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Industrial Hygiene Digest

INDUSTRIAL HEALTH NEWS

LITERATURE ABSTRACTS

MEDICAL

ENGINEERING

CHEMICAL

TOXICOLOGICAL

LEGAL

NATIONAL
AUG 22 1960
MEDICINE

AUGUST, 1960
(Vol. 24, No. 8)

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

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WV-002195

Industrial Hygiene Features

New smoke and air pollution control rules and regulations are enacted by Allegheny County. See Abst. No. 728.

The effect of smoking on asthma and emphysema is discussed in Abst. No. 734.

Abst. No. 735 presents information on tobacco amblyopia.

Abst. No. 740 is concerned with education for industrial medical practice.

Dermatoses from phenylmercuric salts is the subject of Abst. No. 742.

See Abst. No. 746 for information on the present status of skin tests.

The topic of Abst. No. 756 is the role of roasted chromite ore in the production of cancer.

Mercury as a potential hazard in medical laboratories is considered in Abst. No. 758.

Pathological changes in ethylene dibromide poisoning is the objective of Abst. No. 763.

Data on the mycological contamination of impinger samples are given in Abst. No. 769.

Consult Abst. No. 772 for some statistical aspects of dust counting.

A case report on asbestosis and carcinoma of the lung is given in Abst. No. 781.

For a discussion on audience and seat absorption in large halls see Abst. No. 787.

Microwave radiation hazards are discussed in Abst. No. 791.

Man versus environment is the subject of Abst. No. 808.

Adhesion of solid particles to solid surfaces is the title of Abst. No. 810.

A discussion on automation and unemployment is presented in Abst. No. 816.

Foundation Facts

A.M.A. ARCHIVES OF INDUSTRIAL HEALTH has changed its name to Archives of Environmental Health beginning with the July 1960 issue, and will start with Volume 1, Number 1.

DR. GROSS PRESENTS PAPER AT INTERNATIONAL CONGRESS. Dr. Paul Gross, the Foundation's Research Pathologist presented a paper on "The Synergistic Action of Tuberculin with Quartz Dust" on July 28 at the 13th International Congress on Occupational Health, held in New York City.

SILVER ANNIVERSARY MEETING

OCTOBER 26 - 27, 1960

TABLE OF CONTENTS

	Page
News Items	1
Occupational Disease Statistics	4
Coming Events	5
Legal Developments	5
Books, Pamphlets and Notices	6
Industrial Medical Practice	7
Skin Diseases and Burns	9
Chemical Hazards	12
Industrial Dusts	17
Physical Aspects of Environment	21
Radioactivity and X-Radiation	23
Environmental Measurements	26
Preventive Engineering	27
Community Air Hygiene	28
Management Aspects	30
Accidents and Prevention	31
Miscellaneous	32
Index	33

... 1960
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Industrial Hygiene Foundation
4400 Fifth Avenue
Pittsburgh 13, Pennsylvania

INDUSTRIAL HYGIENE DIGEST
Literature and News

NEWS ITEMS

...rses in Industrial Health.

The Department of Industrial Health, School of Public Health in cooperation with ...e Institute of Industrial Health, University of Michigan Medical Center offers courses in ...ustrial health. Academic instruction leading to the Masters Degree in Public Health ...dustrial Health) can be obtained in one year. An additional academic year is offered to the ...ysician who has had his general internship and who desires to be qualified for an in-plant ...sidency. This comprehensive plan is designed in accordance with requirements of the ...M.A. Council on Medical Education and Hospitals and the American Board of Preventive ...dicine (Occupational Medicine). First Year: Required courses include Epidemiology, ...statistics, Public Health Administration, Environmental Health, and Industrial Hygiene. ...ectives in Radiological Health, Community Air Pollution, and Toxicology. Second Year: ...quired courses in Clinical Medicine, Occupational Diseases, Industrial Health Research, ...d Mental Health. Electives over practically any field of specialization including Toxicology, ...vironmental and Radiological Health, Industrial Medical Practice, and Epidemiology. A ...mmer school course is included in the two-year plan which consists of academic instruction ...Ann Arbor and field work in Industrial Medicine at an industry. Information relative to ...mission, fees, living expenses and housing, fellowships, scholarships and student aid will ...furnished upon request from the Office of the Director, Institute of Industrial Health, 1630 ...versity Hospital, Ann Arbor, Michigan. -- J. Occ. Health

...A Offers New Manual. List of Pesticide Uses Not Assigned Numerical Tolerances, Now ...ilable.

The National Agricultural Chemicals Association has compiled a manual from ...l USDA data listed in "A Summary of Certain Pesticide Chemical Uses" and its supple- ...through March 31, 1960, published by the Pesticides Regulation Branch, U.S. Depart- ...of Agriculture. Copies of the manual, titled "Pesticide Chemical Uses Accepted on a ...sidue Basis", may be ordered from the National Agricultural Chemicals Association, ...rtment of Information, 1145 Nineteenth Street N.W., Washington 6, D.C. The price is ...nts per copy.

...ment Society of America Fall Meeting.

More than 50 technical sessions are to be offered at the Instrument Society of ...rica's Fall Instrument-Automation Conference and Exhibit, together with its 15th annual ...ting. The event is being held at the New York City Coliseum, September 26 to 30. Nearly ...leading instrument manufacturers will display and demonstrate the latest developments in ...ntific equipment. Among the sessions planned are those covering chemical and petroleum ...mentation, metals and ceramics instrumentation, nuclear instrumentation, sample ...ng, laboratory analysis instrumentation, and standards measurements. Details are ...ble from ISA, 313 Sixth Avenue, Pittsburgh 22, Pa.

722 Anachem Conference.

The Eighth Detroit Anachem Conference will be held October 24, 25, and 26, 1960 at the McGregor Memorial Conference Center, Wayne State University, Detroit, Michigan. This year will see a program of increased scope which will present a "bill of fare" consisting of two categories: (1) papers reviewing methods and techniques that may find immediate application in the laboratory, and (2) papers devoted to new approaches to analytical chemistry. The subject matter will be related to polarography, spectroscopy, x-ray fluorescence, flame photometry, chromatography, absorption photometry, activation analysis, and other [illegible] as well as general chemical analysis. Dr. Harry A. Bright of the National Bureau of Standards will receive the 1960 Anachem Award and give the Award Address. For additional information write to M.D. Cooper, Chemistry Department, Research Laboratories, General Motors Corporation, 12 Mile and Mound Roads, Warren, Michigan.-- Am. Ind. Hyg. Assn. J.

723 Hygienic Guide Series.

The following additional Hygienic Guides are now available: Acetonitrile (Methyl Cyanide, Ethanenitrile), Diethylamine, Nitropropane, Diethylene Triamine (2,2'-Diamino diethylamine), and Tetrachloroethylene (Perchloroethylene). They are given in the June AIHA Journal (pp. 265-271) and can be obtained from the American Industrial Hygiene Association, 14125 Prevost, Detroit 27, Michigan, at 25 cents each. -- Am. Ind. Hyg. Assn. J.

OCCUPATIONAL DISEASE STATISTICS

724 Occupational Disease Statistics. (Cases Reported to the Respective Health Departments.)

	Conn. May	Ind. Apr.-May-June	Pa. June-July	Tenn. May-June	Total
Acid fumes (inhalation)				1	1
Asthma			1		1
Brucellosis				1	1
Dermatitis	47*	8*	43	12	110
Fumes (unidentified)			2		2
Lead poisoning			2		2
Pneumoconiosis			45		45
Pneumoconiosis (suspected)			1		1
Pneumonitis (chemical)			1		1
Poisoning			1		1
Silicosis	1		3		4
Silicosis (suspected)			7		7
Silico-tuberculosis	1	2			3
Tuberculosis			2		2
Welding fumes (inhalation)				2	2
Total	49	10	108	16	183

* Causes are listed as follows:

Connecticut: Oils, fats and waxes, 12; solvents (N.O.C.), 7; poisonous plants, miscellaneous, 5; infections and synthetic resins and chemicals, 4 each; soap solutions, [illegible] etc., 3; abnormalities of temperature and chemicals (N.O.C.), 2 each; acids and alkalies, 1.

Indiana: Solvents, 1; green nylon thread, 1; disseminated neurodermatitis, 1; staphylococci skin disease, 1; cause not stated, 4.

COMING EVENTS

25 Aug. 27-Sept. 1	American Hospital Association, San Francisco, Calif.
Sept. 1-7	International Congress on Nutrition, International Union of Nutrition Scientists, Washington, D.C.
Sept. 8-9	Society of Plastics Engineers, New Horizons in Vinyl and Plastics in the Shoe Industry, Boston, Mass.
Sept. 11-16	American Chemical Society, 138th National Meeting, New York, N.Y.
Sept. 12-14	Canadian Agricultural Chemicals Assoc., Lake of Bays, Muskoka, Ont.
Sept. 14-16	National Petroleum Assoc., Annual Meeting, Atlantic City, N.J.
Sept. 15-16	Armed Forces Chemical Assoc., 15th Annual Meeting, Washington, D.C.
Sept. 15-16	Society of Cosmetic Chemists, 7th Annual Cosmetic Seminar, Chicago, Ill.
Sept. 15-18	Drug, Chemical and Allied Trades Assoc., 70th Annual Meeting, Bolton Landing (Lake George), N.Y.
Sept. 25-28	American Institute of Chemical Engineers, Tulsa, Okla.
Sept. 26-30	Instrument Society of America, 15th Annual Meeting and Instrument-Automation Conference and Exhibit, New York, N.Y.
Sept. 27-29	Technical Association of the Pulp and Paper Industry, Testing Conference, Grand Rapids, Mich.
Oct. 2-6	Water Pollution Control Federation, 33rd Annual Meeting, Philadelphia, Pa.
Oct. 3-5	7th Annual Ottawa Symposium on Applied Spectroscopy, Ottawa, Ont.
Oct. 4-7	10th Annual Instrument Symposium and Research Equipment Exhibit, National Institutes of Health, Bethesda, Md.
Oct. 6-8	9th National Clay Conference, Clay Minerals Committee of the National Academy of Sciences, Nat'l. Research Council, Purdue University, Lafayette, Ind.
Oct. 7	Detroit Rubber and Plastics Group, Fall Meeting, Detroit, Mich.
Oct. 9-13	ASTM Committee D-2 on Petroleum Products and Lubricants, Wash. D. C.
Oct. 10-12	Assoc. of Official Agricultural Chemists, Annual Meeting, Wash. D.C.
Oct. 10-12	National Electronics Conference, Chicago, Ill.
Oct. 11-15	American Council of Independent Laboratories, Annual Meeting, Miami Beach, Fla.
Oct. 12-14	American Vacuum Society, Nat'l. Vacuum Symposium, Cleveland, O.
Oct. 12-14	Fourth Conference on Analytical Chemistry in Nuclear Reactor Technology and First Conference on Nuclear Reactor Chemistry, Gatlinburg, Tenn.
Oct. 17-18	American Coke and Chemicals Institute, Annual Meeting, White Sulphur Springs, W. Va.
Oct. 26-27	Industrial Hygiene Foundation of America, Inc. 25th Annual Meeting, Pittsburgh, Pa.

LEGAL DEVELOPMENTS

26 Occupational Diseases—Inhalation of Chrome Products—Pulmonary Dust Disease.

Was there sufficient evidence to support the findings of the Medical Board to the effect that claimant had sustained a compensable occupational disease, from long exposure to the inhalation of chrome products, which resulted in permanent total disability? The employer and insurer on appeal claim primarily that the pulmonary dust disease the claimant had contracted was not a hazard charactoristic of and peculiar to his employment. Plaintiff was employed by the chemical company in various categories but always exposed to chromic in the form of dust and fumes. Plaintiff's right lung was removed and for disability resulting

therefrom plaintiff filed his claim. The Medical Board made specific findings as to all the issues, particularly, the important one, when in compliance with the statute, it found to effect that plaintiff was injuriously exposed to the hazards of an occupational disease and that such disease was due to the nature of the occupation or process in which plaintiff was employed. It was conceded that plaintiff had been subjected to chrome dust and fumes over a long period of time. It was not disputed that he was permanently disabled. It was generally agreed by most of the medical experts that chrome products will irritate the lungs. The doctors, in varying degrees, stated that plaintiff suffered from chronic ulcerative bronchitis and a pneumonitis. There was evidence—though there was also evidence to the contrary—that the pulmonary dust disease suffered by plaintiff was due to the nature of the employment in which the hazards of the disease actually exist. There was also evidence that occupational diseases in the chrome industry do exist and that pulmonary dust diseases are characteristic and peculiar to chrome workers, but there was also evidence that it has not been certainly established that the rare and unusual combination of ailments which had disabled the plaintiff was due to exposure to chrome fumes and dust. The court, therefore, felt that it must, in this case, as did the lower court, on the basis that there was some substantial or legally sufficient evidence to support the finding of the Commission that the Medical Board was correct when it found that plaintiff had sustained a compensable occupational disease. Affirmed. Mutual Chemical Company v. Thurston. Maryland Court of Appeals. No. 154. September Term, 1959. March 17, 1960.

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727 Occupational Diseases—Tenosynovitis—Insurer's Liability—Date of Disability.

Suit was brought by an employee against her employer and its two successive insurers for workmen's compensation for disability to each of her wrists and hands arising out of and in the course of her employment. Plaintiff was employed as operator of a sewing machine and developed an occupational disease known as tenosynovitis from the constant strain on the muscles and tendons of her wrists and hands. The first "knots" in the tendons developed in May, 1955, and recurred from time to time until May, 1958, and she was finally discharged on August 4, 1958, because of her permanent disability. The condition which she has is compensable under the occupational diseases statute but the question herein is which two successive insurers is liable to plaintiff. While the disability for which compensation is sought came into existence before May 2, 1958, while St. Paul was insurer, the statutory test for liability is when the employee was "last injuriously exposed to the hazards of the disease" and provides that the employer and its insurer, during the time of such exposure, "shall alone be liable therefore, without right to contribution from any prior employer or insurer". Thus the very purpose of the statute was to fix a clear and definite test for determining which employer and insurer was liable. The proof shows that plaintiff was "last injuriously exposed to the hazards of the disease" during the period from May 2 to August 4, 1958, while Travelers was the insurer. So, by force of the statute, Travelers (the last insurer) is made solely liable to plaintiff. So much of the judgment of the lower court as awards a recovery to plaintiff against her employer is affirmed, but so much as awarded her a recovery against St. Paul is reversed and judgment is here entered against Travelers. Tennessee Tufting Company v. Potter. Tennessee Supreme Court. April 6, 1960.

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728 New Smoke and Air Pollution Control Rules and Regulations Enacted by Allegheny County.

Legislation pertaining to smoke and air pollution control in Allegheny County became effective August 1, 1960. Article 13 which relates to rules and regulations of smoke and air pollution control consists of the following sections: Purpose; Definitions; Air Pollution Control Advisory Committee—Declaration of Policy; Administration and Enforcement: General; Railroad Locomotives, Boats, and Other Vehicles; Power Plants,

Heating Plants, and Domestic Heating Plants; Steel and Allied Industries; Miscellaneous Pollutants from Combustion; Permits and Fees; Licenses and Fees for Solid Fuel Dealers; Nuisances; Alleged Violations; Hearings and Appeals; Emergency Orders; Penalties; Emergencies and Severability; Repealer; and Effective Date. An Air Pollution Control Advisory Committee shall be appointed by the Board of County Commissioners. The Board of Health may make recommendations to the Board of County Commissioners for such appointments. This Committee shall study the problem of air pollution control within the County, and shall from time to time recommend to the Board of Health appropriate means of air pollution abatement, including needed additions to or revisions of these Rules and Regulations. The Air Pollution Control Advisory Committee shall consist of not less than 11 nor more than 15 members. Not more than 2 members of said Committee shall hold any public office. Five members shall be appointed for a term of one year, 5 members for a term of 2 years, and the remainder for a term of 3 years. Upon expiration of any term all succeeding terms shall be for a term of 3 years. The policy of the County of Allegheny is declared to be, that though cooperative effort, the Director and the Committee shall continually strive, in collaboration with representatives of all affected groups and industries, to diminish air pollution and promote sound air pollution control practices.

29 A Comprehensive Radiation Control Program in New York City. H. Blatz. Radiology 74, 474-479 (March 1960).

A Radiation Health Code became effective in New York City on June 15, 1958. The Code provides for the registration of all radiation sources within New York City and requires compliance with recommendations of the National Committee on Radiation Protection. The program of radiation control is reviewed. -- Nuclear Sci. Abstr.

BOOKS, PAMPHLETS AND NOTICES

30 Accident Facts, 1960 Edition. National Safety Council, 425 N. Michigan Avenue, Chicago 11, Illinois. 96 pp. (1960). $1.85, discount in quantities.

Accidental deaths reported in the United States in 1959 were up 400 from the 1958 total of 91,000. Increases in work and motor-vehicle deaths were partially offset by a decrease in home. The 1959 death rate of 51.6 per 100,000 persons was the lowest on record. Disabling injuries amounted to 1,950,000. The accidents in which the deaths and injuries occurred, together with non-injury motor-vehicle accidents, work accidents and fires, cost the nation in 1959, at least $13,000,000. Accidental work deaths in 1959 totaled about 13,800, an increase of 500 over the 1958 total. Disabling work injuries totaled 1,950,000, a rise of 150,000 from the revised 1958 total. Contributing to the increases was an increase in total hours worked; employment rose about 2% and average hours worked per week up nearly 1%. Since the end of the war, accidental deaths of workers on the job have decreased 16%. Off the job deaths show very little change, and for most years actually total more than at the end of the war. The ratio of off-job to on-job deaths increased from 1.82 in 1945 to a high of 2.33 in 1957. In recent years, this ratio has been decreasing as off-job programs gain support. While deaths have decreased less off the job than on the job, the reverse is true for injuries. Since 1945, on-job injuries have decreased only 3% compared with an 18% decrease for injuries off the job. Handling objects is the principal source of compensable work injuries. Falls cause the next largest number, with falling objects and machinery accidents the third and fourth sources. Fatal injuries arise principally out of vehicle accidents, while injuries of temporary disability arise principally out of handling accidents. Among reporting states, the average wage compensation paid in all work injury cases was about $775. Fatalities averaged nearly $13,800; permanent partial disabilities over $1,200. Other interesting sections in this booklet present statistics on motor-vehicle accidents and on accidents on the farm, in the home, and at school.

731 Reports of Occupational Disease Attributed to Pesticides and Agricultural Chemicals. State of California Department of Public Health Bureau of Adult Health, 2151 Berkeley Way, Berkeley 4, California. 23 pp. (1958)

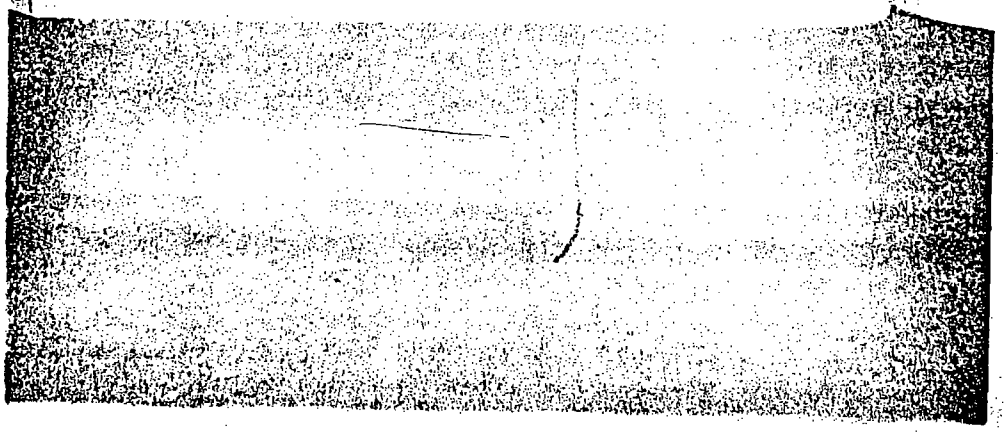
This report is based on the Doctor's First Report of Work Injury. According to Section 6407 of the Labor Code, 1957, State of California, each physician who attends an injured employee and each employer of the injured worker is required to file a report with the Department of Industrial Relations when disability lasts beyond the day of injury or requires medical treatment other than ordinary first-aid treatment. These reports serve as a guide in determining the nature and kind of occupational health problems caused by pesticides and agricultural chemicals despite such limitations as incomplete coverage and some possible delay in reporting. There were 910 reports of occupational illness attributed to pesticides and other agricultural chemicals in 1958, an 18% increase over the 749 reports received in 1957. There were 3 fatalities attributed to the occupational use of pesticides and other agricultural chemicals during 1958. The pamphlet includes the following major sections: Importance, Incidence, Geographic Distribution, Chemicals, Chemical and Clinical Type of Disease, Chemicals and Industry, Chemical and Occupation, Chemical and Lost Time, Industry and Clinical Type of Disease, Age and Clinical Type of Disease, Fatalities, Reference Tables.

732 Health Benefit Coverage of the Labor Force in New York State. C. Raushenbush, et al. New York State Department of Labor, Division of Research and Statistics. Publications No. B-114 and No. B-114A. 80 Centre Street, New York 13, N.Y. Part 1, 84 pp. (Feb. 1960). Part 2, 27 pp. (Mar. 1960).

Part 1 of this report tells how many people in New York State have hospital, surgical, regular medical, and major medical benefits, with special reference to persons who are in the labor force—employed workers, self-employed, and unemployed. Somewhat more than half of those with health benefits are in job-connected programs for which the employer pays all or part of the cost. Part 2 of the report deals with this group, using the results of a survey of employers who are under the New York State unemployment insurance system (a coverage almost identical with that of the State's non-occupational disability benefit system). The survey revealed not only the number with and without various health benefits, but also the benefit level in hospital, surgical, regular medical, and major medical plans. About 15 of the 7,620,000 persons in the labor force of New York State have prepayment protection for hospital expenses. This December 1958 figure, from which duplicate coverage has been eliminated, refers to workers with primary coverage, that is, it excludes the wives and dependent children who have secondary coverage under a policy or benefit plan that protects the head of the household. Hospital-expense protection is so widespread that it is almost equal to the number of persons who have any health benefits under a prepayment program. Surgical benefits cover 67% of the labor force, regular medical benefits 48%, and major medical insurance 12%. Persons with supplementary major medical expense protection also have hospital and surgical benefits, in practically all cases, and many of them also have regular medical benefits. Persons with comprehensive major medical insurance are here counted as also being covered by each of these 3 types of basic benefits.

733 Health Statistics from the U.S. National Health Survey, Series C-No. 3. The Hawaii Health Survey. Description and Selected Results. Oahu, Hawaii. October 1958-September 1959. U.S. Department of Health, Education, and Welfare, Public Health Service PHS Publication No. 584-C3. 54 pp. (May 1960). For sale by Supt. of Documents, U.S. Government Printing Office, Washington 25, D.C. 40 cents.

The Hawaii Health Survey was conducted on the Island of Oahu from September 1, 1958 through September 28, 1959. The data were collected by interviews in a scientifically designed sample of households geographically distributed throughout the island. Interviewing was done continuously throughout the year, each week's sample having been selected at random from among all of the households on the island. Approximately 3,300 households were interviewed, comprising 12,500 persons in the resident civilian non-institutional population of the



Interviews were not conducted in institutions which provide long-term medical or domiciliary care nor in penal institutions. During the interview, persons found to be on active duty in the Armed Forces of the United States were excluded, but members of their families were included. Also excluded from the interview were persons who had a home elsewhere. Therefore, vacationers to Oahu were excluded as well as persons who did not regularly reside on Oahu at the time of the interview.

INDUSTRIAL MEDICAL PRACTICE

Effect of Smoking on Asthma and Emphysema. G. A. Peters and R. Drew Miller. Proc. Staff Meetings Mayo Clinic 35, 353-358 (June 22, 1960).

Clinical observations, studies in laboratory animals and objective measurements of pulmonary function in smokers and non-smokers indicate that bronchial secretions and ciliary action as well as bronchial muscular tone may be unfavorably altered by cigarette smoke, so that impairment of pulmonary function may occur. The authors have described representative cases in which objective improvement of pulmonary function in asthma and emphysema followed cessation of smoking. Although the exact etiologic relationship of smoking to emphysema is not as yet clear, it is apparent that patients with asthma, bronchitis or emphysema should not smoke. Failure to advise such patients to stop smoking constitutes incomplete therapy. -- Authors' summary

Tobacco Amblyopia. C. W. Rucker. Proc. Staff Meetings Mayo Clinic 35, 345-348 (June 22, 1960).

Excessive smoking of tobacco causes dimness of vision in some persons. The nature of the visual loss is so characteristic that a careful examiner can usually be certain of the diagnosis even in the absence of supporting information. Although it impairs ability to read and to recognize faces, it does not lead to blindness. The exact means by which tobacco impairs vision is not known. A plausible suggestion is that it has a toxic action on malnourished cells in the retina. Nicotine is not alone responsible for the deleterious effects on vision. Other volatile alkaloids present in the tobacco or formed during its combustion also produce poisonous effects. The general health and nutritional state of the patient are determining factors. The majority of patients are elderly, or at least past the age of 50. A disproportionately large number have diabetes, which perhaps lowers their resistance. Many of those who smoke excessively also drink excessively, and this has posed the question of the relative importance of alcohol in this disorder. There is so much overlapping that it has been given the name "tobacco-alcohol-amblyopia". Treatment consists of abstinence from tobacco and an adequate, balanced diet with supplements of vitamin B complex. If the visual loss is of only a few months' duration and if there is no atrophy of the optic nerve as evidenced by pallor of the optic nerve heads, some restoration of vision is to be expected. The process is slow and may continue over a period of several months to a year. Optic atrophy precludes much return to vision.

Pathological Effects of Smoking on the Larynx and Oral Cavity. K. D. Devine. Proc. Staff Meetings Mayo Clinic 35, 349-352 (June 22, 1960).

The author discusses the subject under the following headings: Experimental Observations, Statistical Data, Clinical and Pathologic Impressions. He concludes his paper with some thoughts expressed by Dr. David M. Spain which in essence states that an event of staggering importance has taken place in the field of cancer research. For the first time,

knowledge is available which if properly utilized can substantially reduce the incidence of one of the major forms of cancer. With every other advance in medicine, the physician has made it his duty to inform himself of its value and use (poliomyelitis vaccine, diphtheria antitoxin, penicillin and the like). So must he now accept the responsibility of adequately informing himself of the facts and their proper utilization as regards the effect of cigarette smoking on health. The overwhelming mass of substantiated facts no longer permits him to be jocular about or remain aloof from this problem.

737 Neurological Conditions in Workers Exposed to Vibration. V. Styblova. Arch. Gewerbepathol. Gewerbehyg. 17, 485-503 (1959). German.

The observations reported in this paper are preceded by references to the literature on the clinical conditions which may be caused in workers by exposure to vibrations and mention of the various occupations in which workers are exposed to vibrations of greatly varying frequency and amplitude. In a period of 4 years a total of 350 workers were observed. This number was composed of groups of men, such as riveters and plate workers, who used pneumatic tools, and others who were exposed to finer vibrations in grinding files and gears. This neurological investigation was restricted to those types of worker in whom the upper extremities are mainly exposed to vibration. There is a full description of the clinical findings with tables and discussion. Subjective neurological symptoms occurred in 65% of the workers in aggregate. For example, among riveters, 104 persons in all, the symptoms of blanching of fingers were noted in 76%. Other symptoms in the upper extremities were paresthesias (85%), pains (49%) and cramps (13%). In general these symptoms were not severe but evidence of marked organic changes in the nervous system such as a polyneuritic syndrome and amyotrophic lateral sclerosis was found in 9% of the workers. The prophylaxis and treatment of the neurological effects of exposure to vibration are discussed. -- Bull. Hyg.

738 Recent Advances in the Chemotherapy of Infection. L. Weinstein. A.M.A. Arch. Ind. Health 21, 487-502 (June 1960).

This paper reviews briefly some of the recently developed information in the field of chemotherapy of infection. It is obvious that a great many problems have been created by the availability of a group of potent agents and that not all of the old ones have been solved. It should be very clear that every new development has not necessarily resulted in an improvement in the management of the infectious diseases and that the appearance of a new drug has not always led to an "advance" in the effectiveness of treatment. The most important accomplishments in this field have come from the proper evaluation of drugs over a sufficient period of time so that all of their properties have been determined under controlled conditions. This kind of information puts the physician in a position to understand and appreciate best all of the problems associated with the use of antibiotics. The significant "advances" in this field have and will continue to come not only from the production of more and more new drugs but from sufficiently broad experimentation and clinical use to characterize all of the antimicrobial agents, "new" and "old", so completely that they can be applied with the greatest possibility of producing benefit and the smallest risk of causing harm. -- Author's conclusion

739 Occupational Exposures as Etiologic Factors in Heart Disease. A Brief Review. L. J. Goldwater. A.M.A. Arch. Ind. Health 21, 509-513 (June 1960).

Abnormalities of cardiac structure or function can be caused by a number of biological, physical, and chemical agents which may be found in the occupational environment. Cardiac death due to ventricular fibrillation may be caused by electric shock and by certain organic compounds. Cor pulmonale resulting from the inhalation of industrial dusts is the most frequently observed anatomical lesion of the heart resulting from occupational exposure. Many reported cardiac disturbances attributed to an occupational exposure represent isolated observations of questionable validity. -- Author's summary

...Education for Industrial (Occupational) Medical Practice. W. F. Ashe. J. Occ. Med. 2, 305-311 (July 1960).

Occupational medicine is defined as the study of man and the environment of his work and the control of that environment for the purpose of health, safety, and optimum productivity. Certain noteworthy things have happened in the 12 years that have elapsed since we began to apply ourselves seriously to the preparation of physicians for this special practice. These include a broadening of concepts from those implied in the earlier term, industrial medicine; formal graduate training of physicians; and a formal mechanism of certification. The structure of the training programs emerged from a study of the needs and opportunities of industrial practitioners, with elaborations being made to suit changing circumstances. Facilities are needed that will permit and encourage self-preparation of practitioners for the examination in occupational medicine given by the American Board of Preventive Medicine. The services of fully trained specialists, in large corporations at least, must as a practical matter be augmented by the work of physicians who are partially trained or whose basic interest is in some field other than this specialty. -- Author's summary

SKIN DISEASES AND BURNS

41 Analysis of 500 Allergic Dermatitides. G. Wagner. Berufsdermatosen 7, 307-319 (Dec. 1959). German.

This is an account of 500 cases of contact eczema seen in a period of about 3 years in the Dermatological Clinic of Kiel University, in which the allergic origin of the skin condition was diagnosed by means of the skin patch test. Among the 500 patients there were 279 (55.8%) men and 221 (44.2%) women. In about 45% of all cases the allergic state was of industrial origin. In the industrial materials group of allergens, of which a list is given, the most frequent was cement containing hexavalent chromium salts, and the next frequent were flour improvers containing persulfate. The most important in the medicament group were substances containing a para-amino group in the benzene ring, of which the sulfonamides caused 41 cases. In the clothing group there were 22 cases of eczema caused by nickel buckles. Next in importance were dyestuffs, particularly those having a p-phenylene diamine grouping. The cosmetic group included cold wave preparations, hair dyes and other "make up" materials. The frequency of allergic skin conditions in different occupations is fully considered and an examination made of the diagnostic value of the skin test and the "standard test series" of materials used in the test at the Kiel clinic.

-- Cond. from Bull. Hyg.

42 Dermatoses from Phenylmercuric Salts. G. E. Morris. Arch. Environmental Health 1, 53-55 (July 1960).

Sensitivity to phenylmercuric salts must be considered when people develop eruptions of the legs after spreading weed or crab-grass killers; the eruption may also appear on the hands from handling the product. Sensitization dermatitis in other body areas may be due to a phenylmercuric salt being used as a primary antiseptic, as a preservative in ointments, or as a spermicidal agent in contraceptive jellies.

-- Author's conclusion

43 Pathogenesis of Silica Granulomas in Man: A Non-Allergic Colloidal Phenomenon. W. B. Shelley and H. J. Hurley. J. Invest. Dermatol. 34, 107 (1960).

The essential features of a silica granuloma ("pseudo-tuberculoma silicoticum") are as follows: (1) appears at a site where foreign material containing silica is introduced, usually as a result of an injury; (2) appears as localized nodules after a completely asymptomatic latent period, the duration of which is measured in years; (3) appears histologically

as an epithelioid granuloma, thus simulating tuberculosis or sarcoidosis. Silica occurs in all sorts of materials—from brick to talc, from dirt to kaolin. The latent period for development of granuloma averages 10 years although a range from 6 months to 59 years has been reported. The presence of anisotropic crystals under polarizing light is the distinguishing histological feature. The authors made numerous intradermal injections into human volunteers of different types and concentrations of silica-containing materials. They found that in man silica in a non-colloidal form does not elicit an epithelioid granuloma. All forms of colloidal silica used in concentrations of 1/1000 or greater invariably produced an epithelioid response. The authors postulate that chemical weathering reduces the large silica-containing particles to the colloidal state in the skin. They found no evidence that the process of allergic sensitization was involved in any way. -- Can. Med. Assn. J. Absts.

744 Free Formaldehyde in Textiles: A Cause of Contact Eczema. G. Hovding. Acta Dermato-Venereol. 39, 357 (1959).

Contact eczema due to formaldehyde-treated textiles became of sufficient frequency in Norway to stimulate an investigation concerning the use of this chemical in textiles. Formaldehyde is used chiefly to impart anticrease and antishrink properties to rayon and cotton fabrics. In addition, however, its use stabilizes casein fibers, improves the resistance of nylon to ultraviolet light and renders wool shrinkproof and mothproof. It is generally used on the fabric as a resin finish in the form of urea-formaldehyde or melamine-formaldehyde. Of 250 different rayon and cotton samples of textiles studied for formaldehyde, 227 contained formaldehyde. Of this number, 200 showed free amounts of formaldehyde in excess of acceptable standards. The author believes that these results bear out the findings of increased frequency of contact eczema from wearing apparel containing free formaldehyde used in fabric finishing. -- J. Occ. Med. Absts.

745 Value of Patch Tests in Dermatology. Special Study of Follicular Reactions. S. W. Becker and M. P. O'Brien. A.M.A. Arch. Dermatol. 79, 569-577 (May 1959).

After partial recovery from extensive autosensitization dermatitis 110 patients were tested with a series of 24 chemicals. Fifty-six similar patients were tested against 14 oleoresins. In 69 patients eczematous or follicular reactions were given against the chemicals, while 16 patients gave erythematous, edematous, and sometimes vesicular reactions to the oleoresins. Serial biopsies on patients with follicular reactions showed the primary reaction to be dermal, the folliculoporal epidermal vesiculation being a secondary phenomenon. Positive follicular reactions suggested dermal allergy, the primary dermatitis being possibly constitutional in nature. Where all tests were negative it was suggested that the primary dermatitis was also constitutional. Recurrent dermatitis after removal of contact with chromates, may also be constitutional in nature. -- Bull. Hyg.

746 Present Status of Skin Tests. C. J. C. Britton. Practitioner 184, 427 (1960).

Skin testing is the most useful test we have in the investigation of allergic diseases. A positive skin test indicates the liberation of histamine or H substance at the site. Tests performed during or just after a severe attack of an allergic disease may fail to show a positive reaction, owing to exhaustion of the skin-sensitizing substance. The intensity of a specific skin reaction may be diminished by administration of antihistamines, ephedrine and other antispasmodics. Corticosteroids cause no significant change in the skin reaction. As a general rule it is wise to avoid administering medication for a period of 36 hours before testing. Skin tests may be positive in patients who are potentially sensitive even though they have not as yet shown any symptoms; 25% of apparently normal siblings of allergic children give positive skin reactions and those with a marked sensitivity develop hay fever for the first time several years later. The reason remains unexplained. Negative skin reactions may also be found on rare occasions when testing patients who have a definite or even striking clinical sensitivity to an allergen. Here it must be remembered that we are testing the skin, whereas the shock tissue

... the nasal or bronchial mucosa, so that false negatives can be expected. For these people the more delicate but unpleasant mucosal tests should be used. Skin tests are of the greatest ... in determining the responsible allergen. When the proper techniques are used, with potent standardized extracts, the correlation between history and skin tests is nearly perfect. -- Can. Med. Assn. J. Abst.

Cutaneous Hypersensitivity to Cement and to Chromates in the Cement Industry. S. Ilic, et al. Acta Med. Iugoslavica 13, 332-338 (1959). French.

This investigation was undertaken to determine by skin tests the sensitivity of workers in 2 cement factories in both cement and to chromates. About 200 male workers in each of the 2 factories were examined and the results compared since it had been stated that the cement from the factory at Popovac contained chromate but that cement from the factory at Beocin did not. Analysis of the cement from the latter showed, however, that it did contain traces of potassium dichromate. Skin tests with a 0.5% solution of potassium dichromate and with 20% and 40% suspension of cement demonstrated skin sensitivity in 31 (14.5%) workers at Popovac of whom 7 reacted to both test agents, 16 to chromate and 8 to cement. At Beocin there were 7 positive reactors—1 to both agents, 1 to cement and 5 to chromate. These results are briefly analyzed. It appears that skin hypersensitivity is not common among cement workers but tends to be more frequent in the older age-groups; in those with long periods of work with cement and in certain stages of the manufacture in which workers sweat heavily. Chromate sensitivity was more frequently found than cement sensitivity. In general, the sensitivity was latent for only 3 cases of eczema found among all workers in the 2 factories. -- Bull. Hyg.

Allergy in Workers in the Cement Industry. D. Karajovic, et al. Acta Med. Iugoslavica 13, 339-345 (1959). German.

In this paper there is an account of the clinical findings in the examination of workers at Popovac and Beocin whose reactions to skin sensitivity tests are described in the previous abstract. Among 425 workers were found 57 cases of chronic bronchitis, 21 of chronic bronchitis with emphysema, 6 of bronchial asthma and 7 cases of bronchitis of asthmatic type. The cases with asthma were considered to be allergic manifestations. These clinical findings and also the results of full examination of ear, nose and throat of about 100 workers are discussed in relation to the results of the skin tests. The high incidence of non-allergic and allergic illnesses is considered to be caused in part by the heavy physical work which is needed in the absence of sufficient mechanization, inadequate ventilation and the neglect of measures for the personal protection of the workers. Further research is needed to determine the constituents of the cement dust which are sensitizing. -- Bull. Hyg.

Allergic Disease in the Antimony Mine. B. Bozovic, et al. Acta Med. Iugoslavica 13, 374-377 (1959).

This is a short paper in which there is a description without much detail, of the results of an investigation of the health of 135 workers, mostly between 20 and 50 years of age, in an antimony mine. The air of the mine has a high temperature, contains increased concentrations of sulfur dioxide and carbon monoxide and is of "abundant dustiness". The dust contains silica, antimony pentaoxide, arsenic trioxide and lead oxide. The most important of the illnesses suffered by the workers were "acute inflammations of the upper respiratory tract" which represented 29% of the total, but "allergic diseases of the respiratory tract were not found at all". Skin tests carried out in 118 workers none of whom had any history of allergic manifestations showed that a high proportion of the men gave a positive result, i.e., "sensitive to general dust (28), bacteria (23), wheat parasites (21), mold (14), bedclothes (6), and to the allergen of dust from the working place (5 workers)". -- Bull. Hyg.

CHEMICAL HAZARDS

750 Plastics. The Toxicology of Synthetic Resins. R. H. Wilson and W. E. McCormick, A.M.A. Arch. Ind. Health 21, 536-548 (June 1960).

This presentation is the third revision of a paper originally written in 1954. (Ind. Med. & Surg. 23, 479 (1954)). It represents a compilation of the literature concerning the toxicological properties of synthetic resins. While not all-inclusive, the bibliography can be used as a reference for the investigator of the toxicology of plastics. The second revision was presented in November, 1955 (Ind. Med. & Surg. 24, 491 (1955)). The authors discuss the subject under the following headings: acrylic resins, alkyd resins, amino (urea and melamine) resins, cellulose plastic materials, coumarone-indene resins, epoxies, fluorocarbons, nylon, phenolic resins, polyethylene, polyester resins, silicones, polystyrene, vinyl resins, and polyurethanes. There are 114 references to the subject in the bibliography.

751 Toxicity of Diborane in High Concentrations. A. R. Stumpe. A.M.A. Arch. Ind. Health 21, 519-524 (June 1960).

Toxic signs and pathological evidence of severe pulmonary damage were observed in golden hamsters after inhalation of relatively high concentrations of diborane. As the concentration of diborane was increased from 50 ppm (58 mg. per cu. m.) to 600 ppm (696 mg. per cu. m.), the mean survival time for exposed hamsters decreased. Also noted was a progressive narrowing of the time interval for all exposed animals to die. However, concentrations in excess of 600 ppm (696 mg. per cu. m.) elicited no further reduction in the minimum, maximum, or mean exposure times for death. Additional toxicopathological studies are necessary for a complete understanding of the mechanism of action of diborane. In view of diborane's extreme toxicity it becomes imperative that future aircraft and rockets utilizing the boranes as high-energy fuels be designed to provide the utmost protection against accidental cabin air contamination. -- Author's summary

752 The Toxicology of Boron Hydrides. G. J. Levinskas. CWL-TM-27-7, Chemical Warefare Labs., Army Chemical Center, Md. 28 pp. (Dec. 1956).

A subacute and chronic inhalation study was conducted with pentaborane. The former, at 1.0 ppm, resulted in the death of several animals within 4 weeks (20 exposures). The chronic study was conducted at 0.2 ppm of pentaborane for approximately 6 months. During this period, the animals showed a loss of appetite, weight loss, apathy, docility, decreased physical activity, and muscle tremors. Less frequently observed were an insensitivity to pain, impaired mobility of the limbs, and signs of eye and nasal irritation. The exposed rats showed an elevated hematocrit. The exposed dogs showed signs of liver damage as measured by the bromsulfalein test. While no marked impairment of excretory ability was shown the exposed dogs frequently showed blood levels of the dye in excess of 10% and 5% for 30 and 45 minutes respectively. All of the other tests gave values within normal limits. It is concluded that, where the possibility of prolonged and repeated exposure to this chemical exists, adequate ventilation be provided to keep the concentration of pentaborane below 0.2 ppm.
-- Nuclear Sci. Abstr.

Neurologic Manifestations of Chronic Carbon Monoxide Poisoning. G. J. Gilbert and G. H. Glaser. New England J. Med. 261, 1217-1220 (Dec. 10, 1959).

A case report from the Section of Neurology at Yale University illustrates the symptomatology and diagnostic difficulties of this insidious and controversial disease. A policeman aged 50 was found during his second admission to a hospital to have been exposed to 2 common sources of carbon monoxide, duty in heavy traffic and in a badly ventilated garage where police-car radios were often charged by gasoline-driven generators. Afterwards a third source was a gasoline-driven farm tractor with the exhaust at head level. During the first admission the diagnosis was psychomotor seizures and cerebral atrophy, possibly related to an old head injury. Treatment with anti-convulsant drugs which he had had for 2 years was continued. He returned to work improved in health but was re-admitted 6 months later. The occupational history was investigated. Chronic carbon monoxide poisoning was verified by finding the blood to be 20% saturated with carbon monoxide 30 hours after ceasing work. Treatment was stopped. He remained essentially asymptomatic except during the tractor episode. The symptoms, which had begun 4 years previously during traffic duty, were anorexia, weight loss, a fluctuating organic mental syndrome and recurrent episodes of unconsciousness, each attack preceded by dizziness and ataxia, usually in the afternoon. Hyperthyroidism, suggested by sweating and fine tremor, was excluded by metabolic tests, the blood iodine being in the hypothyroid range and the radioactive iodine uptake normal. There was transient albuminuria. Serum glutamic oxalacetic transaminase was slightly elevated. Serial electroencephalograms after withdrawal from exposure showed progressive clearing of focal and paroxysmal abnormalities, correlated with clinical improvement.
-- Cond. from Bull. Hyg.

Radiometric Extraction Method for Fluoride. Pyrolysis-Ion Exchange Separation. W. J. Maeck, G. L. Booman, M. C. Elliott, and J. E. Rein. Anal. Chem. 32, 922-925 (July 1960).

A liquid-liquid extraction technique is used as the basis for the quantitative determination of fluoride. The sample, after pyrolysis or ion exchange treatment, is added to a hafnium solution containing hafnium-181 traces. Trioctylphosphine is added and the extraction carried out; the hafnium retained in the aqueous phase is measured. An inverse linear response is established for hafnium extraction vs. fluoride concentration. -- AC Briefs

The Dynamics of Sulfur Dioxide Inhalation. Absorption, Distribution, and Retention. O. J. Balchum, et al. A.M.A. Arch. Ind. Health 21, 564-569 (June 1960).

Sulfur dioxide is readily absorbed from the upper and lower respiratory tract even when inhaled in low concentrations (1 ppm). It can be absorbed by the tracheal mucosa when the latter alone is exposed to a degree sufficient detrimentally to influence pulmonary function. After absorption from the sites of deposition in the trachea, bronchi, and lungs, it is distributed to all tissues, including the brain. It can still be detected in the trachea and lungs one week after exposure. The physiologic and metabolic effects of the prolonged inhalations of low-level concentrations of sulfur dioxide are unknown, and experiments are now in progress in an attempt to obtain further data on this aspect of the effects of the inhalation of low concentrations of sulfur dioxide. -- Authors' summary

The Role of Roasted Chromite Ore in the Production of Cancer. W. W. Payne. Arch. Environmental Health 1, 20-26 (July 1960).

Fractionation by particle size and analysis of the residue from leaching roasted chromite ore reveal that the smaller particles contain a higher percentage of hexavalent chromium than the larger particles. This increases the acute toxicity of the smaller particle size fractions which reach the lung by inhalation. The subcutaneous injection in mice of 3,4-benzpyrene with the residue resulted in a lower incidence of tumors than when the benzpyrene was injected alone or with very insoluble chromic phosphate. The incidence of tumors

decreased and the latent period increased with increasing amounts of hexavalent chromium. No promoting effect was observed. When administered by implantation in sheep fat the residue produced sarcomas in 4 of 70 rats. A fraction of the residue from which most of the water soluble compounds had been removed produced similar tumors in 3 of 52 mice when injected subcutaneously. No tumors occurred in the control groups of the same size and in groups receiving two other fractions of the residue or a group receiving chromic phosphate. The results of this experiment give additional evidence that the intermediate products in the production of chromium chemicals and the discarded residue may be hazard[illegible]. -- Author's conclusion.

757 Production of Cancers in Mice and Rats by Chromium Compounds. W. W. Payne. A.M.A. Arch. Ind. Health 21, 530-535 (June 1960).

Evidence that chromium in one or more forms is responsible for the increased incidence of cancer of the lung in chromate workers, furnished previously by the production of cancers in rats by several chromium compounds, is strengthened further by the occurrence of cancers at the site of implantation in mice receiving 2 of these compounds, calcium chromate and sintered calcium chromate. No tumors were produced by sintered chromium trioxide or sintered calcium chromate when injected subcutaneously in mice using tricaprin as a vehicle. By administering calcium chromate in gelatin capsules instead of sheep fat, it has been shown that the latter is not essential to the production of cancers in rats by chromium compounds. -- Author's conclusion

758 Mercury as a Potential Hazard in Medical Laboratories. Frances E. Noe. New England J. Med. 261, 1002-1006 (Nov. 12, 1959).

This is a special article in which attention is drawn to the hazards of exposure to mercury particularly in physiological and medical laboratories. Control of mercury vapor in industry is well established but the possibility of insidious mercury poisoning in laboratories is insufficiently realized. The problem of control in laboratories is here clearly considered with references to the literature in sections some of which deal with toxic levels of mercury vapor; portals of entry and absorption; excretion and urinary levels; the clinical characteristics of mercury poisoning and the diagnosis. A valuable section also describes some of the errors of technique in handling and storing mercury and personal habits of smoking and eating in laboratories which may be hazardous. The ventilation of laboratories and the points to which attention should be paid in the construction of new laboratories are also considered. -- Bull. Hyg.

759 Colorimetric Microdetermination of Sexivalent Chromium. G. Halliwell. Anal. Chem. 32, 1041-1042 (July 1960).

Chromium (VI) is usually determined by reaction with diphenylcarbazide reaction. An alternative procedure is reported here using a stable, colorless cadmium iodide-starch reagent which is oxidized by chromium (VI) to the blue starch-iodide complex. The cadmium iodide-starch reagent is highly sensitive for chromium (VI) and is free from the difficulties associated with the preparation and storage of the diphenylcarbazide reagent. The method presented here covers the range 0.05 to 0.5 microgram of chromium per ml. in a final volume of 10 ml. -- Author's abst.

760 Lead Fume from Welding on Galvanized and Zinc-Silicate Coated Steels. W. L. Pegues. Am. Ind. Hyg. Assn. J. 21, 252-255 (June 1960).

An investigation was made to determine whether or not welding and cutting operations on steel with inorganic coatings, consisting of zinc-silicate or galvanizing could give rise to hazardous amounts of lead and zinc fumes. Results of the investigation show that

the welder's breathing level such welding or cutting operations on zinc-silicate coated steel in poorly ventilated areas gave rise to fumes containing 4 to 75 times the maximum allowable concentrations (MAC) of lead, and 1 to 14 times the MAC of zinc. The same operations on galvanized steel under similar conditions produced fumes containing 2 to 4 times the MAC of lead, and 3 to 12 times the MAC of zinc. When ventilation was adequate the MAC was not greatly or consistently exceeded for either type of metal coating. -- Author's summary

761 A Little-Known Source of Lead Poisoning: the Manufacture of Ferrules for Electric Light Bulbs. L. Moreo. Med. lavoro 50, 673-678 (Nov. 1959). Italian.

The author reports 2 cases of lead poisoning, one female and the other a male in operatives making the ferrules for electric bulbs. The poisoning is considered to have arisen through the use of "vetrite" a soft glass (into which the 2 metal supporters for the filament are placed) with a lead content which varied from 0.035% to 6%. The female patient had worked for 11 years a machine which automatically placed a blob of the fused glass on to the top of the ferrule, but she had had attacks of colic, vomiting, and oliguria 3 months before admission. She had an enlarged liver, signs of kidney damage, and a free erythrocytic protoporphyrin of 340 micrograms % and a postversenate urinary lead of 8,250 micrograms per 24 hours. The man had worked at one of the furnaces removing the fused glass for 29 years, and 24 months before admission had an obvious attack of lead poisoning. No estimation of the lead content of the air near the furnaces was carried out but a laboratory experiment showed that it was possible for as much as 3 to 4 mg. of lead per cu.m. per hour to be emitted. The author is certain that these 2 cases arose from the nature of the work and points out that they are the first to be recorded in the literature. -- Cond. from Bull. Hyg.

762 A Study of Carbon Tetrachloride. (I) The Effect of Carbon Tetrachloride Inhalation on Rat Serum Enzymes. H. H. Cornish and W. D. Block. A.M.A. Arch. Ind. Health 21, 549-554 (June 1960).

A single 4-hour exposure of rats to 1,000 or 1,500 ppm of carbon tetrachloride vapor results in marked variations in the level of serum glutamic-oxalacetic transaminase (GOT), xanthine oxidase, and esterase. The extent of enzymatic change bears a direct relationship to the degree of exposure. During repeated daily exposures over a 10-day period, changes in serum enzyme activity could be demonstrated at exposure levels of 100 and 50 ppm of carbon tetrachloride vapor. In general, the female rat exhibits a more marked enzymatic response to carbon tetrachloride inhalation than does the male. While increases in serum GOT and xanthine oxidase may be due to release of enzymes from damaged tissue, the decrease noted in serum esterase must be accounted for by some other mechanism.
-- Authors' summary

763 Pathological Changes in Ethylene Dibromide Poisoning. E. V. Olmstead. A.M.A. Arch. Ind. Health 21, 525-529 (June 1960).

Search of the literature has failed to reveal a description of the pathological changes incident to ethylene dibromide poisoning in humans. It was therefore felt worthwhile to document these changes as observed in a case which came to necropsy. Ethylene dibromide is used as a soil fumigant for the control of ground pests. It is available in pellet form and is ordinarily dissolved in water for use in the soil. Thousands of gallons are consumed yearly in the United States. It is known to be a highly toxic material, and its systemic effects after oral ingestion are directed toward the liver and kidneys in experimental animals. Ethylene dibromide is also used commercially in "leaded" gasolines and as a chemical intermediate. The author describes a case of a 43-year-old white woman who ingested 9 Fumisol capsules, each containing 0.5 ml. of ethylene dibromide. The patient died 54 hours after ingestion of the poison. The pathological changes resulting from the ingestion of 4.5 ml. of ethylene dibromide are described. The major changes were characterized by massive central lobular necrosis of the liver with focal proximal tubular epithelial damage in the kidney. These changes parallel those found in various experimental animals after oral administration of this chemical.

764 The Subacute Oral Toxicity to the Rat of Certain Polydimethylsiloxanes.
W. E. MacDonald, G. E. Lanier and W. B. Deichmann.
A.M.A. Arch. Ind. Health 21, 514-518 (June 1960).

Silicones are noted for their versatility of use. This is partly because they appear in many different physical forms, such as fluids, resins, greases, and rubbers. One of the best known of these products is polydimethylsiloxane. Compounds of this type are finding increasing applications in the food industry for the purpose of eliminating foam or for protective coatings for food containers and cooking kettles. Because they come in contact with foods, their oral toxicity is important. The purpose of this investigation was to determine the subacute oral toxicity to the rat of several polydimethylsiloxanes. It was found that when polydimethylsiloxanes having viscosities (25°C) of 50, 350, 1,000, 10,000, and 60,000 centistokes, respectively, were fed to rats in a concentration of 1.0% of the diet over a period of 90 days no deleterious effects resulted.

765 Outbreak of Paralysis in Morocco Due to O-Cresyl Phosphate Poisoning.
H. V. Smith and J. M. K. Spalding. Lancet 2, 1019 (Dec. 5, 1959).

A personal account is given of a visit to Morocco to assist in investigating an outbreak of paralysis. Two thousand cases had occurred before the authors left Morocco, as the outbreak continues. It proved to be due to poisoning by o-cresyl phosphate, present in lubricating oil sold as "olive oil". The lubricating oil was man-made and was synthesized to withstand the very high temperatures occurring in turbo-jet aircraft engines.

-- Authors' summary

766 The Sub-Acute and Chronic Toxicity of 1,1-Dimethylhydrazine Vapor.
E. E. Rinehart, E. Donati and E. A. Greene.
Am. Ind. Hyg. Assn. J. 21, 207-210 (June 1960).

Utilization of 1,1-dimethylhydrazine in guided missile systems has promoted investigation of its potential health hazards. The authors found that the toxic effects seen in rodents from inhalation of 75 ppm and 140 ppm of 1,1-dimethylhydrazine are tremors, convulsions, and death. Dogs were significantly more sensitive; the resulting toxic effects from exposure to 25 ppm were hemolytic anemia, convulsive seizures, and death. Repeated exposure of dogs to 5 ppm for 26 weeks produced only mild toxic effects (slight lethargy, mild hemolytic anemia, slight bilirubinemia). Based upon the results of these experiments there seems to be no doubt that for man the maximum allowable concentration (8 hours per day, 5 days per week for prolonged periods) of 1,1-dimethylhydrazine vapor should be well below 5 ppm. Until more data and experience are available, it is suggested that 0.5 ppm be used as a guide to good industrial handling and safe practice.

767 Toxic Hazards During DDT- and BHC-Spraying of Forests Against Lymantria Monacha.
M. Wassermann, S. Iliescu, G. Mandric and P. Horvath.
A.M.A. Arch. Ind. Health 21, 503-508 (June 1960).

A study was made of the medical problems arising from the use of ground and aircraft application of the gamma isomer of benzene hexachloride (BHC) and DDT insecticide aerosols. Warm and cold aerosol generators were used. The spraying operation lasted about 30 days and had a technical efficiency of 90% to 95%. The men under observation were recruited among foresters, people physically strong and of good ingenuity. No lethal or acute intoxications were recorded. During the first days of the action some toxic and traumatic accidents were caused by the falling of horses loaded with benzine or insecticide containers; in some cases men falling resulted in skin pollution, simultaneous erythema, abrasions, ulcerations, and other traumatic injuries. Troubles consisting of conjunctival, respiratory and gastrointestinal mucosa irritation were observed especially among airport workers and the exterminators operating the Swingfog apparatus. In the urine of the workers of the airport from 2 to 4 mg. per liter of BHC was found. Exterminators working with mobile devices apparatus developed dermatitis with furfuraceous desquamations and conjunctival irritation.

Some workers complained of asthenia, anorexia, and gastrointestinal disturbances. In the majority of cases these phenomena disappeared in 3 to 4 weeks after the spraying was finished. -- Cond. from authors' summary

INDUSTRIAL DUSTS

'58 On the Problem of Baritosis. G. I. Rumiantsev. Gigiena i Sanit. 23, (4) 17-21 (1958). Russian.

A thorough investigation of the health of laborers who had been exposed to the action of the dust of barite or pure barium sulfate has shown that an occupational disease of the lungs of the type of pneumoconiosis (baritosis) may develop. The action of barite and pure barium sulfate has been studied experimentally on animals with the aid of roentgenological examinations. It has been possible to trace the gradual changes in the lung tissues until the appearance of small nodular shadows. Histological examinations of the lung tissue have shown the presence of nodules with signs of developing sclerosis (at late stages of poisoning) and marked lesions in the bronchi, blood vessels, and lymphatic system. -- APCA Abstr.

'59 Mycological Contamination of Impinger Dust Samples. R. L. Kathren, H. Blocker and B. Tom. Am. Ind. Hyg. Assn. J. 21, 261-262 (June 1960).

Dust samples collected in a foundry were found to be contaminated with uniform spherical particles approximately 2 microns in diameter. Examination of the sample indicated that the contaminant was not dust but mold spores. These molds were found to be introduced from the rubber stoppers of the impinger tubes. The use of scrupulously clean glassware and propyl or isopropyl alcohol as the sampling medium should eliminate the possibility of mold contamination. -- Authors' summary

'60 Fractionation of Particles in the Thermal Precipitator and its Bearing on Size Analysis by Electron Microscopy. H. Thürmer. Staub 20, 6-9 (Jan. 1, 1960). German.

Both theory and experiment indicate that the velocity with which particles move away from a hot surface and towards a cold one is about 3 times greater for sizes which are small compared with the mean free path of air molecules than for large sizes. If, therefore, the rate of air flow through a thermal precipitator is increased gradually to the stage at which particles begin to pass through the instrument, instead of being deposited, failure in this manner should occur at a lower flow rate for larger particles. This experiment was carried out with coal dust and magnesium oxide smoke by cutting down the heating current through the wire, until penetration commenced, and plotting the critical current against the flow rate of air through the precipitator. It was found that the rate of air flow for magnesium smoke could be increased to about 7 times that for coal dust. Particles deposited on the collection slip of a thermal precipitator are therefore spread out downstream according to size, the coarse ones penetrating the farthest. Although it is easy to avoid errors in counting with the light microscope, because the entire deposit can be traversed, difficulty arises with the electron microscope on account of the small size of the field. To overcome this a special thermal precipitator was made which had a very thin wire and a narrow gap so as to make the deposit as compact as possible in the direction of air flow; the width obtained was about 1/3 that of the conventional instrument. The glass slips were coated with a film of carbon which received the deposit and was subsequently floated off onto the gauze of the specimen-holder of the electron microscope so that the deposit ran parallel to the mesh and was located at an aperture, entirely unscreened by the wires. At a magnification of 2,000 it was possible to cover the whole width of deposit with 7 photographs. -- Cond. from Bull. Hyg.

771 Correction for Anisokinetic Sampling of Gas-Borne Dust Particles. S. Badzioch. J. Inst. Fuel 33, 106-110 (Mar. 1960).

A representative sample of dust can be obtained from a dust-laden gas stream only if sampling is isokinetic. An expression is given for the effect of isokinetic sampling upon the relative quantity of dust entering the sample nozzle. Two methods for calculating the dust concentration are considered and a criterion is provided for deciding, under the particular sampling conditions, which method gives the closer approximation to the true dust concentration. Procedures are given for determining the true concentration and size [illegible] dust from a sample collected anisokinetically. Errors arising from sampling at a fixed velocity, irrespective of the value of the gas velocity, are small providing the appropriate method of circulation is employed. -- APCA Abstr.

772 Some Statistical Aspects of Dust Counting. J. R. Ashford. Brit. J. Appl. Phys. 11, 13-21 (Jan. 1960).

The author uses statistical methods to analyze errors arising in the counting and sizing, by optical microscope, of thermal precipitator samples of air-borne dusts. The samples were taken in coal mines as part of the National Coal Board's Pneumoconiosis Field Research program. The method of evaluating samples is described and the main sources of error are stated. These are: (1) sampling variation in the number of particles within the area counted; (2) the basic error of the counter as indicated by repeated counts of the same traverse by the same counter, due to the difficulty in deciding whether a particle is within a given size-range and of marking off particles counted; and (3) differences between observers. To separate these 3 types of error the logarithms of the numbers of particles counted were used: this is stated to be accepted practice since both variability and personal error increase with the number counted. The logarithm of the number of particles recorded by a given observer at a given time is therefore treated as being the sum of 3 independent terms, namely the logarithm of the average count, the logarithm of the observer's error factor at the time, and the random error. The results show that at any given time a particular observer has a characteristic average counting error which with less experienced counters varies with time. By contrast, the basic counting error, between repeat counts of the same traverse, by the same, experienced, observer, shows little variation between observers continuously engaged in counting slides. Basic counting errors arise from: (1) failure to count all particles in the appropriate size range, and counting some twice; and (2) allocating some of those counted to the wrong size-range. Of these, the latter is normally the more important, and since the number in a given range normally falls steeply with increasing size this latter can cause overestimates in the count in any range. -- Cond. from Bull. Hyg.

773 Particle Size Analysis for the Chemical Engineer. L. Cohen. Chem. & Process Eng. 40, 383-386 (Nov. 1959).

For the chemical engineer who is interested in using particle size analysis for routine process control or to obtain design data, this article summarizes the applications of particle size distribution, the various types of instruments available, and the factors involved in the choice of an instrument. Some comments are made on the limitations of the various instruments, not as a critical review but as a brief guide for the uninitiated to this rather controversial field. The choice of an instrument must be made in the light of all factors involved. The choice of an instrument for size analysis is very wide and it is not possible to pick out any one instrument as being the best in all respects and in all circumstances. -- APCA Abstr.

774 Dust Control in Glass Manufacturing. E. F. Wilson. Glass Ind. 41, 202-203, 230-238 (Apr. 1960).

Major sources of dust in the glass industry originate in the material handling operations prior to mixing, in mixing, and in subsequent handling of the mixed batch, including dusting in the tank itself. Since control of dust is so difficult after it has become

air-borne, the fine particles should be prevented from becoming air borne. In some industries oil is sprayed on finely divided materials to cause the fine particles to adhere to larger particles. The sources and treatment of dust in the glass industry and the secondary source of dust from power plants are discussed. Modern methods of treatment may be applied to all types of processes. Automatic controls which reduce the human element to a minimum provide dependable operation. These systems, properly applied, give complete dust control which in turn yields better quality control, lower equipment maintenance costs, and lower operating costs. -- APCA Absts.

775 Pneumoconiosis in Diatomaceous Earth Workers. A. Ahlmark, T. Bruce and N. Nystrom. Nord. Med. 59, 289-290 (Nov. 20, 1958).

Diatomaceous earth deposits in Sweden are exploited only in a few places and to a relatively limited extent. Pneumoconiosis is reported in 3 men engaged in quarrying, drying and pulverizing diatomaceous earth. In all 3, the disease had reached stage III (Johannesburg scale). Advanced pneumoconiosis was present in 2 men after only 10 years exposure. Tuberculous complications were not demonstrable. All 3 were nevertheless totally disabled by their disease. In one man, pneumoconiosis was the main cause of death. -- APCA Absts.

776 Unusual Manifestations of Silicosis. C. S. Morrow. Tuberculology 18, 35-38 (Sept. 1959).

Two unusual case histories are presented. The first was a case of silicotic pneumolithiasis and the second a case of Caplan's syndrome. The exact etiology of the Caplan type of pneumoconiosis has been the subject of speculation. The possibility that the lung lesions are solely a manifestation of rheumatoid arthritis and unrelated to pneumoconiosis, has not been accepted. A probable explanation is that the tissue response to infection, tuberculous or otherwise, which ordinarily results in conglomerate masses, is modified by the rheumatoid state to produce instead the Caplan lesion. The clinician is urged to be aware of this snydrome since it may be confused with metastatic malignancy of the lung. -- APCA Absts.

777 Non-Typical Forms of Lung Silicosis. M. Weber. Med. Pracy (Lodz) 9, 387-396 (1958).

The author emphasizes the frequency of the non-typical forms of silicosis and discusses the classification of these forms. Based on his own material, he describes the observed cases of the following different forms of silicosis: acute silicosis; silicosis with a slow course of disease; cases with a great difference between the clinical and radiological picture; and silicotic cases which are radiologically non-typical. All of these non-typical forms create some difficulty in the evaluation of different periods of silicosis, and stress the necessity of taking into consideration in each instance the clinical picture as a whole. -- APCA Absts.

778 Clinico-Radiological Assessment of Silicosis with Autopsy Comparison. H. Lent and H. Gravenkamp. Beitr. Silikose-Forsch. No. 62, 1-76 (1959). Gorman.

The authors describe investigations carried out on 142 Ruhr coal miners, in whom an autopsy was performed within 2 years of clinical assessment. The chest x-rays were rescrutinized and reclassified in the light of the clinical findings before the morbid anatomy was studied. Eligibility for compensation under the workmen's compensation scheme was considered and errors in awarding compensation are included as mis-diagnoses. The x-rays were finally compared with the lung sections and histological reports. The usual German method of classifying silicosis into 3 stages was used. In 18 (12.7%) of cases there was a discrepancy of at least one stage between the clinico-radiological and pathological assessments, but in only 13 (9.7%) was this considered as undoubtedly due to faulty radiological classification. In 8 cases the amount of silicosis was overestimated, in 5 underestimated, on the chest x-ray. In 7 cases the assessment of compensation was at fault. Reasons for the disagreement are discussed and numerous illustrative cases are described in great detail. -- Bull. Hyg.

779 The Bronchoscopic Picture in Silicotuberculosis. A. Ferraris and G. Paoli. Lotta contro tuberc. 29, 1021-1030 (July-Aug. 1959). Italian.

In this paper the authors give 3 schematic outlines to show what are the likely, sometimes alternative, details which may be seen through the bronchoscope in cases of silicosis, broncho-pulmonary tuberculosis and silicotuberculosis respectively. The tracheo-bronchial lesions which may be found to affect the picture seen in respiratory tuberculosis are also schematically listed according to 2 separate authorities. It is obvious that the many [illegible] may combine in a wide variety of patterns in each of the 3 diseases and so may the [illegible] be seen throughout the bronchoscope. No pattern or patterns can be expected to be typical of silicotuberculosis, but a bronchoscopic examination can, nevertheless, prove of great value in the diagnosis of this condition and this is illustrated by a series of 6 cases. -- Cond. from Bull. Hyg.

780 The Bronchographic Picture in Silicotuberculosis. A. Ferraris and G. Paoli. Lotta contro tuberc. 29, 1031-1050 (July-Aug. 1959). Italian.

In their paper on bronchoscopy (see previous abstract) the authors set out 3 schematic outlines of the likely bronchographic signs, to be seen in cases of silicosis, broncho-pulmonary tuberculosis and silicotuberculosis respectively. From another author they quote a list of the signs which may be observed when tuberculosis involves the bronchial system. The signs will combine in many different ways to give a wide variety of bronchographic shadow patterns none of which can be said to be typical of silicotuberculosis, but bronchography can still be of great value in diagnosis. The authors carried out both bronchoscopic and bronchographic examinations on 27 patients found to be suffering from silicotuberculosis and they select 6 of these to describe their findings and conclusions in each case, reproducing photography of the bronchography and of the chest radiography. Both bronchoscopic and bronchographic pictures in one of these cases showed the signs of silicosis but did not show evidence of the associated tuberculosis at the time. In two other cases, both bronchoscopy and bronchography gave indications of the tuberculous association, while in 2 other cases the indications were seen by bronchoscopy but not by bronchography and in the other case it was the opposite. -- Bull. Hyg.

[redacted] Case Report and Review of the Literature. J. Anderson and F. A. Campagna. Arch. Environmental Health 1, 27-32 (July 1960).

A case of asbestosis associated with carcinoma of the lung is presented. The literature is reviewed, and this is the 24th reported case, with complete autopsy findings. In general, it conforms to the previously described cases where a relationship between the 2 diseases is intimated. It is suggested that further cases of asbestosis, with and without neoplasia, be reported with careful attention to other factors, such as smoking. Only when these facts are available will final assessment of the relationship between asbestosis and lung carcinoma be possible. -- Authors' summary

782 Pneumoconiosis (Talcosis) in Soapstone Workers. A. Ahlmark, T. Bruce and A. Nystrom. Nord. Med. 59, 287-288 (Nov. 20, 1958).

Mining and processing of soapstone in Sweden are confined to 2 places and employ only about 100 men. The stone consists mainly of the minerals talc and chlorite. The disease condition produced by exposure to such dust is best described as talcosis. The authors describe 5 cases of mild pneumoconiosis which were demonstrated after at least 20 years exposure, as a rule not until after more than 30 years exposure. In no case was the working capacity of the individual affected. -- APCA Abs.

...servations on a Case of Probable Bone Marrow Anthracosis. D. Miller. Blood 14, 1350-1353 (Dec. 1959).

A case history is presented in which aspirations of bone marrow, taken from both the sternum and iliac crest during examinations for an anemic condition, demonstrated a foreign material to be present. This material was presumed to be carbon on the basis of its appearance, its resistance to the action of strong acid, and after ruling out other possibilities. Although the patient had worked over 40 years in the manufacture of bricks and had a very heavy exposure to mineral dusts, he specifically denied any prolonged contact with coal dust. The resemblance to an incident previously described (1927) in the literature in which there was an anthracosis involving the bone marrow, is noted. Deposition of mineral dusts in extra-pulmonary sites, especially in the lymphatic drainage of the liver and spleen, has been known to occur in some cases of pneumoconiosis. -- APCA Abstr.

PHYSICAL ASPECTS OF THE ENVIRONMENT

Implications of Space Radiations in Manned Space Flights. W. H. Langham. Aerospace Med. 30, 6 (June 1959).

Based upon present physical measurements of ionizing radiations in space, 2 major radio-biologic-problem areas in manned space flights are suggested. These are: (1) the biologic effects of densely ionizing primary cosmic-ray particles and (2) the effects of the particulate radiation belts, the Van Allen layers, associated with the earth's magnetic fields. The dose from secondary radiations in the earth's atmosphere at an altitude of about 40,000 feet is only about 100 mrad per week in the northern latitude where it is at a maximum. The primary cosmic particles consist of about 80% protons, 19% alpha particles, and 1% nuclei of elements of atomic numbers greater than 2. Above the earth's atmosphere, the primary cosmic-dose rate drops to about 60 to 70 mrad per week. There is only inferential information regarding the relative biological effectiveness of this radiation, since no accelerators exist which are capable of producing particles in the laboratory analogous to the heavier high-energy components of primary cosmic rays. It seems unlikely that the existence of a heavy primary cosmic ray problem should be a deterrent to low-orbiting manned space flights of the near future. The rough estimate of the dose rate in the 2 Van Allen layers is 10 and 100 rads per hour and the thickness of the belts 2,000 and 4,000 miles respectively. Knowledge is needed about the characteristics of this radiation before the hazard may be evaluated and steps taken to alleviate it. -- J. Occ. Med. Abstr.

Development of Heat Pyrexia. J. Gold. J. Am. Med. Assn. 173, 1175-1182 (July 16, 1960).

In a study of heat stroke, more than 250 observations were made on healthy adult human subjects. Data were obtained on body heat storage, sweat rate, sweat replacement, blood pressure, venous pressure, oxygen consumption, blood gas analyses, hemoconcentration, and osmolarity; and on cardiac output, cardiac shadows, and auscultatory and electrocardiographic findings. During extreme heat exposure there was an increased venous pressure and operational arteriovenous shunt (or its functional equivalent) in the presence of cardiac failure. It is postulated that (1) the primary event in the circulatory collapse of heat pyrexia is high-output cardiac failure, (2) the cessation of sweating is the result of rising venous pressure, (3) older persons are more susceptible because of irreversible circulatory changes, and (4) an effective treatment may be the intravenous administration of saline solution together with rapid digitalization. -- Editor's summary

786 Diffusion of Water Vapor Through the Human Skin in Hot Environment and with Application of Atropine. K. J. K. Buettner and F. F. Holmes.
J. Appl. Physiol. 14, 276 (Mar. 1959).

Water transfer between the skin and the environment occurs by evaporation of sweat, by adsorption or desorption from the horny layer, and by diffusion. In previous papers, the senior author studied water diffusion across human skin by experiments which correct for sweat losses and for changes in water content of the corneum. Diffusion of water displayed osmotic behavior. Thus, when skin is in contact with a liquid medium, water diffuses into the skin when the solute concentration is below 2 M and diffuses outward at greater concentrations. When small areas of skin are exposed to controlled atmospheres at regulated temperatures and vapor pressures, the body loses water by diffusion through the skin to dry atmospheres and gains water by inward diffusion from moist atmospheres. The neutral relative humidity in 250 normal subjects had a mean value of 86%. At this humidity, neither gain or loss of water by diffusion is observed, indicating an equilibrium state. Diffusion of water vapor is greatly accelerated at high temperatures under conditions associated with sweating, indicating a lowered resistance of the diffusion barrier in the epidermis. Experiments employing tourniquets and also the local application of atropine seem to indicate that diffusion of vapor through the skin under hot conditions constitutes a substantial fraction of total water loss, sometimes exceeding sweat loss. Diffusion, as a component of insensible perspiration, is thus not a small constant quality which can be largely ignored but, instead, represents an important variable whose magnitude and direction depends on a number of environmental and physiological factors. -- J. Occ. Med. Absts.

787 Audience and Seat Absorption in Large Halls. L. L. Beranek.
J. Acoust. Soc. Am. 32, 661-670 (June 1960).

From detailed acoustical studies made in over 40 large concert halls and opera houses in 15 countries, absorption coefficients are derived for audience, chorus, and orchestra areas, unoccupied seating areas, plaster walls and wood walls. It is postulated that the absorbing power of a seated audience, chorus or orchestra in a large hall is proportional to the floor area it occupies. This postulate is validated for audience densities of between 4.5 and 8.5 sq. ft. per person, including aisles, and for halls with volumes between 200,000 and 1,500,000 cu. ft. The "area" concept as opposed to the "per person" concept of audience absorption explains the serious differences reported repeatedly in the literature between reverberation times calculated during design and those measured after completion of the halls. This paper also presents graphical relations between empty and fully occupied hall reverberation time vs. frequency characteristics for fully occupied halls. The results of this study may not be applicable to rooms whose volume, shape, and materials are substantially different from the large concert halls and opera houses included in this study. -- Author's summary

788 Recovery from High Values of Temporary Threshold Shift. W. D. Ward.
J. Acoust. Soc. Am. 32, 497-500 (Apr. 1960).

Twelve normal observers were exposed to noise that produced at least 50 db of temporary threshold shift measured 2 minutes after cessation of the noise. The temporary threshold shift was measured at regular intervals until recovery was complete. Results indicate that while the recovery from these high values of temporary threshold shift proceeds as a function of the logarithm of time during the first few hours, later recovery is instead linear in time. -- Author's summary

789 Value of Ear Defenders for Mental Work during Intermittent Noise. Muriel M. Woodhead.
J. Acoust. Soc. Am. 32, 682-684 (June 1960).

Ear defenders were worn for protection against the distracting effects of bursts of loud, but not unacceptable, noise during a mental task. Two types of noise were used: one characterized by high and the other by low frequencies. Performance was better with defenders than without them. The improvement was particularly marked with the high-frequency burst. -- Author's summary

RADIOACTIVITY AND X-RADIATION

790 What's Available in the Atomic Energy Literature. Anon. TID-4550 (6th Rev.) Technical Information Service Extension, AEC. 46 pp. (Mar. 1960).

What unclassified atomic energy literature is available, how to locate and use this information, and how this information may be obtained are discussed. Guidance is furnished for locating, obtaining, and using fully the information announced in abstract journals, indexes, bibliographies, and other informational guides issued by the United States Atomic Energy Commission. -- Nuclear Sci. Abstr.

791 Microwave Radiation Hazards. W. E. Morgan. A.M.A. Arch. Ind. Health 21, 570-573 (June 1960).

(See IHD Abstract 822, July 1959). The author offers the following suggestions for the control of possible radiation hazards: (1) Avoid any exposure to radio-frequency energy having a power density of 0.01 watts per cm^2 or greater. Areas accessible to transit personnel and having a power density equal to or greater than 0.01 watts per cm^2 should be posted with a caution sign and flashing light, and should not be occupied for any length of time. (2) Do not make detailed visual examination of any microwave radiator, reflector, wave guide horn, or magnetron during periods of transmission. (3) Limit the number of personnel having access to areas immediately adjacent to test stands or benches containing equipment radiating energy of hazardous power. Only those required to perform specific tests should be present. (4) Use dummy loads, water loads, or other absorbent materials whenever possible to absorb the energy output of the transmitter while being operated or tested. (5) When No. 4 cannot be complied with; provide absorbent screening to isolate test stands from each other or from adjacent administrative areas which may be affected by the microwave radiation. It is believed that repeated exposure to radar waves while observing proper precaution does not lead to any cumulative or chronic effects on the body. This seems to be proven by the lack of evidence showing that anyone has been seriously injured from working with radar equipment. There have been some reports in the past concerning alleged injuries, but it is the opinion of most medical scientists that the reported disorders were not caused by radar.

792 Effects of Ultra-High-Frequency Radiation on Animals. M. Lubin, et al. A.M.A. Arch. Ind. Health 21, 555-558 (June 1960).

Twenty-nine rabbits and 44 rats were subjected to repeated whole-body exposure with ultra-high-frequency radiation at about 400 megacycles. About an equal number of animals served as controls. No pathological damage was found which could be attributed to the effects of radiation. -- Authors' summary

793 Present Health of Children Given X-Ray Treatment to the Anterior Mediastinum in Infancy. E. A. Conti, G. D. Patton, Jane E. Conti and L. H. Hemplemann. Radiology 74, 386-391 (Mar. 1960).

A survey was made of 1,564 children in Pittsburgh given x-ray treatment to the thymus gland as a routine between 1938 and 1946. In 224 children, the diagnoses of enlarged thymus glands was made at birth. Eighty per cent of these were treated with 200 to 450 r of 140-kvp x-rays through a 4 x 4 cm port. Ninety-five per cent of the 1,340 children with thymus glands of normal size were given 150 r through a port of the same size. Between 1956 and 1958, the families of 89.6% of the treated children were questioned about the medical histories of these children and of their 2,923 untreated siblings. Positive medical data were

confirmed but negative data were not tested. The death records of the Pennsylvania State Department of Health were also searched, as were the leukemia records from 1954 to 1957. No cases of malignant disease were found in the treated group, although 4 cases of cancer, including one of leukemia would be expected to occur in a group of children of this size and age distribution. The 4 malignant tumors in the sibling group, including one case of leukemia, compared closely with the expected number. -- Nuclear Sci. Abstr.

794 Retention and Effects of Radioactive Particulates in the Lung. C. W. LaBelle, et al. Am. Ind. Hyg. Assn. J. 21, 195-200 (June 1960).

A 5-microgram dose of uranium dioxide particles placed in the lungs of rats is eliminated in 2 stages. During the first stage, about one-third of the material is removed within the first day or two (half-life 17 hours) while the remainder is eliminated much more slowly, with a half-life of 73 days, so that small but measurable amounts can still be recovered during the second year. With a specific activity of 10,000 dpm in 5 micrograms of material, the integrated radiation exposure to the lung during the first year is almost exactly equal to the accepted tolerance dose of 15 rep per year. No signs of radiological damage could be detected in any of the animals exposed to this dose, either during the year in which the exposure occurred or during the following year, when the effective exposure was for all practical purposes negligible. This confirms the accepted view that a dose of 15 rep within one year is without effect, since the observation period, though extending only to a total of 2 years is very nearly equal to the life span of the animals. It is worth noting, however, that the amount of radioactive material required to yield this tolerance level is rather greater than is implied by the maximum permissible intake tables of Morgan, Snyder and Ford. In other words, the Morgan tables are conservative. There is evidence to suggest that at least some insoluble particulates are cleared from the lungs slowly, with half-lives up to 6 months. In such cases the figures in the Morgan tables would be too high. This does not imply that the Morgan tables are not valuable, but only that they need to be used with due allowance for known departures from their premises. -- Cond. from author's conclusions

795 Information and Education for Industrial Use of Radioisotopes. P. J. Blaetus. TID-7571, (pp. 262-266). Office of Isotopes Development. Isotope Technology Branch, AEC. 5 pp.

Significant publications and services are outlined which are available to anyone interested in acquiring an introduction to the literature of nuclear energy as a whole and applications of radioisotopes in industrial research and development in particular. -- Nuclear Sci. Abstr.

796 Radioisotopes and the Law. S. D. Estep. TID-7571, (pp. 75-91), University of Michigan Law School. Ann Arbor. 17 pp.

The use of radioisotopes can result in great benefits for mankind, both as to health and economics. However, the use of such materials presents significant health and safety risks to the user and perhaps to many others. In most cases the very characteristic which makes radioisotopes unique and therefore so useful makes them dangerous. The dangers are sufficient to have caused government agencies to impose regulations upon their use. A survey is presented for the business executive and engineer of the possible legal consequences of making use of radioisotopes. Not all of these consequences arise from the health and safety problems but those of greatest significance do and attention is directed primarily to this area. The responsibility of the lawyer is to identify for the user the potential liabilities involved in using such material. -- Nuclear Sci. Abstr.

Radioisotopes in Medicine. R. R. Tarrice and M. S. Blumberg. SRIA-13. Stanford Research Institute, Menlo Park, Calif. SRI Project No. IU-2567. 187 pp. (Dec. 1959). Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D.C.

The Atomic Energy Commission has sponsored training, research grants, subsidies, and information programs in the field of nuclear medicine. Workers in the field of nuclear medicine have seen a remarkable growth in the availability of radiomaterials within the past 13 years. The major source of this supply has been the Oak Ridge National Laboratory. This production facility has made in excess of 130,000 shipments of radioisotopes valued at more than $18 million. One-half of this has been for use in the medical profession. Data are summarized on the medical uses of isotopes in the United States. There are 135 references. -- Nuclear Sci. Abstr.

Biochemical Effects of Ionizing Radiation. Margery G. Ord and L. A. Stocken. Ann. Rev. Nuclear Sci. 9, 523-552 (1959).

Data on the biochemical effects of ionizing radiation in carbohydrate, fatty acid, and protein metabolism of various animals are reviewed. Changes in enzyme activities after irradiation in vivo and in vitro are discussed. Data on irradiation damage to nucleic acids and nucleoproteins are reviewed. The influence of oxygen on the response of cells and tissues to ionizing radiation is discussed. Descriptions of substances which can exert protective effects to ionizing radiation under certain conditions are given. -- Nuclear Sci. Abstr.

On the Present Possibilities of Washing Radioactive Substances off the Skin of Living Animals. J. Nosek and V. Chmelar. Health Phys. 2, 306-307 (Feb. 1960).

Experiments on animals showed that a detergent and sodium salts of EDTA acid or a detergent and sodium salts of polyphosphoric acids are effective for the decontamination of living skin contaminated with long-life fission products of uranium-235. The formulas are included for two decontaminating solutions which proved effective. -- Nuclear Sci. Abstr.

A Profile of Dispensary Visitors in an Atomic Energy Research and Development Plant. J. G. Hipps and R. E. Masters. A.M.A. Arch. Ind. Health 21, 559-563 (June 1960).

This is a brief description of the dispensary medical services in a research and development atomic-power plant employing about 4,000 persons. There is a male-to-female employee ratio of 5:1. The magnitude of the services is presented, along with a discussion of the reason for visits to the dispensary, disposition of industrial and non-industrial cases, and extent of treatment of the latter. Some emphasis has been placed on the physician's participation as compared with the total services provided.

ENVIRONMENTAL MEASUREMENTS

Some Aspects of Gas Chromatography. P. J. Farenden and M. P. Mencosa. Bull. Brit. Coal Utilization Research Assn. 23, 366-376 (Aug.-Sept. 1959).

Typical of the many studies of gas reaction kinetics that have been made possible by the development of gas chromatography are those of the behavior of various hydrocarbons in internal combustion engines, the reactions of free radicals, and the competitive halogenation of hydrocarbons. It is also a most convenient method for the analysis of azeotropic mixtures. Chromatographic data also provide the necessary information for the determination of adsorption isotherms and the evaluation of certain thermodynamic functions. Most of the

development has been in the use of gas-liquid chromatography for the identification and determination of volatile organic liquids; progress in the use of gas-solid chromatography for gas analysis has been less marked. The combination of a sensitive and stable detector and an integrating recorder, used in conjunction with well-tried adsorbants, might provide an instrumental method of gas analysis with accuracy. The article discusses the tools and applications in detail. There are 127 references to the subject. -- APCA Abstr.

[illegible]er, Concentration, and Analysis of Collected Air-Borne Particulates Based on Ring [illegible] Techniques. P. W. West, H. Weisz, G. C. Gaeke, Jr. and G. Lyles. Anal. Chem. 32, 943-946 (July 1960).

A procedure has been developed for the analysis of the particulate material, including aerosols, collected from a very small air sample (1 cu.m.). A number of standard atmospheric sampling devices have been used for the collection of the samples. The ring oven and associated spot tests were then used for the concentration and final determination (qualitative or quantitative) of the various constituents present in the mixture. Techniques have been developed for the direct transfer of the sample from various filter media used in the sample collection devices to the special paper required in the ring oven. As little as 2 or 3 micrograms of a constituent in a total air sample of 1 cu.m. can be quickly and conveniently determined with good accuracy. -- Authors' abs[illegible]

803 Air Pollution by Sulfur Dioxide, Hydrogen Sulfide, and Carbon Disulfide. L. Rosival and M. Strecha. Smokeless Air (London) 30, 194-199 (1960).

A study was made of the atmospheric pollution caused by some detrimental effects of the homogeneous phases of gases, i.e., sulfur dioxide, hydrogen sulfide, and carbon disulfide. Sulfuric dioxide was examined polarographically, hydrogen sulfide and carbon disulfide colorimetrically. Observing the air pollution with sulfur dioxide in the winter season at 9 observing stations, the result of 84 experiments after 8 hours, the highest concentration appeared at the main railway station (0.706 mg./cu.m.) and in the residential part of the center of the town (0.623 mg./ cu.m.), this is due to the dense population of these places. For an objective estimation of the grade and character of air pollution, it is necessary to use a large number of simple instruments and analytical methods to establish the individual harmful agents. The aim of these studies demands a national and international standardization of apparatus or analytical methods to gain reliable and comparable results. -- APCA Abstr.

804 Determination of Sulfur Trioxide and Sulfur Dioxide in Flue Gases. R. S. Fielder, P. J. Jackson and E. Raask. J. Inst. Fuel 33, 84-89 (Feb. 1960).

The apparatus described is easy to operate, compact, and portable. Measurements can be made at an average rate of one every 15 to 20 minutes. The turbidimetric technique is simple and is more sensitive than previously published methods, its precision, at similar concentrations, is comparable with the best of these. The successful use of this apparatus and analytical procedure in thousands of measurements in power stations have shown that this is a convenient and reliable test method for the determination of sulfur oxides in flue gases in the lower temperature passes of boiler plants. The simplicity of the apparatus and the analytical method have made it possible to establish, for the first time, the determination of sulfur trioxide in flue gas as a routine technique of power station chemistry.

805 Size Distribution of Air-Borne Dust Samples from British Coal Mines. J. W. J. Fay and J. R. Ashford. Brit. J. Appl. Phys. 11, 1-13 (Jan. 1960).

From the analysis of the results described, four general conclusions can be drawn regarding thermal precipitator samples of air-borne dust obtained on the coal faces and in roadways. Data for hard-heading work are insufficient to justify any generalizations. (1) The low 1 micron particles appear to arise largely from atmospheric pollution and may be neglected from the point of view of the hazard represented by radiological pneumoconiosis. (2) Above

micron dust obeys a simple exponential size-distribution law. (3) Average beta-values for the exponential function vary with locality. (4) At any one colliery, the average beta-value is reasonably constant regardless of location and shift. Evidence in support of the first conclusion is largely of an indirect nature, but it is in complete accord with previous results. The other 3 conclusions relating to size-distribution of the above 1 micron component, seem well established and sufficiently convincing to be accepted as generalizations. The evaluation of the samples was carried out using the optical microscope, the particles were sized in terms of the diameters of circles of equivalent projected areas. The implications of the results are discussed and it is shown that the 1 to 5 micron particle number count is a satisfactory parameter for the measurement of the hazard associated with air-borne dust. -- APCA Absts.

PREVENTIVE ENGINEERING

The Reduction of Smoke from a Vertical Boiler Fired by an Underfeed Stoker. D. L. R. Bailey and L. E. Reed. J. Inst. Fuel 33, 188-192 (Apr. 1960).

A series of tests has been made to measure the smoke emitted under different conditions of operation from a verticle boiler fired by an underfeed stoker. The density of smoke was affected both by the quantity of air supplied and by the method in which it entered the combustion chamber. The introduction of secondary air either through the boiler door or through the back of the boiler was found to reduce the emission of smoke, but the minimum quantity of smoke was produced when using modulated control of both the rate of coal feed and the quantity of primary air. The latter method was found to be the most suitable to meet the requirements of the Clean Air Act. -- APCA Absts.

Methods of Dust and Fume Disposal. W. A. Darrah. Ind. Heating 27, 70-82 (Jan. 1960).

Most fumes are largely diluted; usually with air, but sometimes with steam or other gases. Fumes may consist of either organic or inorganic compounds. Smoke is an example of a common fume composed of carbon and droplets of tar. Paint fumes, baked japan, or solvent vapors, are examples of fumes in vapor stages. Each of the various types of air cleaning devices have a field of use peculiarly its own. Filtration, combustion, and catalytic methods for removal of different types of fumes are discussed. Another method of removing fumes and vapors is by absorption in activated charcoal. This material, made from coconut shells, will absorb various fumes and even some air-borne odors. -- APCA Absts.

Man Versus Environment. Twenty-Seventh Research Report of the Committee on Sanitary Engineering Research of the Sanitary Engineering Division. Proc. Am. Soc. Civil Engrs. J. Sanitary Engr. Div. 86, No. SA4 Part 1 13-23 (July 1960).

Sanitary engineers should provide the leadership in the entire area of environmental control. Complete integration and coordination of the broad areas of water usage and water pollution is needed. Research on problems of water pollution should be more actively supported by the Public Health Service. Water quality criteria should be reviewed and defined, as an important guide for regulatory agencies, and economic considerations should be evaluated. Research is needed in the catagorical relationships of health effects of atmospheric pollutants in the physical science involved and in engineering studies. To meet evident needs in this field, available resources should be channeled to specific projects on the basis of urgency of need and expected productivity. Food constitutes a dominant component of man's environment that is continuously undergoing change. A broad program of research in food technology is urged so that these changes may be properly appraised before they reach the application stage. Team approach and interchange of information should be emphasized among

professional groups in the filed of occupational health. In these studies both sociological and economic information should be developed and should provide a baseline for evaluation of engineering in relation to specific occupational hazards. -- Authors' conclusions

809 Weigh Odor Control Methods Carefully. W. Viessman. Heat. Pip. & Air Cond. 31, 94 (Sept. 1959).

To eliminate or abate an odor condition in an air conditioned space it is necessary either to remove the offending gases or vapors or reduce their concentration. Sources of odors are many, and detection and measurement must ultimately rely on human appraisal. Odors are affected by temperature and humidity. They may not only be objectionable to the sense of smell but may also cause irritation to the nose and throat. Some of the physical methods for removal are by ventilation with outside air, air washing or scrubbing, charcoal adsorption, and masking. Chemical absorption or destruction of odor sources, vapor neutralization, masking, and catalytic combustion are other means. For a given building the quantity of outside ventilation air admitted should be in accord with engineering standards and local codes. The author presents an example of possible economies and comparative investment and operating costs of an outside air system and a recirculating air system.
-- Cond. from Author's summary

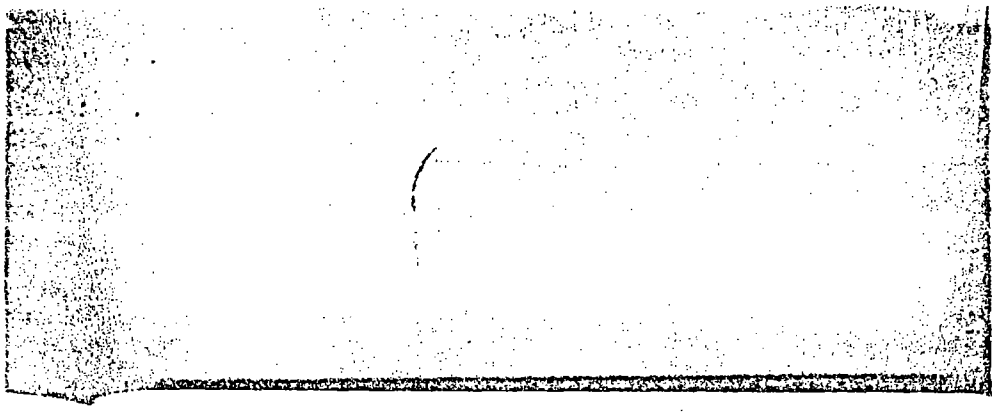
COMMUNITY AIR HYGIENE

810 Adhesion of Solid Particles to Solid Surfaces. Margaret C. Kordecki and C. Orr, Jr. Arch. Environmental Health 1, 1-9 (July 1960).

The tenacity with which particles typical of those found in polluted atmospheres adhere to solid surfaces like building walls, automobile surfaces, and plant leaves, was investigated over a range of relative humidities. Because of great variation in individual adhesion tensions, size distributions were determined covering many adhering particles before and after subjection to increasing disruption forces applied to all the particles by means of a centrifuging technique. Particles continuing to adhere after centrifuging at increasing speeds were found to shift rather uniformly toward the smaller sizes, both when single and bimodal distributions were employed. Average forces of adhesion were found to agree reasonably well with previous measurements, and, as would be expected the data suggest that electrostatic forces exert their primary influence at low relative humidities while the surface tension of condensed water films becomes important at high humidities. Finally, calculations show that, exclusive of precipitation, natural phenomena like wind and vibration can never cause re-entrainment of more than a small portion of particle debris once it becomes attached.
-- Authors' summary

811 Multi-Operational Chamber for Calibration Purposes. R. S. Brief and F. W. Church. Am. Ind. Hyg. Assn. J. 21, 239-244 (June 1960).

Frequently during industrial hygiene and air pollution work, a need arises for a chamber which can be used for calibration purposes. A multi-operational calibration chamber has been designed and built for this purpose. The chamber incorporates extreme flexibility of operation. Both static and dynamic operation are feasible within this chamber. Thus, both continuous and batch generation of gases, vapors, dusts and mists can be utilized to prepare any reasonable concentration of these materials within the chamber system. The mixtures that can be prepared are used to improve the accuracy of industrial hygiene and air pollution field studies, as well as permit research and development work in these fields. Specific uses for this calibration chamber include: (1) Calibration of air sampling and detection devices



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MANAGEMENT ASPECTS

815 Organizational Health and Executive Development. C. Argyris.
Advanced Management 24, 8 (Dec. 1959).

The author is concerned with the fact that executives place emphasis on end-products such as high morale, loyalty, and interest in the company rather than on organizational processes. According to his research, high loyality and high productivity are partially caused by the fact the employees are permitted to be non-involved and experience few contacts with management. He makes a plea for the process of increasing the healthy development of the total organization and says that it is a sick organization which would create the "organization man". It is argued that a healthy organization would stress individuality. In order to initiate the process toward organizational health, several steps are involved: first, to define what is to be included in the concept of organizational health; second, to translate this concept into actual behavior; third, to develop criteria to measure and evaluate the state of organizational health; and fourth, to apply these criteria to an executive development program or to other programs to see if they are contributing to organizational health. It is argued that changes may need to be made in the organizational structure, managerial controls, and leadership patterns, but it is also admitted that no concrete recommendations can be made in these areas at this time. It is further asserted that effective leadership is no different from effective living. Hence, the healthy leader grows and develops his own potentialities in such a way as to encourage relationships with others so that the process of growth and development takes place for all in the organization. Looking to the future, it is contended that personnel departments will be concerned with developing quality leadership and healthy organizations through the functions of research and training.

-- Cond. from J. Occ. Med.

816 Automation and Unemployment. W. Phelan.
Illinois Labor Bull. 20, 14-15 (June 1960).

For decades industry has been highly mechanized but humans regulated the machines and controlled the input of variables. Today, machinery, which can control other machinery and regulate the input relationship of many variables, is available. The application of this new machinery in industry is called automation. Automation is primarily applicable in manufacturing, communication, and transportation industries, and in data processing (paperwork). If purchasing power can be maintained and at the same time automation is widely used, society as a whole is economically ahead. Automation produces goods cheaper in two ways. First of all, production costs are reduced. Labor, material, and indirect factors, as material handling, are all utilized more efficiently. Secondly, the production of surplus is eliminated. Automation of data processing systems enables management to receive daily or weekly inventory reports from all sectors of the distribution channels. Hence, when the retail inventories of a particular item are growing too large, the manufacturer realizes this situation in days instead of months. Therefore, production will be immediately shifted to a more needed item. With automation productive capacity increases, and more goods and services can be produced and distributed. However, through the increase in productive capacity by application of automation, the right of those who may have become unemployed through the application of automation must not be ignored. In a few industries, automation may come abruptly. Nevertheless, the situation may be only temporary and as soon as the individual has adjusted to the circumstances, he will realize that he must shift to growing industries. During the transition period, he will get unemployment compensation, which in the State of Illinois is now $50 a week for a possible 26 weeks. Older workers who would find it difficult to switch to new industries usually will be kept in the present industry and used as a skeleton work force.

ACCIDENTS AND PREVENTION

817 A Power Plant Safety Program. W. C. Kramer
Coal Utilization 14, 21-22 (June 1960).

The prime requisite for a successful safety program is the enlistment of full cooperation from all plant employees. The author presents a program which does not use incentives or rewards and still has been highly successful. Before a safety program can get off the ground, the principles and objectives must be spelled out. The following could be called to a company's safety philosophy: (1) Every employee has a responsibility for safety. (2) Safety is an integral part of doing a job right and is made a vital part of all job training. (3) No job is so urgent or emergency so great that it cannot be taken care of safely. (4) Top management must be sincere and active in their pursuit of safety if such an attitude is to prevail. When this attitude reaches and is accepted by first line supervisors, the safety program works because employees adopt the attitude of those for whom they work. (5) Safety on the job and off the job are equally important. A proper attitude toward safety is a way of life.

818 Understanding the Electron. J. G. Huffman.
Natl. Safety News 82, 38-39, 171-172 (July 1960).

Last year in the United States about 1,000 persons met death by accidental electrocution; another 5,000 received serious injury from electrical causes. Property damage ran into millions. Electron flow or movement along a conductor is called an electric current. A rate of 6×10^{18} electrons per second is equivalent to one ampere. When current flows, it releases energy. An electrical current of only 25/1000 ampere passing through the human body can be lethal. Fortunately, it usually requires considerably more, especially when the current path does not cross the heart or important nerve centers. Even though not lethal, serious burns can result where higher currents are involved. Three things are necessary for sufficient current to pass through the human body to be dangerous. First, the circuit has to be complete. The current must have points of contact where it can enter and leave the body. The second condition is that the voltage must be high enough to cause a large enough current to flow. Finally, the source must have the capacity to supply the current, whatever the voltage. The commonest situation which can provide the three necessary conditions for serious shock is contact with an ungrounded portable device, such as a hotplate, a stirrer, or a pH meter. These devices often develop an electrical path between the internal wiring and the frame. If this path is a metallic one, it's called a short; if it's due to dirt or a breakdown of insulation, it's called a leak. In either case, the frame of the device would be hot electrically to ground. This hazard can be almost completely eliminated by the use of a 3-wire receptacle, plug, and cable. Heating tapes with thin porous insulation represent a class of potentially hazardous devices which cannot be made safe easily. Leakage sometimes exists from the heating wire in the tape through the insulation to the surface. It can be due to the insulation being worn thin or to some conducting material having soaked into it. There is no metal frame to ground, so a third wire is of no value. Other precautions to be observed in handling electrical equipment in the laboratory are discussed by the author.

MISCELLANEOUS

819 Industrial Waste Disposal Tailored to Stream Flow. C. J. Velz. Proc. Am. Soc. Civil Engrs., J. Sanitary Engr. Div. 85, No. SA6, Pt. 1, 95-109 (Nov. 1959).

Recognizing the technical and economic limitations of waste treatment in maintaining satisfactory stream conditions during drought season, two possibilities for more efficient utilization of water resources hold promise. Either the stream flow should be regulated to make a higher level of total flow useable; or the industrial waste discharge should be regulated, tailored to the varying pattern of stream flow. A detailed case analysis of the latter, regulating release from waste storage lagoons in accord with the varying assimilation capacity of the stream, indicates industrial expansion potential 10 to 50 times that possible under drought flow conditions. -- Public Health Engr. Abstr.

820 Treatment of Phenolic Effluents. D. A. Hall and G. R. Nellist. J. Appl. Chem. (London) 9, 565-576 (Nov. 1959).

The following methods of disposal and treatment of phenolic liquors from coke oven plants are studied: (1) Direct use on froth flotation media in coal washing plant. The coal absorbs 60% of the phenols present, but only half the normal output can be used in this way. (2) Chemical oxidation of the phenols by ozone. This is satisfactory for dilute liquors (100 ppm of phenols) but is too costly for spent ammoniacal liquors. (3) Biological oxidation. The activated sludge process is satisfactory but somewhat expensive. An enclosed percolating filter containing coke activated with soil organisms gave promising results. (4) Extraction of phenols. The use of light creosote oil in a rotating disc extractor gave promising results. For liquors rich in phenols, the procedure recommended is method (4) followed by methods (3) or (1) and then method (2) if desirable. Final effluents with 10 to 50 ppm of phenols can be obtained. -- Public Health Engr. Abstr.

INDEX

Accident facts (bk. rev.) 730

Air pollutants
- adhesion to surfaces 810
- determining 812
- effect on epithelium 813
- release of sodium aerosol in combustion 814
- sulfur dioxide, hydrogen sulfide, carbon disulfide 803

Air pollution
- control
  - Allegheny County 728
  - dust and fume disposal 807
  - in vertical boiler 806
- measurement(s)
  - chamber for calibration purposes 811

Air sampling, ring oven techniques 802

Allegheny County, air pollution control 728

Allergy(ies)
- analysis of allergic dermatitides 741
- in antimony mine 749
- in cement industry 748

Anthracosis, bone marrow 783

Antimony mine, allergic disease in 749

Asbestosis, and lung cancer 781

Asthma, effect of smoking 734

Atomic energy
- available literature 790
- plant, dispensary visits 800

Automation and unemployment 816

Baritosis, in barite workers 768

Benzene hexachloride, toxic hazards 767

Books
- accident facts 730
- health benefit coverage in New York State 732
- health survey, U.S. Natl., Hawaii 733
- occupational disease attributed to pesticides 731

Borenes (boron hydrides)
- toxicity of diborane 751
- toxicology 752

Cancer
- and air pollutants 813
- from chromates 757
- lung, asbestos 781

Cancer (continued)
- pathological effects of smoking 736
- roasted chromite ore 756

Carbon monoxide poisoning
- neurologic manifestations 753

Carbon tetrachloride
- effect on rat serum enzymes 762

Cement industry, allergy in workers 748

Chemotherapy of infection 738

Chromate
- cancer in mice and rats 757
- dermatitis from cement 747

Chromatography, some aspects of 801

Chromite ore, role in cancer 756

Chromium, microdetermination 759

O-Cresyl phosphate, outbreak of paralysis 765

DDT, toxic hazards 767

Dermatitis, dermatosis(es)
- analysis of dermatitides 741
- in cement industry 747
- formaldehyde in textiles 744
- phenylmercuric salts 742
- silica granulomas in man 743
- status of skin tests 746
- value of patch tests 745

Diatomaceous earth, pneumoconiosis 775

1,1-Dimethylhydrazine, toxicity 766

Dust control, suppression
- in glass manufacturing 774

Dust counting, determination
- size distribution in coal mines 805
- statistical aspects 772

Dust sampling, samplers
- correction for anisokinetic [illegible]
- myocological contamination [illegible]
- size analysis 773

Electrical hazards
- in the laboratory 818

Emphysema, effect of smoking 734

Ethylene dibromide
- fatal case of poisoning 763

Executive development and organizational health 815

Eye, tobacco amblyopia 735

Fluoride(s), determination 754

Formaldehyde and contact eczema 744

[illegible]
[illegible] average in New York State 732
survey, U. S. Natl. Hawaii health survey 733

Heart disease and occupational exposures 739

Heat
development of heat pyrexia 785
and humidity, diffusion of water vapor through skin 786

Industrial medicine
in atomic energy plant 800
education for practice of 740

Industrial relations and organizational health 815

Infection and chemotherapy 738

Lead
fume from welding coated steels 760
poisoning in making light bulbs 761

Man versus environment 808

Mercury
hazard in medical laboratories 758

Noise
audience and seat absorption 787
measurement(s)
temporary threshold shift 788

Noise control and reduction
value of ear defenders 789

Odor control methods 809

Ophthalmology, tobacco amblyopia 735

Pesticides
and occupational disease (bk. rev.) 731

Phenylmercuric salts, dermatoses 742

Plastics, toxicology 750

Pneumoconiosis
baritosis 768
in diatomaceous earth workers 775
talc in soapstone workers 782

Polydimethylsiloxanes, oral toxicity 764

Radar
effects on animals
control of hazards

Radiation (ionizing, nuclear, x-rays, etc.
biochemical effects
in manned space flights
effect on mediastinum
protection, code, New York City

Radioactive
decontamination of animals
particulates, retention in lung

Radioisotopes
information for industrial use
and the law
in medicine

Resins, toxicology of synthetic

Safety in a power plant

Silica granulomas in man

Silicone(s)
polydimethylsiloxanes, toxicity

Silicosis
clinico-radiological assessment
non-typical forms
unusual manifestations

Silicotuberculosis
bronchographic picture
bronchoscopic picture

Skin, diffusion of water vapor through

Smoking
effect on asthma and emphysema 734
pathological effects

Space flight, radiation implications

Sulfur dioxide
determination in flue gases
dynamics of inhalation
in urban area

Sulfur trioxide, determination in flue gases

Talc pneumoconiosis, in soapstone workers

Thermal precipitator
fractionation of particles

Uranium dioxide, retention in the lung

Vibrating tools
and neurological conditions

Waste disposal
tailored to stream flow
treatment of phenolic effluents