relationship to lymphatic vessels. Nodular muscular hyperplasia may be confused radiologically and at a post-mortem examination with a true silicosis. No increase in muscle of the bronchi, bronchioles, and blood vessels is found in these cases.

-- Author's summary

- 361 A Connective Tissue Disease with Pulmonary Fibrosis in Guinea Pigs. P. Gross, Marian L. Westrick and J. M. McNerney. A.M.A. Arch. Pathol. 69, 130-138 (Feb. 1960).  
Reprints available from the Industrial Hygiene Foundation upon request.

A disease of connective tissues was found in 14 guinea pigs in which an interstitial pulmonary fibrosis with degeneration of elastic tissue was the most prominent feature. Other

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involvement included calcific degeneration of the aorta with aneurysmal dilatation, and calcification as well as other lesions of the heart. These affected 14 guinea pigs were found among a total of 281 animals that either inhaled or were given injections of one of a number of diverse dusts. None of the latter is known to be capable by itself of producing the lesions described. Although not proved, the probability points to a common factor in the experimental technique used as the etiologic agent. A control series of 122 guinea pigs of the same sex and age range not exposed to any of the dusts in question failed to reveal evidence of this disease.

-- Authors' summary

- 362 Mechanism of Clearance of Inhaled Particulates from the Lung. L. J. Casarett. Wash-1023. (pp. 137-155). Rochester, University of New York Atomic Energy Project. 19 pp. Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D.C.

Several mechanisms have been proposed by which a particle may move or be moved within the lung or out of the lung. Some of these have been demonstrated adequately while others are in considerable doubt. Observations are described which were made following the administration of polonium-210 to rats via the lung. A diagram of the exposure apparatus is included. Data are tabulated and photographs of tissue sections are included.

-- Nuclear Sci. Absts.

- 363 Some Physical and Physiological Factors Controlling the Fate of Inhaled Substances. P. E. Morrow. Wash-1023. (pp. 113-136). Rochester, University of New York Atomic Energy Project. 24 pp. Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C.

Dust deposition is the active process wherein dust is removed from the air while it is being respired. The term implies the extent to which dust is removed in terms of the same measure of dustiness as used to characterize the inspired air. Some fraction of the dust deposited is not in reality on the surface membrane of the respiratory tract but in suspension within the lung air. In the over-all course of dust deposition the amount of dust so involved is relatively small and short-lived and is particularly insignificant when deposition is measured as a steady state condition. Dust deposition in the respiratory tract can be thought of as a process occurring within a small compartment of air with the same physical forces in control that are involved in the dust deposition from the environmental air outside of the body. The forces of interest include gravitational, inertial, and Brownian motion. Physiological and other factors governing the deposition of dust in the respiratory tract are reviewed. Attempts to predict deposition as a function of physiologic measurements are discussed.

-- Nuclear Sci. Absts.

- 364 Silicosis and Avian Tuberculosis. R. P. Jahn. Am. Rev. Respiratory Diseases 80, Pt. 1, 78-84 (July 1959).

In a case followed for 21 years, the development of silicosis and a superimposed infection was observed. In addition to a positive avian tuberculin test, atypical acid-fast bacteria were recovered repeatedly and constantly over a 10-year period. These bacilli with cultural qualities, agglutination studies and drug-resistant patterns typical of avian tubercle bacilli showed consistent inability to infect a guinea pig and ability to infect fowl.

-- Bull. Hyg.

- 365 Public Health and Hygienic Factors in the Region of an Asbestos Mine and Factory. A. Tomic. Higijena (Belgrade) 10, 273-286 (1958).

An investigation has been made of the hygienic conditions in the environs of an asbestos mine and factory in Yugoslavia. Among 76 workmen seeking medical attention who were examined radiologically 22 (28.9%) were suffering from asbestosis, 29 (38.2%) from anthracosilico-asbestosis and 2 (2.6%) from anthracosilicosis. The dust content of the air in the factory ranged from 5 to 550 mg./cu.m., and the total daily atmospheric deposit at various points in a village situated 600 meters from the factory ranged from 203.5 to 996.6 mg./sq.m.

-- Bull. Hyg.

- 366 Talcosis in a Rubber Factory. Kay H. Clausen.  
Acta Tuberc. Scand. Suppl. 47, 60-61 (1959).

During 1957 about 1,200 workers in a rubber factory were x-rayed by a mobile unit. Definite talcosis was diagnosed in 9 cases, average exposure 19 years, range 7 to 30 years, and slight talcosis 7 cases, average exposure 12 years, range 0 to 25 years. Even in patients whose lungs revealed definite lesions, nodules up to 5 mm. in diameter, only 3 had symptoms, cough, expectoration and dyspnea. It was noted that while some workmen developed gross lung lesions after many years of exposure to talc dust, other workmen after the same exposure showed no abnormal radiographic changes.

-- Cond. from Bull. Hyg.

- 367 Pneumoconiosis in Carbon Electrode Makers. A. J. Watson, J. Black, A. T. Doig and G. Nagelschmidt. Brit. J. Ind. Med. 16, 274-285 (Oct. 1959).

In the absence of adequate preventive measures the manufacture of carbon electrodes is attended by a considerable dust hazard. The present paper is based on a study of the clinical, radiological, and pathological changes resulting from inhalation of this dust, which is derived from crushed coke and anthracite. An account is given of the findings in a clinical survey of 15 men who had been employed for at least 10 years in manufacturing carbon electrodes. Four of these men were suffering from complicated and 5 from simple pneumoconiosis. In addition, the findings in 3 necropsied cases (2 complicated and 1 simple) are recorded. Bacteriological examination of the lungs and analysis of the lung dust was carried out in the 2 cases of complicated pneumoconiosis. It is shown that carbon electrode makers may develop simple pneumoconiosis with focal emphysema and that this may be complicated by the development of massive fibrotic lesions. Both the simple and the complicated pneumoconiosis are indistinguishable from the corresponding conditions in other coalworkers. Quartz was almost entirely absent from the lungdust of the 2 necropsied cases with massive fibrosis and in one of these cases virulent tubercle bacilli were shown. The significance of these findings is discussed in relation to the etiology of progressive massive fibrosis. While it is evident that they are incompatible with the "silica" theory, they provide some limited support for the "tuberculosis" theory.

-- Authors' abst.

- 368 The Origin of the Term Anthracosis. A. Meiklejohn.  
Brit. J. Ind. Med. 16, 324-325 (Oct. 1959).

Dust diseases of the lungs are classified generically as the pneumoconioses. There are several varieties, of which anthracosis was the first to be named specifically. The original article, in which the name anthracosis was coined, is reprinted prefaced by a biographical note of its author, Dr. Thomas Stratton. The term "anthracosis", meaning charcoal lung, not black or coal lung, was introduced in 1838 by Dr. Stratton following attendance at the post-mortem examination on a coal miner. His paper, entitled "Case of Anthracosis or Black Infiltration of the Whole Lungs", was published in the Edinburgh Med. Surg. J. 49, 490 (1838).

#### PHYSICAL ASPECTS OF THE ENVIRONMENT

- 369 The Hazards of Underwater Activities. J. M. Daley.  
Med. Bull. (Std. Oil M. J.) 20, 21-28 (Mar. 1960).

The subject of underwater hazards is important to industrial physicians for several reasons. (1) Some industries make use of underwater facilities. The petroleum group, for instance, has off-shore drilling and loading activities. (2) Since World War II, the growth of diving as a sport has been phenomenal and the number actively participating in one form or

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another is in the millions. (3) The sea remains as one of the few unexplored regions of the world, and—already—wide interest is being shown in the future potential of the sea. One can mention military uses, possible additional food and mineral resources, and even weather control measures. The author hopes that his paper has clarified some of the major medical hazards of underwater swimming. It is a fine sport and a valuable asset in scientific, commercial and military operations. However, unless the well-established precautionary measures are understood and followed carefully, serious illness and injury can result in not only temporary but permanent disability, and even death. While the diver himself has a responsibility for his own safety, the practicing physician can do much to select as well as discourage individuals who may or may not have the physical and emotional qualifications for this activity. He also should have some knowledge of the many physiologic aspects of underwater swimming in order to diagnose and treat properly any of the injuries and illness that may appear.

- 370 Late Consequences of the Neurological Forms of Decompression Sickness. I. Rozsahegyi. Brit. J. Ind. Med. 16, 311-317 (Oct. 1959).

Various neurological forms of decompression sickness are classified and an inquiry 2 1/2 to 5 1/2 years after the acute illness is reported. One hundred subjects with decompression sickness of the central nervous system were examined. In more than half of the cases the clinical picture was that of chronic encephalomyelopathy, vegetative neurosis, or psychosomatic symptoms. Symptoms were found in 3/4 of the cases, and objective signs in the same proportion. Fourteen patients were unable to work 2 1/2 to 5 1/2 years after the acute illness, and only 13 of 100 patients were reported to be reasonably well. The best and only adequate treatment for decompression sickness is recompression. After recompression the prognosis for recovery is increasingly poor the longer time passes, and after the first 6 weeks, there is no hope of a perfect recovery.

-- Author's abst.

- 371 Impact of Space Exploration on Biology and Medicine. C. T. Randt. J. Am. Med. Assn. 172, 663-665 (Feb. 13, 1960).

Space exploration offers an unparalleled opportunity for the productive integration of the physical and biological sciences directed toward expansion of our knowledge of the universe. Means of improving human tolerance of the expected combined stresses involved in space flight and provision of adequate life-support systems will be necessary to allow man to lend his unique capabilities to accomplishment of the tasks ahead. New knowledge of extraterrestrial environmental effects of all forms of life will result from studies of comparative biology on the broadest scale and will undoubtedly lead to further understanding of the fundamental laws of nature.

-- Editor's summary

- 372 Medical Aspects of Ambient Radiations of Extraterrestrial Space. P. A. Campbell. J. Am. Med. Assn. 172, 668-671 (Feb. 13, 1960).

If man is to travel above and beyond the earth's atmosphere he will have to shield himself from radiations to which he is not ordinarily exposed. Three types of radiation here described are the primary cosmic radiation, the secondary cosmic radiation, and the two Van Allen bands of high-speed particles circulating about the earth's geomagnetic equator. Beginning at about 650 km. (400 miles) above the earth, radiation of the Van Allen type reaches intensities of 10 to 100 r per hour, which would be fatal within 30 days to more than half of a number of human subjects exposed to it for two days. An important problem in space travel, therefore, is that of circumnavigating the two zones of Van Allen radiation or of devising shields within allowable weight limits.

-- Editor's summary

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- 373 Physiological Aspects of Hypergravic and Hypogravic States. Application to Space Flight. J. E. Ward. J. Am. Med. Assn. 172, 665-668 (Feb. 13, 1960).

The planning of a circumterrestrial orbiting space flight of a human passenger includes a mission profile to accommodate the inherent structural limitations of the passenger and life-supporting subsystems. During launching, reentry, and recovery phases of a man-missile flight, the man will be in gravitational environments with which he is not familiar, since the force of the earth is 1 g. Should an escape from the missile be necessary, during its powered flight (4 to 10 g.), decelerating forces of 40 g. will be affecting the capsule. A man can tolerate a force of 8 g. for only 90 seconds. The functional problems of the human body while in orbit, a zero-gravity environment, concern neurological mechanisms, spatial orientation, motion sickness, cardiovascular function, gastrointestinal activity, excretion, and skeletal muscle activity. The value of the physician members of the space-capsule-design team is obvious, and one of the important objectives of the manned space flight will be to collect psychophysiological data.

-- Editor's summary

- 374 An Analysis of some Observations of Thermal Comfort in an Equatorial Climate. C. G. Webb. Brit. J. Ind. Med. 16, 297-310 (Oct. 1959).

The analysis is introduced by a brief account of the development of work on thermal comfort. The observations, which are fully described in relation to the interior climates which were experienced, were made in Singapore in 1949-1950. The climate of Singapore is typical of the equator, being warm, damp and windless; and the annual variation is almost negligible. Buildings are unheated, of an open type, and shaded from the sun and sky. A multiple regression equation has been derived, giving the thermal effect on a number of subjects of variations in the air temperature, the water vapor pressure, and the air velocity within the ranges experienced. The implications of the equation are discussed, and a climatic index is derived from it which is similar in definition to the widely used "effective temperature" scale, but shows a better correlation with thermal sensation. The new index is named the Singapore index. At a further stage the thermal sensation scale is simplified for the purpose of probit analysis. The probit regressions of discomfort due to warmth and cold are separately given in relation to the new index, and are combined to yield a thermal comfort graph from which the optimum is obtained and explored. A comfort chart for the rapid assessment of these humid climates is supplied, and an alternative form of the index equation is given which is more suitable for rapid calculation. It appears desirable in an equatorial climate to attempt to minimize discomfort by allowing to some extent for individual thermal requirements, and the benefits of a suitable climatic spread within a room are described.

-- Author's abst.

- 375 Clothing for Cold Conditions. L. H. Turl. J. Occ. Med. 2, 123-128 (Mar. 1960).

(1) Clothing ensembles should be as permeable as possible to water vapor. All textile fabrics other than coated materials are permeable, as are most types of leather to a lesser degree. The permeability of coated fabrics is governed entirely by the coating material. No freely permeable coated fabrics have yet been produced, although recent developments show promise. (2) In cold climates where wind is a factor, the highest degree of wind resistance is desirable in the outer clothing layer or layers. (3) In cold climates where (wet) precipitation is encountered, the highest degree of water repellency or penetration resistance is desirable in the outer layer. (4) In clothing ensembles for general cold weather use, maximum accommodation of varying climatic conditions and levels of activity is essential. Design features affording ventilation within the assembly, as well as constructional features to minimize the adverse effects of absorbed perspiration (e.g., the "string" vest), are highly desirable to permit adjustment of the rate of heat loss as required. (5) Weight and stiffness of assemblies should be kept to a minimum. With adequately wind- and water-resistant outer fabrics a minimum of bulk and weight of thermal insulation is required beneath. (6) Clothing should be used with intelligence, to avoid the onset of conditions within it which reduce or destroy its effectiveness. Varying levels of activity (and particularly high sweating rates) should be anticipated where possible, and minor sacrifices in comfort made if necessary to secure continued maximum performance of the clothing.

-- Author's conclusions

## RADIOACTIVITY AND X-RADIATION

- 376 On the Radiation Hazards of Space Flight. J. A. Van Allen,  
SUI-59-7. University of Iowa, Iowa City. 31 pp. (May 1959).

An appraisal of the radiation hazard of space flight is presented. Included are considerations of cosmic rays, auroral soft radiation, the geomagnetically-trapped corpuscular radiation, and the nature and origin of trapped radiation. In addition, radiation exposure levels and practical space flight considerations are discussed.

-- Nuclear Sci. Absts.

- 377 An Inhalation Exposure to Uranium Octoxide. R. R. Fish and G. R. Patterson, Jr.  
Wash-1023 (pp. 46-58). Oak Ridge National Laboratory, Tenn., and Union Carbide Nuclear Company, Y-12 Plant, Oak Ridge, Tenn. 13 pp. Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C.

An industrial worker accidentally received an inhalation exposure of enriched uranium fume during October 1957. This case has been studied by several methods in an effort to estimate the magnitude of the lung burden. A description of the accident illustrates the difficulty in detecting this type of exposure through the use of air sampling alone. Samples of urine were analyzed fluorometrically and by two different electrodeposition procedures. Blood samples and specimens of feces were analyzed also to aid in estimating the inhaled dose. Five separate estimates of the initial lung burden, based upon the bioassay data and *in vivo* counting, agree that the dose was in the range 1 to 10 mg., and was probably close to 4 mg.

-- Nuclear Sci. Absts.

- 378 Late Effects of Chronic Radiation Burden. O. Hug.  
Bull. schweiz. Akad. med. Wiss. 14, 501-516 (1958). German.

Late effects from irradiation may be the result of local or generalized immediate damage and then shows a threshold-value of the dose and a definite time intensity factor. Other late symptoms of damage may develop independent of the nature and degree of the immediate damage and may have a similar relation to the dose as genetic radiation effects. These forms of damage appear to be due to irreversible changes of molecular or cellular units which manifest themselves only later in life and in connection with aging processes. Also, tumors caused by irradiation show an analogous and pathogenic difference. In contrast to radiation cancer after high local doses of irradiation, animal experiments have shown an increase in spontaneous rate of numerous tumors after irradiation of the entire organism or of larger portions of the body. Dose-effect relation and time intensity factor as well as histology indicate different types of carcinogenic mechanisms, whereby both a direct carcinogenic action and also a non-specific furthering of tumor development are probable, and for both there is experimental support. Such an increase in the general tumor diathesis depending on the dose has not yet been shown in humans. It is often assumed a priori that also some late effects of radiation in man have a linear dependency on dose without threshold value. The evaluation of the hazard to man arising from an increase in radiation level will depend on the truth of this assumption.

-- Nuclear Sci. Absts.

- 379 A Shield for Patient Protection in Dental X-Ray Work. J. M. Dunning.  
Ind. Med. & Surg. 29, 112-113 (Mar. 1960).

A simple shield is described which brings a protective material the equivalent of 0.6 mm. of lead close to the neck of the patient and down over the abdomen in such a way as to protect the gonads from secondary radiation from dental x-ray machines. The shield

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weighs only seven and one-half pounds and is easy to adjust without the use of straps. The shield makes significant reductions in whole body and gonadal radiation exposure, and is well received by dental patients.

-- Author's summary

- 380 Electrodeposition of Enriched Uranium in Urine. T. P. Hamrick. Wash-1023 (pp. 29-44). Union Carbide Nuclear Company, Y-12 Plant, Oak Ridge, Tenn. 16 pp. Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D.C.

A program is described for monitoring personnel engaged in handling uranium. Urine samples are collected on an assigned date which is always preceded by two scheduled days off. The samples are refrigerated and delivered to the laboratory. Samples are prepared for electrodeposition within 24 hours and are counted on an alpha proportional counter. Data are recorded on a pre-punched IBM card. The card provides the necessary information to evaluate worker exposure. It also locates cases of unusually high exposure so that a more thorough examination and determination of dose may be made.

-- Nuclear Sci. Absts.

- 381 Radiological Program of the Los Angeles County Air Pollution Control District. A. Wiley and P. S. Tow. J. Air Pollution Control Assn. 10, Parts I, II 88-91 (Feb. 1960).

The role of the Air Pollution Control District during declared disasters has been clearly established by statutes. It is impossible to predict the severity of a war-caused disaster or even the response of any group charged with alleviation of disaster effects. A responsible organization, well-trained and equipped, must be able to respond to aid the general population in any disaster, and may thereby be an important factor in saving the lives of hundreds of thousands of persons. Responsibility of the Air Pollution Control District in monitoring and control of air-borne radioactivity associated with situations of less than disaster proportions is less clear-cut. Fallout from nuclear weapon tests or from nuclear reactors located outside a particular county area cannot be controlled by agencies of that county. Fallout from weapon testing, up to now, has accounted for the preponderance of air-borne radioactivity in Los Angeles County. With increasing numbers of nuclear reactors and other sources of radioactivity, this condition may change. Thus, there is a need now for more precise regulations governing control of radioactive sources and a better delineation of responsibilities of the various governmental agencies.

-- Cond. from authors' conclusions

- 382 Human Exposure to Radiation. K. Z. Morgan. Bull. Atomic Scientists 15, 384-389 (Nov. 1959).

A review is given on the maximum permissible radiation doses to humans considering both industrial and medical exposures. A comparison of common x-ray exposures is made between various medical examinations.

-- Nuclear Sci. Absts.

- 383 Aircraft Contamination from Residual Stratospheric Nuclear Weapon Debris. M.C. Gaske, R. R. Spore, Jr. and J. L. Dick. AFSWC-TN-59-5. Air Force Special Weapons Center, Kirtland, AFB, New Mexico. Project No. 7806. 42 pp. (Mar. 1959).

When nuclear weapons of relatively large yields are detonated, radioactive debris is carried high into the atmosphere. Some of this material is trapped in the stratospheric region forming a reservoir of fission fragment debris. This material diffuses back to the surface of the earth with a half fallout time on the order of years. As a result of the presence of this contamination, nearly all operational aircraft have some radioactivity. Those which fly above the tropopause collect considerably more contamination than those which operate at a lower altitude. Data have been collected and are presented to show the nature and amount of the radioactive contamination on several representative groups of Air Force aircraft. For aircraft which generally operate below the tropopause, the highest measured external radiation levels rarely exceed 0.05 mrad./hr. Maximum external radiation levels detected on high performance aircraft such as the F-102 and B-52 were on the order of 0.1

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mrads/hr. on isolated spots. There was no detectable air-borne contamination in the cockpits or in the immediate vicinity of any of the aircraft. It is concluded that there is essentially no measurable radiation exposure to either flight or aircraft-maintenance personnel resulting from residual radioactive bomb debris in the atmosphere, and neither radiation monitoring nor decontamination of aircraft is warranted if the aircraft have not penetrated fresh nuclear clouds.

-- Nuclear Sci. Absts.

### ENVIRONMENTAL MEASUREMENTS

- 384 On Horizontal Flat-Plate Sampling of Solid Particles in the Atmosphere. K. D. Hage, C. H. H. Diehl and M. G. Dudley. *A.M.A. Arch. Ind. Health* **21**, 124-131 (Feb. 1960).

Horizontal flat-plate sampling surfaces reveal appreciable systematic departures from the expected deposit patterns when they are exposed to the wind. The most significant effects are the following: (1) The deposit increases very regularly along the sampling surface in the direction of the wind. The magnitudes of the departures from a uniform deposit appear to increase rapidly with wind speed. (2) The deposit increases from the outside edge areas to the central area of the sampling surface in the direction normal to the wind. (3) The over-all average deposit is seriously below the expected average in the presence of wind speeds of 2.0 to 3.0 m. per second. The difficulties may be avoided substantially by placing the sampling surfaces just below the general level of the environment with suitable precautions to avoid shielding. The observed systematic deposit variations on the sampling surfaces probably reflect some of the principal features of the air flow immediately above the surface, since rebound effects are negligible on adhesive paper with deposit densities of the magnitudes observed in these experiments.

-- Authors' conclusions

- 385 A Combustion Method for the Determination of Solvent Vapors at Low Concentrations in Air. R. Goldstein, J. Gliksman and J. H. Elliott. *J. Air Pollution Control Assn.* **10**, Parts I, II 45-53 (Feb. 1960).

The chief usefulness of the present analytical method is the determination of emissions from sources of known single solvents or of mixtures of hydrocarbon solvents. The mass concentration of a mixture of hydrocarbons (both aliphatic and aromatic) can be determined with sufficient accuracy for most purposes. Using an average formula of  $\text{CH}^{1.6}$ , analytical results would be 5% high if the solvent were benzene and 5% low if the solvent were hexane. Since these two solvents represent the limits of saturation and unsaturation commonly found, an analysis of a hydrocarbon solvent can thus be reported with a 95% accuracy on a weight basis. However, most oxygenated solvent mixtures found in various lacquer formations cannot be estimated within an error of less than  $\pm 25\%$ . Because the method can supply only limited information on emissions of mixed solvents, the present combustion-infrared carbon dioxide analyzer has been considered for the detection system for chromatographic analysis. The relative insensitivity of the carbon dioxide analyzer to water vapor is an especially attractive consideration. The precision achieved by the present method restricts the combined carbon dioxide concentration to a maximum of 5,000 ppm. Thus the emissions from a direct-fired source such as a bake oven cannot be measured accurately. This restriction can undoubtedly be removed with a gas chromatographic procedure capable of separating high background carbon dioxide concentrations from low concentrations of solvent vapors.

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- 386 Proportional Sampling System for the Collection of an Integrated Auto Exhaust Gas Sample.  
J. C. Chipman and M. T. Massey.  
J. Air Pollution Control Assn. 10, Parts I, II 60-69 (Feb. 1960).

A proportional sampling system was developed for the purpose of obtaining an integrated auto exhaust gas sample. The system was designed to accumulate continuously a constant percentage of the discharge gas from a vehicle under road operating conditions. The sampling rate varies simultaneously with the exhaust gas flow rate. This is accomplished by an electronic system consisting essentially of a strain gage pressure transducer, voltage amplifier and a power amplifier. The latter operates a servovalve. The control signal to the system is obtained by the use of a viscous flowmeter which meters the air delivered to the carburetor system of a vehicle. An evacuated receiving tank accumulates the metered portion of the total exhaust gas emitted while a vehicle is operated. The collected sample is subsequently analyzed and the total quantity of exhaust gas components emitted from a vehicle during a test run is readily determined.

-- Authors' summary

- 387 Atmospheric Ozone. A. Galli.  
Riv. Aeronaut. (Rome) 35, 51-65 (Jan. 1959). Italian.

The distribution of ozone in the atmosphere and its variation in quantity depending on various factors, such as altitude, atmospheric turbulence, and time of the year, was studied in detail. Ozone is primarily a constituent of the atmosphere at high altitudes. Several charts in the text indicate the vertical distribution of ozone in the altitude range of 1 to 45 km. (0 to 28 miles). Various methods are discussed for the determination of ozone, including spectrometric and spectrophotometric procedures. The spectrophotometric method of Dobson, which is considered particularly effective for quantitative measurement of atmospheric ozone, is discussed in detail. It is concluded that after many years of theoretical and experimental research, it is not yet possible to construct a satisfactory theory of the mechanisms of production, equilibrium, and variations of ozone in the atmosphere. Many more studies are needed, and since much of the essential information is based on the movement of the air, information from continuing meteorological studies and any others available should be used. It is hoped that information compiled from studies of the International Geophysical Year will yield valuable basic information.

-- APCA Absts.

### PREVENTIVE ENGINEERING

- 388 Some Recent Developments and Applications of Scrubbers in Industrial Gas Cleaning.  
G. T. Nicklin. Proc. 52nd Annual Meeting, Air Pollution Control Association, Los Angeles, Calif. 20 pp. (June 21-26, 1959).

Performance predictions are required of any scrubbing equipment and, theoretically, many factors involving heat and mass transfer can be predicted. Other operating factors such as rates of transfer, percentage removal of a particular gas, liquid, or solid from a process gas stream, can best be determined by actual test under existing conditions. Technical and operating considerations as well as capital and maintenance evaluations are discussed for various types of industrial scrubbers. The following group classifications give a short description of some scrubbers, and their general operating characteristics; washer and spray chamber type; centrifugal scrubbers; venturi scrubbers; impingement types; wet filters; packed towers; film type towers; rotating elements. Although mass and heat transfer calculations give many use tools for estimating scrubber performance, actual tests or pilot plant data are necessary for accurate performance predictions.

-- APCA Absts.

- 389 Attitudes on the Design of Flue-Fed Incinerators. M. Sterling. Proc. 52nd Annual Meeting, Air Pollution Control Association, Los Angeles, Calif. 13 pp. (June 21-26, 1959).

An attempt has been made to ascertain present attitudes of air pollution control officials and equipment manufacturers on the preferred design of new flue-fed incinerators. The basic flue-fed incinerator has undergone little change until a few years ago when the effects of air pollution legislation required that existing units be modified. Fifty-six air pollution control agencies and 14 incinerator manufacturers were contacted, and answers for suitable data were obtained from 33 of them. In 55%, the respondents felt there was value in the use of flue-fed incinerators. The balance felt that if incineration were the desired disposal technique, this should be accomplished in suitably designed commercial incinerators. Some distinctive features to be used as a basis for the design of the unit are discussed.

-- APCA Absts.

- 390 Gas Chromatographic Study of the Oxidation of Hydrocarbons. K. C. Stein, et al. Proc. 52nd Annual Meeting, Air Pollution Control Association, Los Angeles, Calif. 14 pp. (June 21-26, 1959).

The exhaust from automobiles is known to constitute a major form of atmospheric pollution, and catalytic oxidation in the muffler or exhaust manifold is a method of dealing with it. Present work at the Bureau of Mines is concerned with the development of suitable catalysts for the purpose. Since a large number of catalysts were to be tested, a rapid method of testing was desirable. The microcatalytic-chromatographic technique appeared to be well suited for this. This technique was described and used to study such catalytic reactions as the cracking and polymerization of hydrocarbons. The testing apparatus and some typical chromatograms obtained with the apparatus are shown. The most active single oxide catalysts were found to be the oxides of cobalt, nickel, manganese, chromium, cerium, titanium, and iron. The microanalytic-chromatographic technique has proved to be a very convenient means for rapid screening in oxidation studies.

-- APCA Absts.

- 391 Industrial Hygiene Features of a Petrochemical Benzene Plant. Design and Operation. J. W. Hammond and E. R. Hermann. Med. Bull. (Std. Oil N.J.) 20, 64-73 (Mar. 1960).

In this paper a report is made on the degree of success attained, as measured by the first 18 months of operation of a benzene plant. The physical and toxicological properties of benzene were kept in mind throughout the planning and design of the 30 million gallon per year plant, which has operated satisfactorily. Four basic principles were used to serve as guides in analysis of the problem and in design: (1) Every proposed step in the series of processes was examined with respect to its capacity to release vapors. (2) Examination of equipment with anticipated points of loss of liquid was made in light of experience with other volatile hydrocarbons in the refinery and rubber plant. (3) For those points where liquid and vapor were to be released to the atmosphere, vapor control measures were built into the equipment. (4) In selection of equipment consideration was given to maintenance so as to prevent atmospheric contamination, along with output and efficiency. Means and methods for minimizing benzene exposure during its manufacture, storage and loading for shipments are described. The Medical Department examined employees before they were assigned to their jobs. Special attention was attached to any blood changes from normal. The usual standards for absence of such as liver, kidney and cardiovascular diseases were applied. Estimation of the degree of exposure and subsequent benzene absorption actually being experienced in a work environment can be obtained by means of a two dimensional sampling program.

- 392 Industrial Ventilation. Providing Clean Air for the Workroom. Anon. Natl. Safety News 81, 63-64, 76-78 (Mar. 1960).

Clean air is necessary for the health and comfort of those who occupy any enclosed space. For some occupancies, open windows may be adequate. For others, elaborate exhaust systems may be needed to remove contaminants from the workroom air.

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Ventilation also includes control of heat and humidity. Maintaining air hygiene requirements may be complicated by the generation of toxic or nuisance air contaminants in industrial processes. General ventilation systems are based on either of two general principles, or a combination of the two: (1) Plenum ventilation. Air is driven into the room by fans, diluting the room air with fresh air, forcing out stale air through doors, windows, and cracks. This method is limited to buildings where contaminants are non-toxic and present in low concentrations. (2) Exhaust (vacuum) systems. Air is drawn from a room by fans and is replaced by air entering through doors, windows, and other openings. Where processes are not injurious to health, general ventilation is usually satisfactory. It is also satisfactory where dilution of air contaminants will keep the concentration below Threshold Limit Values (T.L.V.) for continuous exposure. Standards for many contaminants have been compiled by the American Standards Association and the American Conference of Governmental Industrial Hygienists has suggested T.L.V. values. Where contaminants are toxic, removal at their source is necessary. Ventilation is often complicated by the necessity of maintaining a comfortable temperature. Exhausting impure air is usually practicable but in cold weather it may be difficult and expensive to warm large volumes of incoming make-up air. Briefly described are fans and blowers, local exhaust systems, portable ventilators, dust collectors, filters, electrostatic precipitation, cyclones, and supersonic flocculation.

### COMMUNITY AIR HYGIENE

- 393 Eye Irritation from Air Pollution. C. H. Hine, et al.  
J. Air Pollution Control Assn. 10, Parts I, II 17-20 (Feb. 1960).

Eye irritation remains one of the major demonstrable ill effects of community air pollution. Experimental work reported in this paper does not demonstrate any objective evidence of histologic or biochemical change following exposure to relatively high concentrations of single or combined pollutants or artificial smogs. Measurements using human panels, by a number of groups, have contributed to a further understanding of the factors which lead to the formation of the eye-irritating components of polluted air, even though these have not yet been identified.

-- Authors' summary

- 394 Contaminant Concentrations in the Atmosphere of Los Angeles County. W. J. Hamming, R. D. MacPhee and J. R. Taylor.  
J. Air Pollution Control Assn. 10, Parts I, II 7-16 (Feb. 1960).

The primary purpose of this paper was to describe long-term pollution trends as measured by the Los Angeles air monitoring network. This is the first time, in the authors' knowledge, that such information has been reported. Except for work in England on a distinctly different type of air pollution problem, there are few data available which span any appreciable number of years. The District's monitoring is done with 24-hour recording devices. Its usefulness is justified primarily as a protection and warning measure. A by-product of this operation is the generation of data from which the levels and trends in pollution can be studied. During the 3-year period, 1956-1959, the general level of carbon monoxide has been rising. The rise in carbon monoxide of 1 ppm per year has not been reconciled with weather or other pollution factors. The rise in nitrogen dioxide was small and trends are available only from 1957. Sulfur dioxide varied slightly without changing its general level. Particulates (expressed in terms of blackness of filter spot) declined during 1956 and 1957. Particulate data have not yet been reduced for 1958. The decline during 1957 could have been due in part to the District's incinerator ban. A preliminary study on the basis of comparable weather factors appeared to justify this conclusion. The oxidant, eye irritant, and plant toxicant declined in 1956 and 1957 from a high in 1955, but exhibited a slight upturn in 1958. Winds and inversions appear to be the determining factors for trends in eye irritant, oxidant and plant toxicant.

-- Cond. from authors' conclusions

- 395 Contaminant Emissions from the Combustion of Fuels. R. L. Chass and R. E. George.  
J. Air Pollution Control Assn. 10, Parts I, II 34-44 (Feb. 1960).

The demand for thermal energy in Los Angeles County is increasing at an astounding rate, and from all indications, will at least double within the next 8 or 10 years. Essentially, all of this demand is being met with petroleum and natural gas fuels. From an air pollution point of view, petroleum fuels are totally undesirable as an energy source because the burning of such fuels in power plants and various other industrial activities results in emissions to the atmosphere each day of hundreds of tons of air contaminants. Since this constitutes a major source of air pollution, every possible effort must be asserted to assure to this area the availability of increased supplies of natural gas. Although considerable progress has already been made, a great deal of engineering research and development are still needed to render feasible the several methods proposed for controlling emissions of air contaminants from the burning of fuel oil. In the interim, it will be necessary to allocate the use of available fuels in such a way as to minimize air pollution from this source. There is general agreement that the most desirable fuel for power generation is natural gas. It is also apparent from the forecasts of thermal energy requirements and natural gas supplies for the Los Angeles area that there will not be enough gas to meet the estimated demand. The variable annual demands for natural gas by firm users will require that under certain conditions, some fuel oil be burned by interruptible users. Efforts will be directed, however, toward reducing this use of fuel oil to a minimum.

-- Cond. from authors' conclusions

- 396 Control of Asphaltic Concrete Plants in Los Angeles County. R. M. Ingels, N. R. Shaffer and J. A. Danielson. J. Air Pollution Control Assn. 10, Parts I, II 29-33 (Feb. 1960).

It is emphasized in this paper that the variables studied only represent average trends of asphaltic concrete plants in Los Angeles County. From this, it can be concluded that: (1) Multiple centrifugal scrubbers have proved to be more efficient than baffled towers. (2) Scrubber water-gas ratio is equally important in both types of scrubbers. The best utilization of water is achieved up to a ratio of 6 gallons per 1,000 standard cubic feet of gas. Above this ratio, efficiency still increases within the bounds studied, but at a lesser rate. (3) Scrubber stack emissions increase linearly with an increase in the amount of minus 200-mesh material charged to the dryer. (4) The burning of PS 300 or heavier fuel oils rather than natural gas results in higher stack emissions. Under constant conditions, an increase of approximately 5 pounds per hour was observed. Although the available data are not conclusive, it appears that dust emissions are significantly decreased when PS 200 oil is substituted for PS 300 oil. Through the use of scrubbers, dust emissions from asphaltic concrete plants have been reduced from a total of 25 tons per day to 1 ton per day. If this is related to the increase in production over the 10-year period then the control program is responsible for a net removal of 34 tons per day of dust from the Los Angeles County atmosphere.

-- Authors' conclusions

- 397 Air Pollution Control Measures for Hot Dip Galvanizing Kettles. E. E. Lemke, W. F. Hammond and G. Thomas.  
J. Air Pollution Control Assn. 10, Parts I, II 70-77 (Feb. 1960).

It appears, based on all investigations to date, that a properly designed baghouse will provide a suitable control device for galvanizing operations. The fumes from the galvanizing operations, where the material to be galvanized has been properly decreased, do not damage cotton bags. The useful life of cotton bags is satisfactory provided ordinary good maintenance is observed. Observations and tests of precipitator installations indicate that this type of collector will be satisfactory although more data must be compiled to determine whether or not the first results can be extrapolated to provide design data for larger installations. To date, no scrubber installations have proved really effective to diminish the fumes discharged to the atmosphere, and wet collection systems invite corrosion problems. Investigations are being continued to develop the most practical means of control for galvanizing operations.

-- Authors' summary

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- 398 Waste Disposal without Air Pollution. C. R. Compton and F. R. Bowerman.  
J. Air Pollution Control Assn. 10, Parts I, II 57-59, 95 (Feb. 1960).

Waste disposal may, in almost all instances, be consummated without placing an undue burden on the atmosphere; however, the accomplishment of that end results from careful planning and is seldom accidental. Awareness of the need for minimizing air pollutants has not always characterized the activities of those saddled with the responsibilities for effecting waste disposal, but an awakening of interest is evidenced and fewer bad choices will be made as engineers become more familiar with air pollution relationships. Air pollution control officers may quicken the education process by serving as catalysts between the needs of the waste producer and the designer and operator of the waste disposal facility. It would appear that many of the questions relative to air pollution from waste disposal could be answered if each of those entrusted with the responsibility to dispose of waste materials would first ask themselves, "what effect will a disposal process have upon the air of our community?" If the question cannot honestly be answered "that the disposal process will have little or no effect upon the atmosphere," then it behooves engineers to dig deeper into their store of engineering ability and come up with answers which will meet that simple criteria. -- Authors' conclusions

- 399 Evaluation of Methods for Controlling Vehicular Exhaust. W. Linville, R. G. Holmes and C. V. Kanter. J. Air Pollution Control Assn. 10, Parts I, II 21-28 (Feb. 1960).

On the basis of the extensive program of review, evaluation and physical testing of many types of automotive control devices and methods, it now appears that essentially complete hydrocarbon control must await development of a practical afterburner, either catalytic or direct flame. Lesser degrees of control, however, may be achieved through the use of devices operating essentially on the deceleration cycle. Fuel modification can be expected to decrease the smog forming capability of exhaust gas. Neither deceleration type devices nor fuel modification alone, however, appear to offer an ultimate solution to the problem. Perhaps future combinations of methods and devices such as the combining of fuel enrichment with an afterburner will prove effective. -- Authors' conclusions

- 400 An Air Pollution Study of a Community Surrounding a Beryllium Plant. V. H. Sussman, J. Lieben and J. G. Cleland. Am. Ind. Hyg. Assn. J. 20, 504-508 (Dec. 1959).

A large portion of the beryllium metal and its alloys produced in the United States is manufactured in a plant situated in Pennsylvania. There has been some concern in Pennsylvania with human exposure to beryllium for a number of years. The Division of Occupational Health of the Pennsylvania Department of Health has made extensive studies of industrial exposure, and in 1955 directed attention to the study of possible exposures to citizens of the community surrounding the plant. A plan for an epidemiological and engineering study of the community was developed and, under a grant from the National Institutes of Health, U. S. Public Health Service, field work was started in May, 1958. Preliminary epidemiological findings have been reported in detail by Lieben, et al. (Am. Ind. Hyg. Assn. J. 20, 494, Dec. 1959), and show that, as of March, 1959, more than 20 cases of non-occupational chronic beryllium disease had been reported in the community under study. Beryllium disease was a primary or secondary cause of death in 9 of these reported cases. The purpose of the present paper is to report on the initial findings of the engineering phase of this study.

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## MANAGEMENT ASPECTS

- 401 The Aging Executive. R. C. Page. Ind. Med. & Surg. 29, 121-124 (Mar. 1960).

There are various opportunities for retired persons. There are careers in politics, in research, in volunteer welfare work and in countless other fields that are open to older persons with the right qualifications. What is of primary importance is that each individual be thoroughly evaluated. As soon as it is known clearly what he can and cannot do, then the matter of placing him becomes more or less a matter of routine. On the other hand, an attempt to dispose of an individual without evaluation may end in tragedy. This is the lesson that modern business is learning, that the subject of human relations becomes increasingly important.

- 402 Sickness Absence among Railway Clerical Staff. D. S. Pugh, C. Gordon and Katherine Levy. Brit. J. Ind. Med. 16, 269-273 (Oct. 1959).

This paper examines in detail the sickness absence experience within one well-defined railway occupation, identified in a previous paper for further study, namely, clerks. The clerks consist of three hierarchical grades. The differences between them are described. A gradient of sickness experience between the three grades is demonstrated. This occurs in inverse relation to the amount of responsibility associated with the posts. The gradient is accounted for by a small number of diagnostic categories. The implication is discussed. Comparisons are made with a similar population in London Transport and the results discussed. It is concluded that psychological factors might provide some explanation of the striking differences in sickness experience operating within one sub-class of the Registrar General's classification (IIIc) and within a limited salary scale. -- Cond. from authors' abstr.

## ACCIDENTS AND PREVENTION

- 403 Industrial Trucks. Anon. Natl. Safety News 81, 194-196 (Mar. 1960).

Trucks of many types keep goods moving through factories, warehouses, docks and railroad terminals. Both hand and power-operated models are available for a variety of lifting and hauling jobs. Industrial power trucks are operated by engines using gasoline or liquefied petroleum gas or by storage batteries. Many trucks designed for gas have been converted to liquefied petroleum gas. Catalytic exhaust purifiers on trucks powered by internal combustion engines permit their operation indoors where there is normal ventilation. Power trucks should comply with code specifications for fire protection. Types of trucks described briefly are: fork lift truck, scoop trucks, powered hand truck, platform truck, low-lift platform truck, high-lift truck, ram trucks, roll-handling trucks, crane trucks, and tractors and trailers.

- 404 Spontaneous Ignition. Anon. Natl. Safety News 81, 246-248 (Mar. 1960).

Spontaneous ignition is a chemical action in which there is a slow generation of heat through oxidation of combustible material. Under certain conditions, oxidation is accelerated until the ignition temperature of the material is reached. This condition requires

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sufficient air for oxidation but not enough ventilation to carry away the heat as it is generated. Acute cases occur suddenly and explosively; in chronic cases heat generates slowly until ignition takes place. Examples of substances subject to ignition are dry yellow phosphorus, which ignites on exposure to air, and quicklime, sodium, potassium, and calcium carbide, which heat when exposed to moisture. At ordinary temperatures some combustible substances oxidize slowly and under certain conditions reach their ignition point. These include vegetable and animal oils and fats, coal, charcoal, and some finely divided metals. Rags and waste saturated with linseed oil or paint often cause fires. They should be deposited in waste cans with covers and removed daily. Agricultural products susceptible to spontaneous ignition include sawdust, hay, grain, jute, hemp, and sisal, especially if exposed to heat or to alternate wetting and drying. Circulation of air, removal of external sources of heat, and storage in smaller quantities are desirable precautions. Fires in iron, nickel, aluminum, magnesium and other finely divided metals are sometimes attributed to spontaneous ignition. This is believed to result from oxidation of cutting or lubricating oils, or possibly from chemical impurities.

405 Static Electricity. Anon. Natl. Safety News 81, 236 (Mar. 1960).

Sparks resulting from static accumulations are a common source of fire. The hazard is particularly serious where there may be flammable vapors, gases or dusts. Cold, dry weather is most hazardous. A warm, humid atmosphere helps to draw off static charges. Static charges result from: (1) Friction between small particles. (2) Contact and separation of two unlike substances, one or both of which are non-conductive. Static charges are generated on dry belts (particularly rubber or leather) by contact and separation of belt and pulley. Accumulations can be controlled by use of conductive rubber belting. Belts may be grounded with sharp-pointed metal combs or metallic tinsel static collectors which are grounded. Where highly flammable vapors may be present, chain drive or conductive rubber pulleys, rather than combs, should be used. Conductive rubber belt dressings, if renewed frequently, are helpful. Finely divided materials falling through the air or blown through pipes, may generate static electricity and ignite explosive mixtures of dust and air. Machines should be bonded and grounded at several points. Humidity maintained at or above 60% at 70°F helps to prevent accumulation of static charges. Ionization of air is also used. Body static charges may create a hazard in areas which contain highly flammable dusts, gases and vapors. Shoes with conductive soles and heels help drain off charges. Their conductive value is reduced by foot powders and by wool, silk, or nylon socks. Cotton and rayon are safer.

406 Eye Conservation. Programs and Equipment for Protection and Correction. Anon. Natl. Safety News 81, 89-91, 96, 118 (Mar. 1960).

Protection of eyes against physical or chemical agents or radiant energies is an essential part of an industrial safety program. The cost of eye protection is small in comparison to the potential savings. A pair of impact-resistant spectacles may cost from \$2.00 to \$10.00, while compensation costs for a lost eye may range from \$1,600 to \$10,000. Most companies require goggles or face shields on jobs where there is an obvious eye hazard, as in chipping and grinding. A few have established 100% eye protection—for visitors as well as for all employees. They point to the fact that many eye injuries occur in "non-hazardous" jobs. Following are some of the menaces to eyes: relatively large flying particles, dust and small flying particles, splashing metal, gases, fumes and liquids, reflected light or glare, injurious radiant energy, requiring moderate reduction in intensity, and injurious radiant energy, requiring great reduction in intensity. For protecting eyes and face against various occupational hazards, four general types of equipment are used: (1) goggles (safety glasses, spectacles); (2) face shields; (3) welding masks and helmets; and (4) acid hoods. Each of these items is described in detail.

- 407 Safety with Solvents. Anon. Natl. Safety News 81, 71-72 (Mar. 1960).

Organic solvents are those which contain the element carbon, and no metallic or basic element. They are classified in four main groups: (1) hydrocarbons; (2) alcohols; (3) esters and ketones; and (4) chlorinated solvents. In addition to solvent power, other properties may be important to the user. Flash point, toxicity speed of evaporation, and cost must also be considered. From the standpoint of safety the two most important properties are the flash point and the maximum allowable concentration. The flash point of a liquid is the ignition temperature of its saturated vapor. Expressed more simply, it is the temperature to which any material must be heated before it will give off sufficient vapor to form an explosive mixture with air. Flash points given in most tables are determined by the closed cup method. These are always lower than those determined in an open cup. Toxicity is measured by "maximum acceptable concentration" (MAC) in parts per million (ppm) of solvent that can contaminate the air in a room for extended periods without endangering the occupants. This term and "threshold limit value" are used interchangeably. The higher the MAC, the lower the toxicity of the solvent. Speed of evaporation is also an important factor in toxicity. In addition to the rated MAC, the time it takes to reach that concentration must also be considered. A solvent of low volatility is generally less hazardous than one of high volatility with the same MAC. It should be assumed that all organic solvents are toxic. If used in any quantities, ventilation determined by an engineer must be provided. Since solvents dissolve fats and oils, they naturally defat the skin. Workers in these processes should be provided with protective gloves and creams.

- 408 Heads Protected. Hard Hats can take more Punishment than Skulls. Anon. Natl. Safety News 81, 98, 112, 114 (Mar. 1960).

Head injuries caused by falling objects are a serious hazard in many industries and such injuries are usually serious—often fatal. The hard hat, first introduced in mines shortly after World War I and much improved since then, has an impressive record of lives saved. Head protection has become standard practice in other industries, including construction, logging, shipbuilding, and many types of maintenance work. Head protection is also becoming general among public utility companies where linemen wear protective hats for protection against live wires overhead as well as against impact. Wearing protective hats is included in many labor contracts and the unions have helped in educating their members on the need for head protection. A protective hat should have: (1) Resistance against impact. (2) Resistance to fire. (3) Resistance to moisture. (4) Light weight. (5) Insulation against electricity if worn around live equipment. The types and construction of various safety hats are described. The article concludes with a section on headwear for women.

- 409 Respiratory Protection. When Work Must be Done in Unbreathable Air. Anon. Natl. Safety News 81, 92-93, 102, 105 (Mar. 1960).

Air contaminants, the undesirable by-products of many industrial processes, provide some of the most serious problems of occupational and public health. These contaminants range from relatively harmless "nuisance" substances to toxic dusts, vapors, mists, and gases. Removal of contaminants at the source and enclosure of processes to reduce concentrations in the workroom air should be the aim of the safety and hygiene program but leaks and breakdowns of equipment may occur. There are also operations where exposure is brief or infrequent. For such situations, personal protection is needed. The worker's air intake may be safeguarded by 3 principal methods: (1) Mechanical filtration to remove dusts, fumes and mists. (2) Absorption or chemical reaction to remove gases and vapors. (3) Supplying respirable air or oxygen. Five general types of respiratory equipment are: (1) Canister gas masks. (2) Chemical cartridge respirators. (3) Mechanical filter respirators. (4) Supplied-air equipment (hose masks and air-line respirators). (5) Self-contained apparatus supplying oxygen or air. Each type of this respiratory equipment is described in detail. Each type has a definite field of usefulness, as well as limitations. Manufacturers and dealers, therefore, want to know the type of exposure when equipment is ordered. Equipment which meets accepted standards carries the label of the Bureau of Mines. Approval specifies type and limits of exposure.

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410 Do Safety Shoes Really Save? C. F. Burris. Safety Maintenance 119, 11-18 (Feb. 1960).

A study made of accident statistics by the National Safety Council over the past few years revealed that when protective equipment is used to safeguard specific parts of the body the resulting percentages of both disability and total compensation injuries are low. For example, toes account for 80,000 or 4% of all accidents, and the total compensation is 2%. The survey covered 233 companies, employing 815,000 persons. There was a total of 1,813 toe injuries; 1,477 were non-disabling and 336 were disabling. Extracting out only those who were injured while wearing safety shoes, there were 661 cases, of which 543 were non-disabling and 119 were disabling. This means that: 63% of those receiving toe injuries were not wearing safety shoes; and furthermore, it was found that 60% of the companies did not require safety shoes. Of the foot injuries to people wearing safety shoes, only 7% involved the 2nd, 3rd, and 4th toe, which was mainly covered by the toe cap; 24% involved the big toe (but it was found that 85% of these big toe injuries were the result of impact behind the cap); 21%, the little toe (however, 91% of these injuries to the little toe resulted from impact behind the toe cap); and 48%, other parts of the foot. To gain some idea of the weight and height factors of the objects causing the injuries, the objects ranged from 2 pounds to 60,000 pounds and they fell from as high as 18 feet. The most frequent height reported was 3 feet. As to the types of activities engaged in when the accidents occurred, they cover a variety of activities: 24% material handling, 15% lifting and loading, and 10% operating machines or power tools. Many companies have set up shoe departments in their plants with the aid of shoe manufacturers and provide trained employees to fit personnel with the correct type shoe for the hazard involved.

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IN RE: ABRAMS

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