



MW88-0019612

Industrial Hygiene Digest

INDUSTRIAL HEALTH NEWS

LITERATURE ABSTRACTS

MEDICAL

ENGINEERING

CHEMICAL

TOXICOLOGICAL

LEGAL

MAY, 1964
(Vol. 28, No. 5)

INDUSTRIAL HYGIENE FOUNDATION

MELLON INSTITUTE

4400 FIFTH AVENUE -- PITTSBURGH, PA. 15213

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IN-RE: ABRAMS November 1992

INDUSTRIAL HYGIENE FEATURES

Abst. No. 426 reports on poison and the pathologist.

A study of the effects of alcohol on mental functions is presented by Abst. No. 428.

Rehabilitation of the alcoholic is discussed in Abst. No. 430.

Fatigue, insufficiency, and pathologic fractures are investigated in Abst. No. 433.

See Abst. No. 444 for information on fungus infection complicating leukemia.

Data on mortality in 1,100 consecutive burns treated at a burns unit are given in Abst. No. 448.

A report on salt poisoning is given in Abst. No. 456.

The pyrophoric properties of zirconium metal are studied in Abst. No. 460.

Signs and symptoms of tetraethyllead intoxication are discussed in Abst. No. 464.

Abst. No. 466 presents analytical methods for the determination of lead.

Abst. No. 471 is concerned with pediatric lead poisoning.

Abst. No. 472 reviews problems in the recognition of lead intoxication.

Consult Abst. No. 482 for information on respiratory disease in southern West Virginia coal miners.

Information on asbestos exposure and neoplasia is given in Abst. No. 484.

Weather and cough is the title of Abst. No. 492.

A short discussion of experimental verification of ventilation equations is presented in Abst. No. 503.

FOUNDATION FACTS

NEW MEMBERS. The Foundation is pleased to add the names of American Potash & Chemical Corporation, and Newport Division, Heyden Newport Chemical Corporation to its membership list.

Various member of the IHF Staff attended the Industrial Medical Association meeting in Pittsburgh, April 13-16, and the American Industrial Hygiene Association meeting in Philadelphia, April 27-30. Much interest was shown in the Foundation's scientific exhibit which highlights the Industrial Hygiene Digest (1937-1963) which now contains over 30,000 abstracts, making it a most useful reference library in the field of environmental and occupational health.

DR. PAUL GROSS, the Foundation's research pathologist, presented a paper on "Some Biologic Aspects of Pulmonary Deposition and Retention of Inhaled Aerosols" at the Hanford Symposium on Inhaled Radioactive Particles and Gases, at Richland, Washington, May 4-6, 1964.

29th ANNUAL MEETING
OCTOBER 21-22, 1964

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November 1992

IN RE: ABRAMS



ANTHONY J. LANZA

Industrial Hygiene Foundation Trustee 1942-1959

Chairman, Industrial Hygiene Foundation
Medical Committee 1936-1952

It is with deep regret that announcement is made of the passing of Anthony J. "Tony" Lanza on March 23, 1964 in New York at the age of 80.

Although chiefly renowned because of his outstanding accomplishment in identifying the etiology of silicosis (called "Lanza's Disease" by some of his friends as a result) Dr. Lanza made several other very significant contributions to the field of Occupational Health. He organized Australia's Division of Industrial Hygiene in 1921, subsequently serving as its advisor. During World War II, serving as an Army Lieutenant Colonel, he organized the U.S. Army's Occupational Health program, receiving the Legion of Merit and the William S. Knudsen Award for this service in the national interest. He worked within the Medical Department of the Metropolitan Life Insurance Company from about 1926-1947, leaving to organize the Institute of Industrial Medicine at New York University. In recognition of this accomplishment, he was honored by being awarded the New York University Presidential Citation in 1960, and in 1964 by the decision to name the newly constructed laboratories near University Valley in Sterling Forest "Anthony J. Lanza Research Laboratories for Environmental Medicine."

Author of many professional papers and books, his most recent text "The Pneumoconioses" resulted in his being chosen for the 1964 meritorious authorship award of the Industrial Medical Association. He had received notice and was planning to attend the meeting in Pittsburgh the week of April 13 to accept the award personally.

Dr. Lanza's reputation as an expert in dust diseases of the lungs was well established when the Industrial Hygiene Foundation was conceived in 1935. It was therefore logical that he should have been chosen chairman of its newly formed Medical Committee in 1936 and, characteristic of Dr. Lanza, the first Medical Bulletin of the Foundation entitled "Silicosis and Allied Disorders" was published within about a year, on April 15, 1937.

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The effectiveness of the Foundation in helping industry control hazardous exposure to silica was largely based upon the ability of experienced industrial hygienists, such as Dr. Lanza, to communicate factual information of a highly technical nature to industry.

Dr. Lanza led a full, useful and long life and we are all better off for his pioneering efforts in the field of occupational health. He is survived by his widow, Laura; two daughters, Mrs. Gregory Maue and Mrs. Gordon Felton, and two grandchildren.

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May, 1964
Volume XXVIII
No. 5

Industrial Hygiene Foundation
4400 Fifth Avenue
Pittsburgh, Pa. 15213

MW08-0019615

INDUSTRIAL HYGIENE DIGEST
Literature and News

NEWS ITEMS

412 Smog Threatens Cotton Crop.

Smog, the bane of many Southern California agricultural crops, now poses a potential threat to the state's number one cash farm crop, cotton. University of California farm advisors in the cotton producing regions, primarily the San Joaquin and Imperial Valleys, have reported a peculiar blotching of cotton leaves and leaf drop. Laboratory conditions have proved that certain smog components cause the same conditions. University scientists have reason to believe that the present encroachment of smog into the cotton producing areas will increase in severity and extent with the inevitable increases in industrial and urban development.

-- Am. Soc. Civil Eng., Sanitary Eng. Div. News 90, Pt. 2, 17-8 (April, 1964)

413 Gordon Research Conference in Water Pollution.

The 1964 Gordon Research Conference on Environmental Science and Engineering (theme: Microchemical Contaminants in Water) will meet at the New Hampton School, New Hampton, New Hampshire, June 15-19, 1964. Attendance is limited to 100 participants. Address inquiries to Dr. W. George Parks, Director, Gordon Research Conferences, University of Rhode Island, Kingston, Rhode Island.

-- Am. Soc. Civil Eng., Sanitary Eng. Div. News 90, Pt. 2, 17-22 (April, 1964)

414 National Association of Sanitarians.

The 28th annual educational conference of the National Association of Sanitarians sponsored by the Pennsylvania Society of Professional Sanitarians will be held at the Benjamin Franklin Hotel, Philadelphia, Pa., June 28 to July 3. Further information may be obtained from George Zechman, 28th AEC Planning Committee, 500 South Broad Street, Philadelphia, Pa., 19146.

-- New Engl. J. Med. 270, 642 (March 19, 1964)

415 Quarantine Rules.

The Japanese Welfare Ministry is planning strict quarantine measures in connection with the 1964 Olympic Games scheduled in Tokyo in October. It is building a new quarantine station at Tokyo International Airport to prevent spread of diseases that might be brought in by the anticipated 7,000 athletes and 100,000 foreign spectators.

-- AMA News 7, 1 (March 30, 1964)

416 Alcohol Consumption.

One of the nation's largest distilleries reported that consumption of distilled spirits in the U.S. in 1962 reached an all-time high of 254 million gallons—a 5% increase over the 1961 total of 240 million gallons. It was the eighth consecutive year in which national rate of consumption increased. -- AMA News 7, 1 (March 30, 1964)

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417 Hygienic Guide Series.

The following additional Hygienic Guide Series are now available: Trichloroethylene (revised 1963) and Chlorobenzene. They are given in the January-February AIHA Journal, pp. 94-99 and can be obtained from the American Industrial Hygiene Association, 14125 Prevost, Detroit, Michigan 48227, at 25 cents each.

-- Am. Ind. Hyg. Assn. J. 25, 94-99 (Jan.-Feb. 1964)

COMING EVENTS

- | | | |
|-----|------------|--|
| 418 | June 1-4 | International Symposium on Basic Science and Clinical Aspects of Muscle, University of Alberta, Edmonton, Alberta. |
| | June 7-11 | Special Libraries Association, 55th Annual Convention, St. Louis, Mo. |
| | June 8-12 | Oak Ridge National Laboratory, International Surface Contamination Symposium, Gatlinburg, Tenn. |
| | June 9-11 | New York Academy of Sciences, Industrial Synthesis and Applications of Organometallics, New York, N. Y. |
| | June 11-13 | Manufacturing Chemists Association, Annual Meeting, White Sulphur Springs, West Virginia |
| | June 13-19 | American Orthopaedic Association, Vancouver, B. C. |
| | June 14-17 | American Leather Chemists Association, 60th Annual Meeting, Lake Placid, N. Y. |
| | June 14-18 | American Nuclear Society, Philadelphia, Pa. |
| | June 14-19 | Interamerican Congress of Cardiology, Montreal, Canada |
| | June 15-19 | American Nurses' Association, Atlantic City, N. J. |
| | June 15-19 | Gordon Research Conferences, Environmental Sciences: Microchemical Contaminants in Water, New Hampton, N. H. |
| | June 15-19 | Gordon Research Conferences, Lipid Metabolism, Meriden, N. H. |
| | June 18-19 | American Pediatric Society, Seattle, Washington |
| | June 18-19 | American Rheumatism Association, San Francisco, California |
| | June 18-21 | American Therapeutic Society, San Francisco, California |
| | June 18-22 | American College of Chest Physicians, San Francisco, California |
| | June 19-20 | American Geriatrics Society, San Francisco, California |
| | June 20-21 | American College of Legal Medicine, San Francisco, California |
| | June 21-25 | Association of Food and Drug Officials, 68th Annual Conference, Denver, Colorado |
| | June 21-25 | Air Pollution Control Association, 57th Annual Meeting, Houston, Texas |
| | June 21-25 | American Medical Association, Annual Meeting, San Francisco, California |
| | June 21-26 | American Society for Testing and Materials, 67th Annual Meeting and 16th Materials Testing Exhibit, Chicago, Ill. |
| | June 22-24 | ACS Division of Medicinal Chemistry, 9th National Medicinal Chemistry Symposium, Minneapolis, Minn. |
| | June 22-24 | Association for Research in Ophthalmology, San Francisco, California |
| | June 22-26 | International Federation of Societies of Cosmetic Chemists, 3rd Congress, New York, N. Y. |

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OCCUPATIONAL DISEASE STATISTICS

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

	Conn. Feb.	Ind. Mar.	Pa. Mar.-Apr.	Tenn. Mar.	Total
Asbestiosis, suspected			1		1
Asphyxiation, carbon monoxide		3			3
Asthmatic bronchitis, acute			1		1
Bronchial asthma			1		1
Conjunctivitis, welding flash		7			7
Dermatitis	21*	51*	41	4	117
Ear irritation, creosote		1			1
Eye irritation		9**			9
Frostbite(fingers 1, toes 1)		2			2
Fumes (unidentified)			8		8
Lead poisoning			6		6
Lung irritation, sawdust		1			1
Paint solvent fumes				1	1
Poisoning, ammonia		4			4
" barcothene fumes		1			1
" carbon monoxide		2			2
" carbon tetrachloride		1			1
" chemical fumes		1			1
" epoxy resins		2			2
" gases		1			1
" naphtha		1			1
" oil fumes		1			1
" paint vapors		3			3
" toluene diisocyanate		1			1
" welding fumes		1			1
Radiation burns			1		1
Respiratory irritation			1		1
Silicosis			7	2	9
" suspected			9		9
Tuberculosis			2	1	3
Totals	21	93	78	8	200

* Causes are listed as follows:

Connecticut: Occupational dermatitis due to oils and greases (and metal cutting compounds) 7; occupational dermatitis due to solvents 5; occupational dermatitis due to other chemicals: miscellaneous 1, multiple chemicals 1, plating chemicals 1, photography chemicals 2, synthetic resins or resin (plastic) compounds 1; occupational dermatitis—other: miscellaneous 1, soaps or detergents 2.

Indiana: Cause not stated 17, acids 6, alkalis 4, epoxy resins 3, organic solvents 6, soap 2, glue 1, tar 1, asphalt 1, lime 1, mold release 1, detergents 1, wood 1, sand mix 1, rosin 1, aquadam 1, rockwool 1, dye 1, cloth 1.

** Oil 2, chloroform 1, paint thinner 1, paint 1, lime 1, brakefluid 1, hygromix 1, hygromycin 1.

LEGAL DEVELOPMENTS

420 Medicolegal Decision—Review Ordered.

A federal judge in Scranton, Pa., ordered a review by the Social Security Administration of the case of an ex-miner who had been denied disability benefits, he claimed, because he had silicosis. The SSA denied the benefits because it judged the man able to perform "light work of a general nature." However, Federal Judge William J. Nealon held that "not only must the capabilities of the individual be viewed in context with his physical, educational and vocational background—but the following question must be asked and resolved: what employment opportunities are there for a man who can do only what the applicant can do?" The man's attorney argued that the miner, who had third stage anthraco-silicosis after 25 years in the mines, was unqualified by education and experience for non-manual work. A hearing examiner in 1961 and an appeals council in 1962 had denied social security disability payments. At a hearing on the case, Judge Nealon expressed dissatisfaction with social security examiners "who set themselves up as medical experts." (Lazar v. Secretary of Health, Education & Welfare). -- AMA News 7, 13 (March 30, 1964)

421 Tannic Acid for Drug Use.

The Food and Drug Administration has announced that bulk tannic acid for drug use must bear a warning against use in enemas. The agency also gave the manufacturer of a tannic-acid-containing enema drug a notice of opportunity for hearing on a proposal to withdraw the new drug approval. The action came following reports of eight deaths due to liver damage from the use of tannic acid in enemas. FDA said that regulatory proceedings may be instituted after 60 days from publication against tannic acid without the label warning. The Statement of Policy noted that it has become a widespread practice for tannic acid to be added to barium enemas to improve x-ray pictures. Tannic acid, it said, is capable of causing severe liver damage when absorbed in sufficient amounts. Medical literature reports called attention to the deaths due to the presence of tannic acid in enemas. Tannic acid for enema use will now be regarded as a new drug requiring evidence of safety and effectiveness before it may be marketed, FDA said. The statement warned that any shipments of tannic acid intended for drug use and containing such phrases as "Caution: For manufacturing, processing, or repackaging," "For prescription compounding," or "Diagnostic reagent—For professional use only" will be regarded as misbranded unless the product bears conspicuously a statement to the effect "Warning—Not for use in enemas."-- J. Am. Med. Assn. 188, adv. p. 17 (April 6, 1964)

422 New Hearings on Pesticides Scheduled.

A new round of hearings on pesticides has been scheduled by Senator Abraham Ribicoff (D. — Conn.) before the Senate Sub-committee on Reorganization. Purpose of the hearings is to probe a report by the U.S. Public Health Service that massive fish kills in the lower Mississippi River basin have been caused by toxic synthetic organic materials. USPHS reports that chemicals found in dead and dying fish and in the water environment include two pesticides, endrin and dieldrin, and two unidentified substances. "The Louisiana fish kill presents a whole new dimension to the pesticide problem," Senator Ribicoff says. "This should silence the pesticide apologists once and for all; it should silence those who repeat the 'read the label litany' since all evidence points to the fact that fish kills are occurring despite use of the toxic material as directed," he adds. -- Chem. Eng. News 42, 21 (April 6, 1964)

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BOOKS, PAMPHLETS AND NOTICES

- 423 Pulmonary Deposition and Retention of Inhaled Aerosols. T.F. Hatch & Paul Gross. Prepared under the direction of the American Industrial Hygiene Association for the Division of Technical Information, United States Atomic Energy Commission. 1964. Available From: Academic Press, 111 Fifth Avenue, New York 10003. Price: \$5.95 clothbound, or \$3.45 paperbound.

This is the first of an Industrial Hygiene Monograph Series prepared under the direction of the AIHA for the USAEC Division of Technical Information, and it sets the highest possible standard from the standpoints of interest, scope, accuracy and timing.

The authors, both world renowned scientists in their field have numerous publications to their credit. They have cooperated in producing an exceedingly well organized and documented presentation of the best current knowledge of all known factors, which produce or influence pulmonary physiopathology. Special attention is given to the nature of respirable particles and aerosols and to clearance mechanisms: of particular interest to physicians are the beautifully illustrated material on histopathology and vivid demonstrations of the importance of particle size. The influence of particle size on respiratory spread of communicable diseases such as tuberculosis, and also of diseases of occupational origin such as metal fume fever is shown. The section on "Particulate Contaminants in Community Air Pollution" will be of interest to all in the field of Air Pollution Control, as will the one on "Potentiation of Respiratory Irritation by Aerosols." A 15 fold potentiation of physiological effect of SO_2 in the presence of 10 mg/m^3 of finely divided particles of sodium chloride (85% less than 0.13 "micron") is described, based on Dr. Amdur's work. The authors note however, that a mass concentration of 10 mg/m^3 represents a highly abnormal situation, scarcely ever to be encountered in ordinary situations of community air pollution. The monograph is beautifully bound and print is easily readable.

Its value is considered to be out of all proportion to its low cost, and certainly all those in the field of occupational health and safety will wish to have ready access to this valuable reference text. - - R. T. P. deT

- 424 Man, Medicine, and Work. Historic Events in Occupational Medicine. J.S. Felton, Julia P. Newman, and D.L. Read. U.S. Department of Health, Education, and Welfare, Division of Occupational Health, PHS Publication No. 1044. 52 pp. (1963). Available From: Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402. Price: 40 cents.

This publication, which traces the growth and development of occupational medicine, was developed from an exhibit by Dr. Jean S. Felton, of the University of California. Beginning with prehistoric man, the publication portrays man's efforts to control his environment and his battles against the sometimes mysterious, and always present, danger of occupational illness. Not until Bernardino Ramazzini, the father of occupational medicine, made his classic studies in the 17th century on the diseases of workers were any efforts made to protect people who worked. Ramazzini's advice went unheeded while the world underwent the economic and social upheaval of the industrial revolution. The wholesale poisonings, crippling and maiming of workers, inherent in the industrial environment of the time, however, created a social awareness of the problem, and the modern concept of occupational medicine was born. Today, workers can face their jobs with far greater assurance of health and well-being than ever before thought possible.

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- 425 Right From the Start. The Importance of Early Immunization. Judy Graves. Public Affairs Pamphlet No. 350. Available From Public Affairs Committee, 22- East 38th Street, New York, N.Y. 10016. 28 pp. (Sept. 1963). Price: 25 cents.

The author describes the major diseases against which immunization is possible and how the vaccines work, and outlines a schedule for shots for infants and children. Also discussed are the costs of immunization, community programs—particularly for families without regular medical care, immunization of adults, and the need for keeping accurate personal records of immunization. Immunizing children—and adults—against health hazards is important not only for the individual but for the community as a whole. The danger to the unimmunized individual is a perennial health hazard as long as there are germs of communicable disease, but when large numbers of unimmunized persons live together in close proximity, as they now tend to do in low-income neighborhoods—the danger is a matter of concern to everyone. Public health officials warn that under such circumstances, an individual case could quickly grow into an epidemic—and once started, epidemics do not respect neighborhood boundaries.

INDUSTRIAL MEDICAL PRACTICE

- 426 Poison and the Pathologist. L. Adelson. J. Am. Med. Assn. 187, 918-920 (March 21, 1964).

The pathologist participating in the investigation of a known or alleged poisoning fatality has a multifaceted responsibility. He must search for and recognize anatomic changes produced by the toxic substance, while recalling that many poisons produce no organic injury even when they are present in lethal concentration. He should always preserve sufficient quantities of body fluids, excreta, and viscera in properly labelled containers so that the chemical analyst has adequate material for all possibilities. Frequent consultation with the toxicologist is essential in the interest of expediting the search for the lethal chemical. Ultimately it falls upon the pathologist to establish the cause of death in the light of all the anatomic and chemical findings.

-- Author's abstr.

- 427 The Acute Effect of Alcohol on the Circulation and on the Oxygen Metabolism of the Heart. V. Ganz. Am. Heart J. 66, 494-497 (Oct. 1963).

Alcohol, in an average dose of 58 mg. per kilogram per minute, was infused during 20 minutes into 10 anesthetized dogs. Cardiac output and the external work of the heart decreased, with no change in arterial blood pressure. Coronary sinus out-flow increased as a result of a fall in coronary vascular resistance. There was no change in either coronary arteriovenous oxygen difference or myocardial oxygen extraction. Oxygen consumption, however, increased in the myocardium. The results are discussed in terms of the effect of alcohol on the pain of angina pectoris.

-- Aerospace Med. Abstrs.

- 428 A Study of the Effects of Alcohol on Mental Functions. M.C. Hutchison, et al. Can. Psychiat. Assn. J. 9, 33 (1964).

In a series of 8 male non-psychotic volunteers, the effects of alcohol on the following 6 mental functions were tested: (1) Orientation and personal history, (2) digit span forward (for immediate memory), (3) digit span reversed (affected by brain injury), (4) abstract thinking, (5) paired associates learning, and (6) retention. It was found that a mean blood alcohol concentration of 1.0 part per 1,000 did not affect the subjects' accuracy of information relating to personal identity and orientation in time and place. The subjects' attention, abstract thinking and learning efficiency were adversely affected

by alcohol. Of the two retention measures, recognition and recall, only the latter was impaired to a statistically significant degree. Reexamination after 24 hours revealed vagueness of recollection, and amnesia ("blackout") for the time period during which the blood alcohol level was rising from 1.5 parts to 2 parts per 1,000. One subject confabulated the content of his conversation with the experimenter.

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

- 429 Evaluation of a Treatment Program for Alcoholics: A Follow-Up Study. A.S. Ellis and J. Krupinski. *Med. J. Australia* 1, 8 (Jan. 4, 1964).

A treatment program for chronic alcoholics is described. If the patient is physically ill upon admission to the hospital, appropriate treatment is instituted, usually consisting of intravenous and intramuscular injections of vitamin B complex, together with sedation and fluid administration. If psychosis or severe psychoneurosis is present, treatment is directed to the psychiatric disability. An attempt is made to assess the patient's social situation and stress. Treatment with vitamin B complex (intramuscular injections and capsules) is continued during the entire stay in the hospital. The patients are urged to attend three Alcoholic Anonymous (AA) meetings a week. They are encouraged to discuss their problem with others in the ward. At the time of discharge from the hospital they are encouraged to keep in touch with the AA. In this study, 500 men admitted for alcoholism in a 27-week period in 1960 were traced for 2 years after their discharge. No significant difference was found between the relapse rates of patients who adopted the full treatment program and those who left the hospital after a shorter stay. The proportion of relapses was significantly lower in patients admitted to the hospital for the first time.

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

- 430 Rehabilitation of the Alcoholic. M.A. Block. *J. Am. Med. Assn.* 188, 84-86 (April 6, 1964).

Success in rehabilitation depends on placing the patient in the facility best suited to treat his individual problem. Restoration of physical health is the initial step toward rehabilitation, and psychotherapy over long periods is required to maintain abstinence. To help alcoholics maintain abstinence, social attitudes must be modified to help rather than hinder their rehabilitation. If alcoholics are to be aided and future generations are to be prevented from having this illness, changes must be made in environments and attitudes toward drinking.

-- Author's summary

- 431 Work Physiology in Health and Disease. E.P. Luongo. *J. Am. Med. Assn.* 188, 27-32 (April 6, 1964).

Physiological principles of work apply both to the able-bodied and the physically impaired. No simple formula exists for evaluating work capacity. Many factors, personal and environmental, not related to physical condition, may determine physiological capacity. Reserve compensation of workers from day to day, in health and disease, cannot be predicted accurately. In radioelectrocardiography and pulmonary-function measurement, telemetry holds promise for more useful and accurate evaluation of physical capacity of individuals at work. Telemetry can be used in industrial physiology measurements for cardiopulmonary diseases and other disorders where there is a question of impairment of physical capacity.

-- Author's abst.

- 432 Coagulation and Fibrinolysis in Injured Patients. D. Innes and S. Savitt. *J. Clin. Pathol.* 17, 1 (Jan. 1964).

Changes in coagulation and fibrinolysis were studied serially in 42 patients hospitalized with a wide variety of injuries. The first hours after trauma are dominated by an acceleration of fibrinolysis and normal clotting time which are often followed by an abrupt rebound to prolong fibrinolysis and normal clotting. Evidence is pre-

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sented that acceleration of fibrinolysis is due to flooding of the circulation by plasminogen activator and that prolongation is probably due to an inhibitor. Prolonged prothrombin time, increased prothrombin consumption index, acceleration of the heparin-retarded clotting time, and fall in platelet count are also frequent during the first hours after injury. There is evidence also of an early deficiency in factor V and a fall in factor VII and prothrombin. The following days are characterized by continued prolongation of fibrinolysis, a lengthening of clotting time, and an increased prothrombin consumption index suggestive of a defect in thromboplastin generation. Prothrombin time may vary phasically. While plasma prothrombin and factor VII are reduced, there is now little change in factor V. The platelet count continues to fall for a few days, but then a thrombocytosis develops. Plasma fibrinogen rises within 24 hours and reaches a maximum within a few days; in the severely injured it remains high for long periods. Various changes are influenced by the severity of trauma.

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

- 433 Fatigue, Insufficiency, and Pathologic Fractures. R.L. Pentecost, R.A. Murray, and H.H. Brindley. J. Am. Med. Assn. 187, 1001-1004 (March 28, 1964).

A partial or complete fracture which results from the inherent inability of bone to withstand stress applied without violence in a rhythmical, repeated, sub-threshold manner is a "stress fracture." Because numerous terms have been used in the medical literature to designate the two types of stress fractures, the following classification is recommended. A "fatigue fracture" occurs when abnormal stress is applied to bone with normal elastic resistance. An "insufficiency fracture" is produced by normal or physiological stress applied to bone with deficient elastic resistance. Fatigue and insufficiency fractures occur most frequently in the weight-bearing bones. The term "pathologic fracture" should be limited to any fracture in bone weakened by tumor.

-- Authors' abst.

- 434 Physiological Studies of Pulmonary Edema at High Altitude. H.N. Hultgren. Circulation 29, 393 (March, 1964).

Cardiac catheterization studies were performed in 4 patients during acute pulmonary edema at an elevation of 12,300 feet in the central Peruvian Andes. Pulmonary hypertension, low cardiac output, arterial unsaturation, and low normal pulmonary artery wedge pressures were observed. Oxygen breathing was accompanied by a prompt, marked fall in pulmonary artery pressure and a slight rise in wedge pressure indicating the presence of anoxic pulmonary arteriolar constriction. In one patient, pulmonary artery wedge pressures were not elevated during added hypoxia nor during exercise. The blood pressure response to the Valsalva maneuver was normal. Similar studies were carried out in 4 subjects after recovery from pulmonary edema. One 9-year-old boy had persisting pulmonary hypertension. None had evidence of underlying cardiac disease.

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

- 435 Respiratory Infection Following Tracheostomy. M.S. Gotsman and J.L. Whitby. Thorax 19, 89 (Jan. 1964).

There are many enthusiastic advocates of tracheostomy, since it has been found valuable in the treatment of poliomyelitis, tetanus, and other conditions associated with respiratory paralysis. However, little attention has been paid to the postoperative respiratory sequels. The authors have been impressed by the frequency with which these patients have become infected with organisms causing cross-infections in hospitals, particularly staphylococci. In order to assess the incidence and significance of infections after tracheostomy, they examined 29 patients submitted to tracheostomy in their hospital during 1961, for evidence of pulmonary infection. Twenty-three lived for more than 3 days and 18 of these became infected

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following tracheostomy. Eleven infections were due to staphylococci that were resistant to antibiotics and 5 were due to *Pseudomonas pyocyanea*. The nature of the infecting organisms clearly indicated the hospital environment as the source of the infection. The authors discuss factors that influence the development of infections, and they make recommendations about the management of tracheostomy patients. -- J. Am. Med. Assn. References & Reviews

- 436 Chronic Obstructive Bronchopulmonary Disease. I. Clinical Features.
R. S. Mitchell and G. F. Filley. *Am. Rev. Resp. Dis.* 89, 360-371 (March, 1964).

One hundred and fifty subjects with clinical and physiologic evidence of chronic obstructive bronchopulmonary disease and at least a 50% reduction in maximal breathing capacity were carefully studied initially and followed for 2 to 6 years. Cases fell clinically into 3 groups: tussive—57% with a long history of cough and deep respiratory infections before the onset of unrelenting dyspnea; dyspneic—27%, cough occurring with or after dyspnea, including 7% (11 patients) with no chronic cough at all; and asthmatic—16% with a history of typical bronchial asthma for years before the onset of nonepisodic dyspnea. The sex ratio was 9:1, males predominating. The observed deaths were 66% and 92% at 10 and 20 years after the onset of dyspnea, by the life-table method. The expected death rate for a population of similar age and sex was 12% and 24% at 10 and 20 years, respectively. Sudden permanent loss of exercise tolerance was observed in approximately one-half of those 75 persons who gave a history of a pneumonia-like illness. The possibility that these attacks of "pneumonia" were complicated by, or were solely episodes of spontaneous pulmonary thrombosis was discussed. Thirty-one per cent of the patients had evidence of peptic ulcer. Ninety-five per cent were habitual cigarette smokers. Eight-five per cent had smoked more than 15 cigarettes per day for an average of 30.1 years before the onset of dyspnea. Forty-two per cent of the habitual smokers have so far succeeded in stopping smoking. Cough stopped or was markedly improved in 66% of those who stopped smoking and in only 2% of those who continued to smoke. Progressive loss of ventilatory capacity is usually accompanied by marked weight loss and intolerance for exercise, and is characteristic of the dyspneic type of patient. If the heart fails, it does so only terminally. Increasing hypoxia on the other hand, was more often accompanied by polycythemia, cardiac enlargement, and right heart failure, and was more frequently seen in the tussive type of disease. Future morphologic studies will be necessary, it is believed, to clarify these relationships. -- Authors' summary

- 437 Alcohol Consumption and Smoking Habits in Male Patients with Pulmonary Tuberculosis.
J. G. Lewis. *Brit. J. Prevent. & Social Med.* 17, 149-152 (July, 1963).

A comparison of the drinking and smoking habits of tuberculous and non-tuberculous patients has been made. A significantly greater number of regular drinkers was found among the tuberculous patients, although smoking was not more common than in the control group. The greater number of regular drinkers in the tuberculous group may be due to several causes: regular drinking may increase the chances of exposure to tuberculosis; an increased susceptibility to the disease may be produced by drinking; and there may be an indirect association whereby alcohol intake is linked with some other factor predisposing to tuberculosis.

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

- 438 Mechanical Properties of Lung in Normal Men Over 60 Years Old.
J. E. Cohn and H. D. Donoso. *J. Clin. Invest.* 42, 1406-1410 (Sept. 1963).

Mechanical properties of lungs in normal men over 60 years old were compared to normal men under 40. Dynamic lung compliance was significantly greater in the older subjects. Transpulmonary pressures at full lung inflation were greater in the younger

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group. Airway resistance was higher and conductance/volume ratios were lower in the older men. Changes of pulmonary physiological parameters with age in men may be secondary to increased pulmonary compliance in the elderly.

-- Aerospace Med. Absts.

- 439 Pulmonary Surface Tension in Experimental Atelectasis. T.N. Finley, et al.
Am. Rev. Resp. Dis. 89, 372-378 (March, 1964).

The results of the present studies are consistent with the hypothesis that: (1) the stability of the alveoli requires that the respiratory surfaces be lined with a material that reduces surface tension to low values; and (2) the maintenance of the lining material requires that there be adequate alveolar capillary blood flow. Atelectasis per se does not cause an increase in surface tension of lung extracts. This is substantiated by the following findings: extracts from lungs that were still collapsed 10 weeks after ligation of the bronchus had normal surface tension; extracts from lungs that were made atelectatic by bronchial ligation for less than 48 hours had normal tension, and in cases of pulmonary artery occlusion, the increase in surface tension of lung extracts occurred before the development of atelectasis.

-- Authors' summary

- 440 Atherosclerosis in Europeans and Bantu. B.J. Meyer, et al.
Circulation 29, 415 (March, 1964).

The atherosclerotic "profile" of the aorta, coronary and cerebral arteries was gauged by means of the atherosclerotic index method in 540 unselected white and Bantu autopsy cases. Of these, 87 white men, 58 white women, 11 Bantu men, and 85 Bantu women, were over the age of 25 years. Ten of the white men and 5 of the white women over 25 years of age had died of coronary occlusion. None of the Bantu had died of this disease. The percentage of deaths due to cerebrovascular accidents was about the same in whites and Bantu. After the third decade, atherosclerosis was more severe in the aorta and coronary arteries of the whites than in those of the Bantu. No racial difference was noticed in the cerebral arteries. The coronary arteries in cases of death due to coronary occlusion almost invariably showed severe atherosclerosis, but the cerebral vessels did not invariably show macroscopically discernible atherosclerosis in cases of death due to cerebrovascular accidents.

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

- 441 Cancer and Life Span in Smokers and Nonsmokers. C.M. Plair and S.L. Wilens.
Am. J. Med. 34, 88-92 (Jan. 1963).

Surprisingly few data are available on the comparative incidence of malignant growths at sites of origin other than the respiratory tract in smokers and nonsmokers. If a relationship between extrapulmonary neoplasms and cigarette smoking could be established, it might suggest that the association of tobacco usage and cancer is an indirect or even coincidental one. For this reason, the incidence of all malignant growths observed in men at necropsy was observed and tabulated according to the smoking habits of the entire group. The necropsy protocols of 993 men who died consecutively between 1958 and 1961 at the New York Veterans Administration Hospital were used. Statistical analysis revealed that carcinoma of the lungs was 4 times as common in heavy cigarette smokers as in nonsmokers or pipe and cigar smokers. The incidence of carcinoma of the upper respiratory tract and upper alimentary canal was 4 times as high in heavy cigarette smokers and in pipe and cigar smokers as in nonsmokers. The incidence of neoplasms in all parts of the body other than in the lung, larynx, pharynx, mouth, and esophagus was twice as high in nonsmokers as in heavy cigarette smokers. The total incidence of all varieties of malignant tumors at death did not vary greatly regardless of the smoking habits of any particular group of men. -- Am. Rev. Resp. Dis. Absts.

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- 442 Cigarette Smoking, Chronic Bronchitis, and Emphysema.
R.S. Mitchell, T.N. Vincent, and G.F. Filley.
J.Am. Med. Assn. 188, 12-16 (April 6, 1964).

Of 150 patients with chronic bronchitis or diffuse obstructive pulmonary emphysema, 143 were cigarette smokers, most of them heavy smokers from an early age. Of the 60 who stopped smoking, 44 noted complete or almost complete relief from coughing. These 44 evidenced a lower mortality rate during the 20 years after the onset of their dyspnea than did the 84 who continued to smoke. The lungs of 125 persons who died after age 40 were graded for chronic bronchitis and the quantity of emphysema and black pigmentation. Emphysema and pigment were usually found in close proximity to each other. These three factors correlated well with each other and also with the cigarette smoking histories. The nature of the black pigment is unknown.

-- Authors' abst.

- 443 Pneumonomycosis. Aspergillina. F.J. Bassermann.
Beitr. Klin. Tuberk. 126, 155-176 (Feb. 1963). German.

A monograph of the deep mycosis known also as pulmonary aspergillosis is presented with case histories and illustrations. Some 13 species of the fungus were found to be pathogenic, among them Aspergillus glaucus, the pathogenicity of which had hitherto been doubtful. A primary form of pulmonary aspergillosis is not recognized, neither is it proven that antimicrobials and corticosteroids have an influence favorable to the development of the disorder. The role of the fungus as secondary invader of hollow spaces in the lung and the proposition that it may participate in provoking bronchiectasis should be considered as valid. -- Am. Rev. Resp. Dis. Absts.

- 444 Fungus Infection Complicating Leukemia. H.R. Schumacher, D.A. Ginne, and W.J. Warren. Am.J. Med. Sci. 247, 313 (March, 1964).

Medical records of 205 patients with leukemia admitted to Jefferson Medical College Hospital over a 5-year period were examined for evidence of fungus infection. Twenty-eight (13.7%) were found to have fungus disease. The most common fungus observed was Candida, which occurred in 25 (89.3%) patients with fungus disease. It was a major or contributory factor in the cause of death in 6 (24%) of the patients with moniliasis. There were 2 patients with aspergillosis; one patient with brain involvement, and one with liver and lung involvement. One patient with chronic lymphatic leukemia succumbed to cryptococcal meningitis. Eight patients received total body irradiation and the etiological significance of this was discussed. Multiple etiological factors were analyzed and antimetabolites, antibiotics, steroids, neutropenia, and the terminal condition of the patient seemed to be of varied importance. Antimetabolites seemed to be more important as an etiological agent in acute leukemia, while steroids seemed to play a more predominant role in the chronic leukemias.

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

SKIN DISEASES AND BURNS

- 445 Abnormal Reactions of Man to Light. T.B. Fitzpatrick, M.A. Pathak, I.A. Magnus, and W.L. Curwen. Annual Rev. Med. 14, 195-214 (1963).

A review is presented of the effects of ultraviolet and visible light on human tissues. A brief discussion is given of the biophysical characteristics of light and of the normal responses of human skin to light. Photosensitization by light alone or by light in conjunction with exogenous agents and metabolites is discussed. Abnormal conditions of the skin and various skin diseases related to exposure to sunlight are reviewed. There are 80 references.

-- Aerospace Med. Absts.

- 446 Respiratory Allergy Due to Chemical Compounds Encountered in the Rubber, Lacquer, Shellac, and Beauty Culture Industries. H.H. Gelfand.
J. Allergy 34, 374-381 (July-Aug. 1963).

This study on respiratory allergy, particularly bronchial asthma resulting from exposure of employees to certain chemical compounds, indicates the presence of a circulating type of antibody. Some of these employees also exhibited allergic skin manifestations suggesting that the delayed-contact type of antibody existed concomitantly with the wheal-type circulating antibody. The study included persons exposed to chemicals in the following occupations: rubber industry, beauty culture (both operators and customers), and the handling of lacquer and shellac. Twenty-two references are given.

-- Public Health Eng. Absts.

- 447 North American Loxoscelism. Necrotic Bite of the Brown Recluse Spider.
C.J. Dillaha, et al. J. Am. Med. Assn. 188, 33-36 (April 6, 1964).

North American loxoscelism caused by the bite of the Loxosceles reclusus, the brown recluse spider, can produce a gangrenous slough at the site of envenomation and a severe systemic reaction. In 16 cases the local reaction including pain, bleb formation, erythema, ecchymosis, necrosis ending in an eschar, and ulceration. The systemic reactions may include fever, nausea, malaise, hemolysis, and thrombocytopenia. Two deaths have been reported in small children. This spider is indigenous throughout the South Central US.

-- Authors' abst.

- 448 Mortality in 1,100 Consecutive Burns Treated at a Burns Unit. B.A. Pruitt, et al.
Ann. Surg. 159, 396 (March, 1964).

The mortality observed in 1,100 consecutive burn patients has been analyzed by probit method. The percentage of body surface burns resulting in death of 50% of patients with such burns was calculated for age groups 0-4, 0-14, 15-49, 50 and above, and found to be 42.8%, 48.5%, 55.8%, and 29% respectively. Comparison with reports for other institutions was made and agreement in mortality in similar populations noted. Shortcomings in method of probit analysis are discussed, as well as possible sources of variation between reported studies. A mortality contour curve is presented for use in predicting expected mortality in any burn patient subsequently encountered. The report notes that no significant change in burn mortality can be detected over the past 12 years, despite the use of newer antibiotics and other therapeutic "improvements."

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

- 449 Defense Mechanisms in Patients With Burns. P. Decoulx, et al.
Presse med. 72, 257 (Jan. 25, 1964).

Despite all the precautions and the use of antibiotics, infection is still a major cause of death in patients with burns. The author reports 324 bacteriological studies performed on 57 patients; a total of 532 different bacterial strains were isolated. This work was performed in trying to establish the failure of anti-infectious defenses in these patients with burns. The amount of properdin in the blood of patients with burns seemed to correspond perfectly with the patients' general condition. Most of the patients who at some time had properdin levels near zero, did not survive. It was a sign of beginning recovery when properdin increased to high levels. These results are interpreted as indicative of the possibility that the intestinal mucosa of the patients with burns permits the passage of the intestinal saprophytes or their toxins into the general body economy. The authors suggest that the use of fresh blood instead of conserved blood or plasma might be of greater therapeutic value because it supplies more properdin.

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

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- 450 Relationship of Infantile Atopic Dermatitis to Asthma and Other Respiratory Allergies.
J. Bono and P. Levitt. *Ann. Allergy* 22, 72 (Feb. 1964).

An infant with atopic dermatitis has a 2.2 times greater chance of developing a respiratory allergy in later life than an infant with no atopic dermatitis. Presented are results of a study of 439 children seen in a medical group clinic and followed for a period of 10 to 14 years. -- J. Am. Med. Assn. References & Reviews

- 451 The Changes Produced by Infra-Red Irradiation in Melanin Pigmentation of the Skin.
R.S. Snell. *Brit. J. Dermatol.* 75, 71-78 (Feb. 1963).

Guinea pigs were treated with infra-red irradiation of wave lengths between 15,000 and 100,000 A for 5 minutes daily, 5 days a week for 4 weeks. This produced an increase in the amount of free melanin in the epidermis with a reduction in the amount of melanin within the melanocytes of the basal layer. Melanocyte counts were significantly increased but not as much as after ultraviolet irradiation.

-- Aerospace Med. Absts.

CHEMICAL HAZARDS

- 452 Multi-Animal Test System for Measuring Effects of Irritant Gases and Vapors on Respiratory Function of Guinea Pigs. S.D. Murphy and C.E. Ulrich.
Am. Ind. Hyg. Assn. J. 25, 28-36 (Jan.-Feb. 1964).

Details of apparatus and a method for measuring respiratory rates, tidal volumes, and trans-thoracic respiratory flow resistance in intact, unanesthetized guinea pigs are described. The method employs previously reported principles of measurement, which have been modified to enable testing of several animals in a single experiment while the animals are breathing clean or contaminated air. Repeated tests can be made on the same animals, thereby making the procedure suitable for application to studies on animals that are chronically exposed to toxic vapors and gases. Respiratory values obtained with this multi-animal test system agree well with results reported by other investigators, both for normal animals and for animals breathing formaldehyde vapors. In addition to the results reported here for formaldehyde exposure, the method and apparatus have been used in studies of the pulmonary function effects of exposures to nitro-olefins, automobile exhausts, acrolein, ozone, and oxides of nitrogen. In all of these studies, alterations in pulmonary function were detected at concentrations much below levels required to produce gross symptoms of intoxication. -- Authors' summary

- 453 The Colorimetric Determination of Low Concentrations of Carbon Monoxide.
D.A. Levaggi and M. Feldstein. *Am. Ind. Hyg. Assn. J.* 25, 64-66 (Jan.-Feb. 1964).

Carbon monoxide in combustion effluents or in ambient atmosphere is reacted with an alkaline solution of the silver salt of para-sulfaminobenzoic acid. The absorbance of the resulting colloidal solution of silver is measured spectrophotometrically, and is proportional to the concentration of carbon monoxide in the sample. Concentrations of 5 to 1800 ppm can be measured with an accuracy of 95±5%. -- Authors' abstr.

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- 454 Diffusion Method of Determination of Urinary Fluoride: Recent Developments.
G.H. Farrah. *Am. Ind. Hyg. Assn. J.* 25, 55-58 (Jan.-Feb. 1964).

The determination of urinary fluoride, as an indication of fluoride exposure, has been greatly simplified by the microdiffusion-colorimetric technique. However, since certain difficulties have been reported in the use of the method, this discussion attempts to assess the relative value of the technique; to clarify several points in the previously published description of it; and to present changes that have been found to be of value.

-- Author's abst.

- 455 Relation of Atmospheric Contaminants and Ozone to Lightfastness. V.S. Salvin.
Am. Dyestuff Reprtr. 53, 33-41 (Jan. 1964).

The presence in the air of atmospheric contaminants introduces a new cause of chemical change which act simultaneously with light exposure or in the absence of light. The effect of atmospheric contaminants, oxides of nitrogen, sulfur dioxide, and ozone, in causing dye fading, is shown for various dyes on cotton, rayon, nylon, acetate, polyester, acrylics, and wool. In the determination of fastness of many dyes to sunlight, the variable of reaction with atmospheric contaminants is a factor. The fading can occur out of contact with direct sunlight. The fading of dyes with ozone takes place in rural areas such as used for sunlight testing stations. The fading of dyes in urban areas containing oxides of nitrogen, sulfur dioxide, and variable amounts of ozone is also established. The phenomena of ozone fading as an oxidative reaction is discussed, and analogies to mechanism of photochemical action on dyes suggested.

-- APCA Absts.

- 456 Hazards to Health: Salt Poisoning. M.E. Calvin, R. Knepper, and W.O. Robertson.
New Engl. J. Med. 270, 625-626 (March 19, 1964).

Confined to their crib and apparently given a box of table salt for entertainment, a set of fourteen-month-old twins consumed an unknown quantity of sodium chloride. Thirty-six hours later—in the absence of either vomiting or diarrhea—they were admitted to the hospital with hypernatremic dehydration. Only after admission, when serum sodium concentrations were determined (179 and 182 milliequiv. per liter) did these historical facts come to light. With parenteral fluid (water and electrolytes) administration recovery was reasonably prompt and seems to have been complete.

-- Authors' summary

- 457 Realistic Air Sampling of Beryllium Production Facilities.
H.M. Donaldson, R.A. Hiser, and C.W. Schwenzfeier.
Am. Ind. Hyg. Assn. J. 25, 69-76 (Jan.-Feb. 1964).

Monitoring of beryllium processing facilities, using both the HASL (Atomic Energy Commission, New York Operations Office, Health and Safety Laboratory) and the Aerotec II Cyclone which fractionate dust closely to the upper respiratory retention parameters of Brown and co-authors, shows that the respirable portion of air-borne beryllium dust may vary from a few per cent to over 90% depending on environment. In general, the higher total air-borne exposures show a smaller percentage of respirable dust. Based on the Kettering study on the fabrication of beryllium, it is obvious that the dust produced in lathing, milling, drilling, and other related machine shop operations is essentially non-respirable, which indicates that alteration to beryllium parts can be made in any uncontrolled machine shop and the respirable air levels generated will remain below the target level of 2.0 micrograms beryllium per cubic meter. In general, these data point out the fact that the apparently insurmountable engineering feat of controlling large beryllium production facilities to target level or below can be accomplished using good local exhaust ventilation and hooding techniques. Not only can a plant be controlled to target levels by this method, but this is being done in Ohio beryllium processing and fabrication facilities. There are 13 references.

-- Authors' conclusion

- 458 Ferrous Sulfate Poisoning. T.J. Covey. *J. Pediat.* 64, 218 (Feb. 1964).

The incidence, pathological aspects, and symptoms of acute severe iron poisoning are reviewed. Four cases are presented: the first terminated in death by acute hepatic failure; the second patient with severe first and second phase symptoms was treated successfully with peritoneal dialysis and edathamil calcium disodium (EDTA); and in the third and fourth patients recovery occurred after treatment by chelation and supportive measures. Four phases of reaction to acute ferrous sulfate poisoning are: hemorrhagic gastroenteritis occurring one-half to one hour or more after ingestion, delayed profound shock 20 to 48 hours after ingestion, liver injury and liver failure, and gastric obstruction occurring at an average of 4 weeks after poisoning. A fifth phase, not yet demonstrated, may be a theoretical phase of cirrhosis due to subfatal liver damage. A plan for management is formulated. It includes the use of EDTA and peritoneal dialysis.

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

- 459 The Significance of Urine Uranium Excretion Data.

M. Lippmann, L.D.Y. Ong, and W. B. Harris.

Am. Ind. Hyg. Assn. J. 25, 43-54 (Jan.-Feb. 1964).

Urine uranium excretion data for persons exposed to uranium by inhalation are analyzed. Data from both chronic and single massive exposures are included, and a generalized excretion pattern applicable to any uranium compound absorbed by inhalation, is proposed. Using this model, estimates can be made of previous exposure levels, future excretion values, and body burdens, based on appropriate urine data. It is shown that routine urine samples cannot be used to monitor individual exposures or to determine chronic exposure levels. However, suitably designed series of samples, collected after the termination of exposure, can provide useful estimates of exposure level and body burden.

-- Authors' abst.

- 460 The Pyrophoric Properties of Zirconium Metal. A Critique Based on a Survey of the Literature. R. P. Gleason and M. B. LeBoeuf.
J. Am. Soc. Safety Eng. 9, 15-20 (March, 1964).

The authors discuss the subject under the following headings: Introduction, General Hazards of Zirconium Powders, Influence of Particle Size, Factors in Ignition and Combustion of Zirconium Powder, Reaction of Zirconium Powders with Water, Presence of Alloying Materials on Zirconium Pyrophoricity, Safety Precautions in the Use of Zirconium Powders, Inert Gases and Exclusion of Oxygen, Presence of Water, Particle Size, Limitations of Amounts of Powder and Personnel Exposed, Zirconium Chips, Cuttings, Fines, and Turnings, Other Considerations and Conclusion. While the paper has been directed toward the pyrophoric properties and hazards of zirconium powders and scrap, there is much more to zirconium reactivity. Molten zirconium is extremely reactive. Zirconium and its alloys can react violently with acid solutions, and zirconium fires and explosions have occurred in the presence of, or in circumstances involving carbon tetrachloride, nitrogen, zirconium tetrachloride, magnesium chloride, and potassium bisulfate. The mechanism occurring in these reactions may not be known, but if the principles covered in this review — (1) importance of particle size and surface area, (2) nature of contact or mixture of zirconium with any oxidant, (3) the character and instability of the protective oxide layer, and (4) limitations of amounts and personnel exposures — are applied in any use or handling of zirconium, the unfavorable experience of the past may be averted whatever the future extent of use. Twenty-three references are listed.

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- 461 Importance and Uses of Lead. R.L. Ziegfield.
Arch. Environmental Health 8, 202-212 (Feb. 1964).

From the present paper it is obvious that the industrial significance of lead is immense and anything but simple. So likewise is its hygienic significance. Merely to know that a man works in a lead plant or even works with lead is no indication that he has sustained occupational exposure to lead. Because a child has been exposed to paint does not necessarily mean that it has been exposed to lead paint, anymore than exposure to a lead pencil means exposure to lead. It seems obvious that many people working with or exposed to lead may have no dangerous exposure, and it seems equally obvious that if the exposure is understood, it can be controlled. It is not the intention of the author to minimize the importance of effective hygiene in the lead industries. The Lead Industries Association has been fully cognizant of the problems ever since its organization in 1928, has made numerous monetary grants for medical research over the years, and has a health and safety director to cope with these problems. Their plea is for the continuation and extension of thorough investigation of the hygiene problem relative to lead, and the broad dissemination of sound information among all who have reason to be concerned. -- Author's conclusion

- 462 Natural Occurrence of Lead. R.T.P. deTreville.
Arch. Environmental Health 8, 212-221 (Feb. 1964). Reprints Available From
Industrial Hygiene Foundation Upon Request.

In the tables and discussion of this paper it has been shown that there is a low but measurable concentration of lead in soil, water, and food, insofar as these have been examined in widely separated and different areas and communities, from primitive to urban. The average concentration of lead in soil is approximately 16 ppm, garden soils ranging up to 360 ppm, and certain anomalous soils, near natural or artificial sources of lead, containing still higher concentrations up to 10,000 ppm. The average concentration of lead in public water supplies in the United States is about 0.01 ppm, approximately one fifth of the present standard of the United States Public Health Service for potable water. In general, the natural lead content of vegetation, including the edible portions (leaves, fruit, and roots), in the fresh state, is of the order of a few hundredths of a part per million, there being certain notable exceptions in items in which, for some reason related to the physiology of the plant, lead has been concentrated. The flesh of animals and especially certain organs of animals (e.g., the liver), tends to have significantly higher concentrations of lead than does food of vegetable origin, while the skeletal tissues, some of which are used for food (e.g., bone meal), are still higher in their lead content. Somewhat in line with these facts, the natural lead content of the edible tissues of shellfish and crustacea is high. A wide variety of factors result in the contamination of many articles of human food with lead in amounts which vary in significance from negligible to highly significant. On the basis of presently available data, the concentration of lead in the ambient air of cities in the United States may be judged to be of the average of 1 microgram to 5 micrograms per cubic meter, with due regard to geographic, topographic, industrial, commercial, and temporal variables that apply. There are 43 references.

-- Author's summary

- 463 Industrial Hygiene and Medical Control Procedures. Manufacture and Handling of Organic Lead Compounds. A.J. Fleming.
Arch. Environmental Health 8, 266-270 (Feb. 1964).

It has become axiomatic in industry that any chemical, no matter how toxic, can be manufactured or used safely providing prior knowledge of its toxicity and mode of action are available so that procedures and regulations for its safe handling can be devised, and applied faithfully. Suitable regulations must also apply to the users of such compounds, and in the case of tetraethyllead and more recently tetramethyllead, the manufacturers accepted the responsibility of seeing that users of these products

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were instructed and guided in safe handling. Over the years, the safety precautions established and the control measures followed have been very successful in promoting the safe handling of tetraethyllead, and the same measures should be equally effective in the handling of tetramethyllead. In essence, the control of the health of employees working with such compounds as these is based on sound clinical medicine, proper industrial hygiene, including, when necessary, the use of adequate analytical procedures for following the extent of the absorption of lead by persons subjected to occupational exposure. As in the case of any other measurement in the laboratory, it is first essential to know what is normal and what is abnormal for the test being performed. The procedures outlined in this paper have been remarkably successful over the years in promoting the safe handling of tetraethyllead and associated compounds, both in their manufacture and in their introduction into gasoline.

- 464 Tetraethyllead Intoxication. L. W. Sanders, Sr.
Arch. Environmental Health 8, 270-277 (Feb. 1964).

The signs and symptoms of tetraethyllead intoxication are not specific or definitive enough to allow for a reasonably certain diagnosis without a sound history of adequate exposure or valid evidence of the absorption of dangerous quantities of this compound of lead. The results of determination of the concentration of lead in the urine (and in the blood) are never available immediately, and frequently are available only in a matter of days. Therefore, a thorough knowledge of the possibilities of exposure becomes of the utmost importance in establishing a diagnosis. It must be emphasized and re-emphasized that tetraethyllead intoxication exhibits itself as purely a psychotic state, for this is the pattern which invariably is seen, and yet is hardly ever identified by physicians who have not had prior experience with it. Whatever other physiologic disturbances may be concurrent with this psychotic disturbance are so masked as not to be in evidence.

- 465 Tetraethyllead and Tetramethyllead. Comparative Experimental Pathology : I. Lead Absorption and Pathology. G. W. H. Schepers.
Arch. Environmental Health 8, 277-295 (Feb. 1964).

Tetraethyllead and tetramethyllead suspended in peanut oil were administered by intragastric intubation to groups of Charles River cesarean-derived albino rats of both sexes. The maximal amounts administered equalled the approximate lethal dose of each compound and also included one tenth, one hundredth, and one thousandth of this dosage. In terms of their lead content, the dosages of tetramethyllead were about 7.6 times greater than those of tetraethyllead. The approximate lethal dose and the one-tenth fraction of this dose of each compound were administered once to individual rats in the respective groups. The smaller dosages were administered successively 100 times, so that their cumulative amounts equalled the doses administered singly. A proportion of the rats, to which the maximum single doses had been given, died. All others survived 21 weeks and were then killed for study. Tissues recovered at necropsy were subjected to histologic appraisal and spectrographic analysis. Both tetraethyllead and tetramethyllead caused significant lesions in various organs, a type of selective distribution of lead in tissues, and specific shifts in the mineral composition of various tissues. The latter will be dealt with in a succeeding paper.

-- Author's summary

- 466 Analytical Methods for Determination of Lead. J. Cholak.
Arch. Environmental Health 8, 222-231 (Feb. 1964).

The selection of an analytical method for lead will depend upon the equipment available, the training and personal preferences of the investigator, and, of course, the nature of the problem. Almost any of the foregoing procedures, whether chemical or instrumental, can be used directly or can be revised and modified to yield reliable results. The attainment of the latter, however, is possible only when the investigator has an intimate knowledge of all the problems and difficulties associated with this type

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of investigative work. Long experience has revealed situations in which trouble may occur. Many of these have been described in the literature, but the investigator must always be alert for new and unexpected sources. An additional condition appears to be necessary for carrying out reliable lead analysis. This condition deals with the continued daily use of a procedure and the proficiency of the analyst. The constant application of a method by proficient technicians under competent and knowledgeable supervision will be found, as a rule, to yield findings which are more reliable than those obtained in laboratories in which samples are submitted sporadically, requiring, perhaps, the preparation of fresh solutions and the setting up of the equipment or the assigning of different technicians, depending on their availability, each time samples are submitted. Under the latter conditions, it is far better practice to send the samples to a laboratory in which such work is being done regularly and with all the necessary precautions against chance errors. There are 20 references. -- Author's conclusions

- 467 Normal Metabolism of Lead. R.A. Kehoe.
Arch. Environmental Health 8, 232-235 (Feb. 1964).

Lead occurs naturally in virtually all foods and beverages, and their natural content is augmented somewhat by a large number of mainly small increments from a variety of sources. The "average" or "normal" (in the sense of usual) adult takes in quantities of lead in the composite bulk of his food and beverages, which vary commonly (98% of the time) from somewhat less than 0.1 mg. to somewhat less than 0.6 mg. and range occasionally, as the result of an unusual degree of contamination of one or more specific items, up to several milligrams per day. Individuals within the normal population vary in their dietary intake of lead, according to their size and appetite (quantity of food consumed), their habits (including their selections) of eating and drinking (qualitative composition of diet), and with a variety of other local or general factors. On the whole the degree of such variability is limited, in the quantitative sense, because of the generally low levels of concentration of lead that occur naturally in foodstuffs, and because of the increasing care and cleanliness which characterize the handling, processing, packaging, and final preparation (cooking and serving) of food in the United States. The mean quantity of lead ingested regularly by 10 healthy adults (experimental subjects) in their food and beverages, over periods of time extending beyond 2 years, ranged from the low value of 0.12 mg. to the high of 0.35 mg. of lead per day; 5 of the 10 subjects varied, in this respect, only between 0.21 and 0.25 mg. of lead per day. Certain normal, healthy individuals engaged in hard work have been found to consume sufficiently large quantities of food to elevate their mean intake of lead above 0.4 mg. per day. Available evidence provides little reason for believing that there is a progressive increase in the lead content of the human body with age under strictly "normal" environmental conditions.

- 468 Metabolism of Lead Under Abnormal Conditions. R.A. Kehoe.
Arch. Environmental Health 8, 235-243 (Feb. 1964).

The experimental observations summarized in the present article have been concerned with the retention of lead in the bodies of experimental subjects, and with the release of such lead following the termination of the experimental administration of lead, as determined indirectly by the differences between the intake and the output of lead as measured. Direct observations have been made, as opportunity has been afforded at necropsy, to obtain the tissues of persons whose exposure to lead during life, had varied in duration, in the actual time during life, and in severity. The most informative data have come from the analysis of the tissues of fatally poisoned children, since these fatalities, as a rule have resulted from the direct effects of lead intoxication uncomplicated by chronic disease. Several facts have emerged from such data: The clinical severity of the intoxication in these cases has varied not so much with the body burden (total quantity of lead in the body) of the deceased, as with the general level of the concentration of lead in the soft tissues, the latter being related to the immediate age and the speed of its absorption. The concentration of lead in the brain in lead encephalopathy

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may range from 0.2 to 0.6 mg. per 100 g. and if it is found to be much below this general level, doubt should be entertained as to the relationship of lead to the fatality, and the etiology of the latter should be investigated further. The concentration of lead in the skeleton of the child or adult, in fatal lead intoxication, may be increased 20-to-30-fold, and, as the direct result of the recent absorption of abnormal quantities of lead, the concentration of lead in the flat bone is found to be much higher than that in the long bone, this being directly opposite to the relationship that obtains after a prolonged period of freedom from abnormal exposure, or under the usual or "normal" environmental condition.

- 469 Epidemiology of Disease Associated With Lead. T.D. Sterling.
Arch. Environmental Health 8, 333-348 (Feb. 1964).

Epidemiological methods, and criteria for proof of association furnished by them, have been examined for use in investigations as to the effects of environmental lead on exposed populations. A number of topics have been covered. These have included observations on the relationships of lead in the environment and in the body, on the relation of lead in the urine and blood to lead intoxication, on the relation of the cumulative absorption of lead to diseases other than lead intoxication, and on the effects of prolonged exposure to low levels of dosage of lead.

-- Author's summary

- 470 Clinical Inorganic Lead Intoxication. R. T. Johnstone.
Arch. Environmental Health 8, 250-255 (Feb. 1964).

The purpose of this paper is to cite certain misconceptions regarding lead intoxication not ordinarily emphasized in the medical literature, especially the literature read by most physicians. It is hoped that it is evident that the physician should differentiate between lead absorption and lead intoxication; that no diagnosis should rest on laboratory tests alone; that the laboratory can be a source of an incorrect diagnosis; that the interpretation of laboratory results should be made by a physician, not a nurse or layman; and finally that the problem of control requires supervision by a physician knowledgeable in this area of occupational health.

-- Author's summary

- 471 Pediatric Lead Poisoning. H. D. Smith.
Arch. Environmental Health 8, 256-261 (Feb. 1964).

Lead poisoning is a treacherous disease because in early childhood its clinical manifestations are commonplace and not specific for plumbism. The intoxication develops gradually, requiring persistent ingestion of lead-containing substances usually over a period of at least 3 months. Then, chiefly during the hot summer months, acute manifestations may develop indicating involvement of the central nervous, gastrointestinal, or hematologic systems. For early recognition of the disease, a high index of suspicion and judicious use of four laboratory tests—blood examination for anemia and erythrocytic stippling, roentgenograms of the long bones for "lead lines," plain x-rays of the abdomen, looking for radiopaque flecks within the intestines, and a urinalysis especially checking for coproporphyrinuria—are essential. If any two of these four tests yield positive evidence, a tentative diagnosis of plumbism should be made, blood should be obtained for a precise analysis of lead, and the possibility of encephalopathy ruled in or out. The search for cases of saturnism should be chiefly among 15-to-36-month-old children residing in the older, more impoverished areas of the city, where the interior walls and ceilings of the houses, having in the past been repeatedly painted, are now in poor repair. Patients once treated must be watched closely for recurrences, and siblings of children with lead poisoning ought to be carefully checked for the disease. Treatment, which regrettably does not prevent either a fatality rate of 25% if encephalopathy is present, or a high incidence of neurologic and behavioral sequelae, includes the

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termination of the exposure to lead, hastening removal of lead from the body through the use of edetate and dimercaprol, symptomatic therapy for encephalopathy, and the prevention of re-exposure to lead. Having stressed when to suspect pediatric lead poisoning, how to diagnose it, and how to treat it, the author should like to conclude by stating that, being entirely a man-made disease, it should be totally preventable! There are 19 references. -- Author's summary

- 472 Problems in Recognition of Lead Intoxication. M.R. Zavon.
Arch. Environmental Health 8, 262-265 (Feb. 1964).

In this discussion the author has surveyed the scene and attempted to highlight some of the difficulties which might be encountered in the diagnosis of lead intoxication. It should by now be obvious that lead intoxication is not a vague clinical entity with all sorts of odd manifestations. The clinical pattern of the disease tends to vary little from the description in this paper. The development of bizarre illness in a person exposed to lead should not automatically result in a diagnosis of lead intoxication. A history of exposure to lead should not result in the abandonment of all that is known of the proper way to arrive at a medical diagnosis. On the other hand, lead intoxication as a diagnosis should not be missed solely because of the failure to consider it as a possibility. -- Author's summary

- 473 Respiratory Response of Guinea Pigs During Acrolein Inhalation and Its Modification by Drugs. S.D. Murphy, D.A. Klingshirn, and C.E. Ulrich.
J. Pharmacol. Exptl. Therap. 141, 79-83 (July, 1963).

The respiratory response of guinea pigs inhaling low concentrations of acrolein was characterized by an increase in total respiratory-flow resistance, a decrease in respiratory rates, and an increase in tidal volumes. The magnitude of these effects increased with increasing acrolein concentrations studied, up to 1 ppm. The changes in respiratory function were reversible when the animals were returned to clean air. Atropine, aminophylline, isoproterenol and epinephrine partially or completely reversed the acrolein-induced increase in respiratory resistance, whereas tripelennamine and pyrilamine had no effect. The mechanism of increased resistance during acrolein-inhalation appears to be one of bronchoconstriction mediated through reflex cholinergic stimulation. -- Public Health Eng. Absts.

INDUSTRIAL DUSTS

- 474 A Point-to-Plane Electrostatic Precipitator for Particle Size Sampling.
P.E. Marrow and T.T. Mercer.
Am. Ind. Hyg. Assn. J. 25, 8-14 (Jan.-Feb. 1964).

A point-to-plane electrostatic precipitator of simple design is described. It was developed as a particle size sampling instrument for use with the electron microscope. The standard operating conditions as well as special design and technical points are described and illustrated. Tests of the instrument have been made using the thermal precipitator as a standard. These comparisons have indicated no important limitation of the point-to-plane precipitator as a particle size sampler. Other advantages and disadvantages of the instrument based on the authors' experience are given. Most of these points are documented by photographs. None of the negative qualities of the sampler appear general or restrictive. Conversely, there are specific attributes which make the point-to-plane electrostatic precipitator a valuable, if not indispensable, tool in aerosol studies. -- Authors' abst.

03121464

- 475 Use of Interference Microscopy for the Mineralogical Analysis of Samples of Airborne Dust Obtained With the Thermal Precipitator. J. Dodgson. Nature 199, 245-247 (July 20, 1963).

This technique, which was not previously applied to mineralogical analysis, was used to reliably identify the chemical composition of individual coal dust particles in the size range 1-20 microns. Dispersion staining is employed in conjunction with a double-beam interferometer mounted in the microscope to produce colored images in white light. The colors may be varied by orientation of a goniometer analyzer in the transmitted beam. Data are presented for analysis of samples for quartz, kaolinite, and muscovite content. Quartz, for example, can be viewed as pale or light blue to dark red; the color depends on the analyzer setting and associated positive or negative phase contrast, respectively. The method does not depend on diffraction by the object and is thus free of "halo" effects. It also permits rapid shift of positive and negative phase contrast and variation of intensity of interference colors in each position. The composition of samples analyzed for quartz, muscovite, and kaolinite by this method were in reasonably good agreement with results obtained by chemical and x-ray diffraction analyses. -- Public Health Eng. Absts.

- 476 Measurement of the Flue Gas Solids Burden From Oil-Fired Installations Using a Silica Wool Filter. L.K. Rendle. J. Inst. Fuel 37, 25-30 (Jan. 1964).

A method is described for the routine determination of solids burden in flue gases from full-scale oil-fired installations in the field and from pilot scale rigs in the laboratory. The method is used when no particle size distribution is required, and is capable of giving reliable results over the whole range of operating conditions. A silica wool filter is used, as such a filter does not alter in weight as a result of possible reaction with sulfur trioxide and accurately measures the smaller amount of solid material in the flue gases from an oil-fired plant as opposed to flue gases from a coal-fired plant. The apparatus is for use in the field. -- APCA Absts.

- 477 A New Method for the Relative Calibration of a Small Particle Counter. J.E. Quon. Am. Ind. Hyg. Assn. J. 25, 15-24 (Jan.-Feb. 1964).

A method is presented for the calibration of a photoelectric nuclei counter suitable for measuring concentrations of combustion nuclei in the range of 10^3 to 10^5 /cm.³. The relative calibration of the counter was obtained by developing the relationship between instrument response and known relative concentrations of nuclei. The calibration can be obtained in less than 10 minutes with good reproducibility. A high concentration of nuclei was produced by a propene or methane diffusion flame. Known relative concentrations were obtained by controlled dilution of the chamber nuclei concentration. -- Author's abst.

- 478 New Developments in Phase and Dispersion Staining Microscopy for the Examination of Dust Samples. G.C. Crossmon. Am. Ind. Hyg. Assn. J. 25, 25-27 (Jan.-Feb. 1964).

This paper is a report of some new improvements in the use of the phase and dark-field microscopes for the counting, particle size determination and identification of dusts. Also included is a macroscopic method of dispersion staining that does not require the use of a microscope. -- Author's abst.

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- 479 The Effect of Dust Particle Orientation on Particle Size Determined by Microscopic Techniques. M. Corn.
Am. Ind. Hyg. Assn. J. 25, 1-7 (Jan.-Feb. 1964).

Narrow forward angle transmission of a monochromatic light beam through an aqueous suspension of dust particles during and after settling was used to obtain particle projected area. Measurements were alternately made in two mutually perpendicular directions; i.e., horizontal and vertical. Random orientation was characterized by equal particle projected areas in these two directions. Narrow size range samples of suspensions of quartz, bituminous coal, anthracite coal and diamond were evaluated. The apparatus is briefly described and results are discussed in terms of commonly employed particle sizing procedures.

-- Author's abst.

- 480 Principles and Applications of Electrostatic Precipitation. K. R. Parker.
Chem. and Process. Eng. 44, 505-511 (Sept. 1963).

The basic principles of electrostatic precipitation and importance of various precipitator components are discussed. The formula relating efficiency to migration velocity of particles is assessed with particular reference to practical design. Problems associated with the collection of electric arc furnace fume are surveyed and a description of a complete wet precipitator plant and equipment suitable for the collection and cleaning of arc furnace fume is given. Similar wet plants treating submicron fume from blast furnace installations have been built and are operating with efficiencies up to 99.9%.

-- APCA Absts.

- 481 Byssinosis: Differential Diagnosis from Bronchial Asthma and Chronic Bronchitis.
H. Arnoldsson, A. Bouhuys, and S. E. Lindell. Acta Med. Scand. 173, 761-768 (June, 1963).

Byssinosis is a disease entity affecting some groups of cotton, flax, and hemp workers. The main symptoms are dyspnea and cough with clinical signs resembling those of bronchial asthma or chronic bronchitis. In the early stages of the disease these symptoms occur only on the first working day after a week end or a holiday. Three cases are reported in which byssinosis was diagnosed in cotton mill workers who worked in the department where raw cotton is spun into a crude thick lint before being transferred to the spinning machines. Lung ventilation measurements change in the course of the day's work. The presence in cotton dust of a histamine-releasing substance could explain the bronchoconstrictive symptoms of byssinosis.

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

- 482 Respiratory Disease in Southern West Virginia Coal Miners.
R. E. Hyatt, A. D. Kistin, and T. K. Mahan. Am. Rev. Resp. Dis. 89, 387-401 (March, 1964).

A random sample was studied of bituminous coal miners and ex-miners, 45 to 58 years old, in a geographic unit in southern West Virginia stratified according to the years they worked underground. The prevalence of pneumoconiosis was 46%; of progressive massive fibrosis 7%. The severity of pneumoconiosis was related to the number of years the men worked underground. There was no relation of pneumoconiosis to years they worked at the coal face in contrast to the total years of underground work; and pneumoconiosis, including progressive massive fibrosis, occurred among underground workers who had never worked at the coal face. There was a tendency to impairment of pulmonary function with category 3 simple pneumoconiosis and with progressive massive fibrosis, although there were exceptions. The number of symptoms and the prevalence of individual symptoms were unrelated to categories of pneumoconiosis. The number of symptoms and the presence of any symptom were related to impairment of pulmonary function. It may be possible to establish categories of symptom complexes which predict pulmonary function. It is possible that miners develop symptoms during the first year of underground work and that these symptoms then persist. There was a relationship between years worked underground and impairment of pulmonary function which could not be explained by age, smoking, or category of pneumoconiosis. There are 37 references.

-- Authors' summary

- 483 Particle Deposition by Diffusion in the Lower Lung: Application of Dimensional Analysis. S.K. Friedlander. *Am. Ind. Hyg. Assn. J.* 25, 37-42 (Jan.-Feb. 1964).

Using dimensional analysis, an expression is derived for the dependence of the particle removal efficiency of the lower lung on the particle diffusion coefficient, the time per breath and parameters related to the structure of the lung. The analysis is limited to particles smaller than a few tenths of a micron in diameter, for which diffusion is the controlling mechanism of removal. It is not necessary to assume a special model for the structure of the lung. The analysis can be used to correlate and extrapolate experimental data; it can also be used to predict the size of the largest particle which is (almost) completely removed in the respiratory region.

-- Author's abst.

- 484 Asbestos Exposure and Neoplasia. I.J. Selikoff, J. Churg, and E.C. Hammond. *J. Am. Med. Assn.* 188, 22-26 (April 6, 1964).

Building trades insulation workers have relatively light, intermittent, exposure to asbestos. Of 632 insulation workers, who entered the trade before 1943 and were traced through 1962, 45 died of cancer of the lung or pleura, whereas only 6.6 such deaths were expected. Three of the pleural tumors were mesotheliomas; there was also one peritoneal mesothelioma. Four mesotheliomas in a total of 255 deaths is an exceedingly high incidence for such a rare tumor. In addition, an unexpectedly large number of men died of cancer of the stomach, colon, or rectum (29 compared with 9.4 expected). Other cancers were not increased; 20.5 were expected, 21 occurred. Twelve men died of asbestosis.

-- Authors' abst.

PHYSICAL ASPECTS OF THE ENVIRONMENT

- 485 Chronic Skeletal Changes in Divers. P.C. Alnor. *Bruns Beitr. Klin. Chir.* 207, 475 (Dec. 1963).

Based on follow-up examination of 131 divers, new ideas about the origin and development of chronic injuries of the skeletal system were gained. Among the 131 divers, there were 72 pathological findings in the skeleton which in 15 of them were monostotic, and in 57 polyostotic. The head of the humerus was the most prominent site of lesion, whereas in caisson workers the head of the femur is most frequently involved. In a group of 65 divers, who were followed up for more than a decade, 43 had skeletal changes. Of these, 26 had no symptoms. Of the 17 who had complaints, 7 were without loss of function, 3 had a loss of function, and 7 were incapable to work in their occupation. The role that diver's accidents play in the development of skeletal changes is discussed. The rare occurrence of spontaneous bends resulted in skeletal injuries in more than half of the cases. It is concluded that typical skeletal changes may develop at any time, even a long time after the diver stopped working, and also, when he had never experienced accidents or bends.

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

- 486 Treatment of Severe Decompression Sickness in Aviators. P. Cannon and T.R. Gould. *Brit. Med. J.* 1, 278 (Feb. 1, 1964).

Four cases of the post-decompression collapse syndrome are described in aviators who have been exposed to a simulated altitude of 37,000 ft. (11,277 m.) in a decompression chamber. The factors which predispose to the development of this

condition are discussed. In all four aviators, compression to pressures greater than atmospheric produced immediate relief and theories of the etiology of post-decompression collapse are discussed in relation to this effect. The success of compression in these four cases and in two treated elsewhere by this method suggests that this form of treatment should be generally adopted for these cases, and a scheme of treatment is outlined. -- J. Am. Med. Assn. References & Reviews

- 487 Effects of High Environmental Temperature on Sweating and Skin Resistance. R.C. Wilcott. *J. Comp. and Physiol. Psychol.* 56, 778-782 (Aug. 1963).

Contrary to observations of Kuno and Neuman results of this study show that, while rise in environmental temperature has greater effects on chest sweating and resistance basal levels than at the palm, effects at the palm are of considerable magnitude. Both areas show thermoregulatory sweating. Because of the complex anatomical structures in the hand, cooling of the hand by thermoregulatory sweating would be expected to be nearly as important as cooling of other body areas. In addition, contrary to Kuno's results, stimuli administered prior to elevation of room temperature evoked increased sweating and reduced skin resistance at both palm and chest, indicating that with some subjects arousal sweating can occur in both areas at normal room temperature. -- Aerospace Med. Absts.

- 488 Response to Cold of Eskimos of the Eastern Canadian Arctic. G.M. Brown, et al. *J. Appl. Physiol.* 18, 970-974 (Sept. 1963).

Skin, muscle, and rectal temperatures and oxygen consumption of Eskimos and Caucasians were compared during an acute cold exposure involving immersion of one hand and forearm in a 5° C. (41° F.) water bath. The Eskimos consumed less oxygen, maintained their rectal temperatures at a higher level, and gave up less heat from the muscles of the limbs. Though the Eskimos had significantly more adipose tissue, average skin temperatures were the same in the two groups. The pattern of temperatures noted now and the previously observed higher blood flow in the hand and forearm of Eskimos point to increased cooling of arterial blood by returning venous blood in the extremities with resultant preservation of heat in the body core. -- Aerospace Med. Absts.

- 489 Effect of Ultrasound on the Brain of Rabbits: A Histological Study. J. Jankowiak, C. Majewski, and E. Kubiak. *Am. J. Phys. Med.* 42, 109-112 (June, 1963).

The brains of two groups of rabbits were irradiated with ultrasound at a frequency of 1 megacycle for 5 treatments on alternate days with a power of either 2 watts per sq. cm. for 10 minutes, or 4 watts per sq. cm. for 5 minutes. Macroscopic examination showed only intense passive cerebral hyperemia. Histologic examination revealed small foci of cortical demyelination on the ninth day following cessation of treatment. Necrotic foci occurred on the twelfth day, and white areas of softening with cavities filled with necrotic masses were found on the fourteenth day, both in the cortex and in the underlying white matter. -- Aerospace Med. Absts.

- 490 Some Effects of Ultrasonic Radiation on Normal Tissues. J.W. Cowden and M. R. Abell. *Experimental and Molecular Pathol.* 2, 367-383 (Aug. 1963).

Lesions could be produced in many different tissues with ultrasonic irradiation at intensities varying from 1 to 3 watts per square centimeter for periods of 1 to 15 minutes. The higher the intensity and the longer the duration of treatment, the more severe were the lesions. Focused ultrasound waves of 37.5 total watts for 5 to 15 minutes produced localized areas of necrosis in liver. Other histologic lesions produced by various intensities and durations of treatment included necrosis, inflammation and edema of skin, subcutaneum, and muscle; degeneration, necrosis,

and giant cell reaction in testis; necrosis, ulcers, inflammation, and hemorrhage in the intestines; and necrosis of bone and hyaline droplet change in renal tubular epithelium. Cavitation, probably due to the accumulation of bubbles of gas, was not observed in livers or other tissues of living animals that were treated. The change was produced in the livers of animals treated *in situ* after death and in livers removed from the body and treated. There are 45 references.

-- Aerospace Med. Absts.

- 491 Hearing Protection in Industry — One Way to Solve the Noise Problem Immediately.
R. B. Maas. J. Am. Soc. Safety Eng. 9, 21-26 (April, 1964).

The injurious effect of excessive noise on the industrial worker in this country has been a growing problem for the past 10 or 15 years. It is known that prolonged exposure to hazardous noise can destroy man's hearing unless preventive measures are taken. Recent additions to state safety rules and orders in both Wisconsin and California make the wearing of hearing protection mandatory under certain conditions. The logical time to acquaint a new worker with hearing protection is at the very beginning when he is also briefed on the physical examination, group health insurances, first-aid facilities, safety glasses, respirators, etc. It is explained that management provides this equipment for his protection and welfare. Hearing protection is much more successful if the nurse or doctor explains the purpose for wearing ear protection and fits the worker properly. The nurse handles this type of protection the same way she promotes other safety and health measures. Like any other aspect of safety and health maintenance, the hearing conservation effort must have unqualified management direction. Management has much to offer the worker in providing hearing protection to its workers because no one gains more than the individual who protects his precious hearing ability from noise until retirement. The safety engineer should soon learn that the problems involved in the promotion of wearing this type of protection is probably no different than the difficulties encountered in the promotion of all other safety devices and equipment. Most protective equipment requires long-range, educational emphasis. There are 16 references.

- 492 Weather and Cough. R. G. Loudon. Am. Rev. Resp. Dis. 89, 352-359 (March, 1964).

Variation in the frequency with which antitussive prescriptions are written has been related to weather over a 2-year period in the city of Dallas, Texas. Nine meteorologic measurements were selected and multivariate statistical analysis was applied, using monthly means to seek broad relationships. A simple correlation matrix shows high correlations between antitussive prescription frequencies in the two hospitals studied, and between them and mortality in Dallas from respiratory diseases other than tuberculosis and cancer. Several of the weather variables, particularly temperature, correlate well with all three. Multiple linear regression equations were obtained to express the prescription frequencies and respiratory mortality in terms of the weather variables. Good fits were obtained; when a one-month time lag was introduced, the "fits" were less good. As the weather variables are interrelated, factor analysis was conducted on the correlation matrix. Three independent factors were extracted; together they account for 83% of the common variance of the correlation matrix. Factor I, the most important, correlates best with temperature, sunshine, and (negatively) north wind; it may be called the "good weather factor." Factor II is a humidity factor, most closely associated with relative humidity and total precipitation, and related negatively to antitussive prescription frequency and respiratory mortality. Factor III, remaining when the effects of Factors I and II have been removed, is a barometric pressure factor, unrelated to prescription frequency or respiratory mortality. -- Author's summary

- 493 Electromagnetism and its Effect on the Organism. G.H. Mickey.
N.Y. State J. Med. 63, 1935-1942 (July 1, 1963).

The exploration of space presents many problems other than the logistics of fuel, food, and atmosphere. Earthly organisms have evolved in and beneath a protective atmosphere and magnetic shield. When man soars beyond the layers of this atmospheric blanket and magnetic shield, he must devise artificial means of protecting himself against such factors as meteorite encounters, weightlessness, lack of oxygen, and excess carbon dioxide and especially against the various electromagnetic radiations and high-energy particles of space. -- Aerospace Med. Absts.

RADIOACTIVITY AND X-RADIATION

- 494 Progressive Thorium Dioxide Myelopathy. G.L. Maltby.
New Engl. J. Med. 270, 490 (March 5, 1964).

Four cases of progressive thorotrast myelopathy are reported. The x-rays are included and the literature about thorotrast complications is reviewed. The opportunity to personally follow these 4 cases of progressive myelopathy to paralysis and in one instance to death after the use in the early 1940's of thorotrast for myelography has stimulated this report. Having watched in 3 of the patients the development of painful progressive paralysis of the lower extremities, plus loss of bladder and bowel control, made the author feel that perhaps a word of warning was in order in this era of the almost unlimited use of contrast media for neurological diagnoses.

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

- 495 Radiochemical Determination of Americium in the Presence of Plutonium in Urine.
D.L. Bokowski. Am. Ind. Hyg. Assn. J. 25, 59-63 (Jan.-Feb. 1964).

The procedure is based on the coprecipitation of americium with bismuth phosphate from a urine sample after digestion with nitric acid. The bismuth phosphate is wet-ashed, dissolved in 6N HCl and the americium coprecipitated with lanthanum fluoride. The lanthanum fluoride is metathesized to the hydroxide and the precipitate dissolved in 2N nitric acid. Removal of concurrently metabolized plutonium is accomplished by liquid-liquid extraction of the nitric acid solution with 0.1 M di (2-ethyl-hexyl) phosphoric acid (D2EHPA) in chloroform. The purified americium is carried on lanthanum fluoride. The precipitate is slurred onto a stainless steel planchet and counted in a low-background proportional alpha counter. The method is effective for quantitative separation from plutonium and uranium. Quantities of the order of 0.5 dpm of americium can be detected in a urine sample.

-- Author's abst.

- 496 Accidental Personnel Exposure to Elemental S-35. A.R. Maass, et al.
Health Physics 9, 731-740 (July, 1963).

While an organic chemist was attempting to open a glass ampule containing 1.27 c of elemental S-35 dissolved in 15 ml. of benzene, the vial exploded, and the operator was contaminated internally and externally with the radioactive material. It is extremely difficult to measure the effectiveness of therapy employed to encourage the removal of absorbed radioactivity, or to assess with assurance the validity of the authors' estimation of total body radioactive burden. By dilution of the absorbed radioactive material, however, with non-radioactive sulfur in several of its many utilized forms and the administration of agents that seem likely to increase the rate

of excretion of S-35, the major load of detectable S-35 was cleared from the body within 5 days. The biological half-life of plasma radioactivity was about 19 hours. Approximately 85% of the urinary and 90% of the fecal radioactivity were excreted within 24 hours of the accident. This is in agreement with the classical concept that only a small portion of sulfur introduced in a non-organic form is retained by the body. The observations in this unusual case are discussed in the light of available literature on S-35. The body burden was estimated to have been 13-26 microcuries. There is ample evidence in the literature to suggest that these quantities of radioactive sulfur are unlikely to cause any radiation damage and, indeed, no adverse effects have been noted during the 3 years since exposure. There are 30 references.

-- Public Health Eng. Absts.

- 497 The Radiation Field Inside Space Vehicles. H. J. Schaefer.
Aerospace Med. 35, 104-110 (Feb. 1964).

The dosage distribution within a closed vessel in proton radiation fields in space is highly structured because the spatial distribution of shielding material about a point in the vessel varies with location. In addition to vehicle frame and equipment, the body of the astronaut itself is part of the total shielding matter. The question arises as to what degree stationary radiation sensors measuring the distribution of air dose in the ship would allow inferences on the tissue dose in the astronaut's body. For three typical space radiation proton spectra, the distribution of air dose is analyzed computationally for a spherical shell of uniform wall thickness and for a conical vehicle carrying a heavy heat shield at the base. The results indicate that, even for the completely symmetrical spherical vessel, the air dose varies considerably at different radial locations due to the influence of shield geometry. For the ordinary cosmic ray beam, the local air dose is higher in regions where the effective shielding is heavier, contrary to flare produced and Van Allen Belt protons which show no build-up phenomenon. For the conical vehicle, the computational analysis is extended to the dosage distribution within a spherical tissue phantom of 30 cm. diameter assumed in two locations, in the nose tip and close to the heat-shield. The results show that the depth dose distribution in the phantom differs greatly with regard to absolute level as well as to radial symmetry at the two locations. The corresponding air doses do not furnish any clues as to these differences. Specifically, greatly different tissue doses in the phantom can be found at locations at which the same air dose is measured. It is concluded that accurate determination of the radiation exposure of the astronaut requires radiation monitors to be worn on the body. This seems all the more a logical solution since personal monitoring would be needed anyhow as soon as the astronaut wants to leave the vehicle. Additional stationary sensors in the vehicle still seem useful for larger vehicles since they would indicate the directionality of the radiation and facilitate corrective action by attitude control or other means. There are 7 references.

-- Author's summary

ENVIRONMENTAL MEASUREMENTS

- 498 Nature of Lead in Automobile Exhaust Gas. D. A. Hirschler and L. F. Gilbert.
Arch. Environmental Health 8, 297-313 (Feb. 1964).

Only part of the lead which is contained in the gasoline burned by cars is discharged in the exhaust gas. One fourth or more of the lead burned is retained in exhaust system deposits or is discarded during changes of lubricating oil and oil filters. Most of the lead in exhaust gas is in the form of inorganic particulate solids composed of lead halide ($PbCl^{\circ}Br$), or complexes of ammonium halide and lead halide. Studies of the organic lead content of exhaust gas have shown

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extremely small amounts. With one car, about 0.023% of the tetraethyllead burned was found as organic lead in the exhaust gas under conditions in which about 1.7% of the fuel was exhausted unburned. Therefore, it would appear that tetraethyllead decomposes much more readily in the engine and exhaust system than do some of the constituents of the gasoline. The percentage of the lead, burned by the car, which is discharged in the exhaust gas depends on the conditions under which the car is driven and also on the prior driving history of the car. During operation under a test cycle of moderate speeds similar to city type driving, 3 cars exhausted from 28% to 45% of the lead being burned in the fuel, based on average values computed from many individual tests. When exhaust systems were fairly free of deposits, the emissions of lead were in the 20%-25% range, but, after the cars had been operated for several thousands of miles at moderate speeds, emissions increased into the 35%-55% range. Individual tests showed wide variations which indicate that a random factor, probably deposit flaking in the exhaust system, is involved in the process of exhausting lead. Operation at high speeds, and particularly full-throttle acceleration at high speeds, may discharge several times as much lead as is being burned. However, continued operation of this type causes lead emissions to decrease, probably because exhaust system deposits are gradually partially expelled. This treatment returns the exhaust system to a condition where it again accumulates lead deposits and exhausts less lead in subsequent driving at moderate speeds. The particulate lead compounds in exhaust gas cover a broad range of sizes, from as small as 0.01 micron to several millimeters in diameter. About one half to two thirds of the lead exhausted in city type driving is in particles 5 microns in diameter and smaller. From about 4% to 12% of the exhausted lead is in particles 1 micron and smaller. High-speed accelerations discharge a lesser percentage of the exhausted lead in these fine-particle sizes. -- Authors' summary

- 499 Atmospheric Monitoring of Toxic Levels of Missile Propellants. J. T. Nakamura and K. E. Ball.
Am. Ind. Hyg. Assn. J. 25, 77-80 (Jan.-Feb. 1964).

The Chemical and Materials Section of the Rocket Research Laboratories at Edwards Air Force Base has been responsible for hazard appraisal of various storable liquid propellants. Evaluating the toxic hazards posed by spills or inadvertent releases was curtailed by a lack of suitable instrumentation and by the shortcomings of applying laboratory wet chemical techniques to field experiments. Under contract to Edwards Air Force Base, Mine Safety Appliances Company developed an instrument suitable for continuous monitoring for toxic levels of NO₂, UDMH, B₅H₉, N₂H₄, F₂, and ClF₃. Based on spill test data from Edwards Air Force Base, realistic performance specifications are suggested for any continuous toxic hazard monitoring equipment for missile facilities. --Authors' abst.

- 500 Monitoring of Trace Constituents in Simulated Manned Spacecraft. T. B. Weber, et al.
Aerospace Med. 35, 148-152 (Feb. 1964).

Innovations in instrumentation and cryogenics have been employed in the isolation and detection of microconstituents in a manned spacecraft simulator. Since the isolation of materials is a tedious and time consuming procedure, specialized units were constructed for the collection of the trace constituents and also to occlude extraneous contaminants from entering the system. Gas chromatography was employed for broad spectrum analysis of compounds and sample separation. Infrared spectrophotometry served as a parallel detection system. During normal operations, 3 to 7 constituents consisting of nitrogen, oxygen, carbon dioxide, carbon monoxide, acetylene, acetone, and methane were normally found. A fire in the space cabin resulted in numerous compounds being liberated, several of which were tentatively identified. Many of these were probably pyrolysis products from the construction components aboard. -- Authors' summary

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- 501 Studies of Analytical Methods for Lead-in-Air Determination and Use With an Improved Self-Powered Portable Sampler.

A. L. Linch, R. B. Davis, R. F. Stalzer, and W. F. Anzilotti.
Am. Ind. Hyg. Assn. J. 25, 81-93 (Jan.-Feb. 1964).

The portable "Uni-Jet" Lead-In-Air Analyzer was revised to provide constant rate collection of tetraethyl (TEL) and tetramethyl lead (TML). Reliable results from monitoring leaded gasoline storage tanks, cleaning and decontamination procedures, were obtained by drawing a two-cubic-foot sample during 20 minutes through methanolic iodine. The aspirating unit powered by non-flammable "Freon-12" has been used widely in fire and explosion hazard areas. -- Authors' abst.

- 502 Some Theoretical Considerations in the Microchemical Detection of Airborne Toxic Chemical Agents. L. J. Hillenbrand, Jr., et al. Microchem. J. 7, 78-88 (May, 1963).

The increasing use of toxic phosphonates, thiophosphonates, phosphates, and carbamates as pesticides, insecticides, corrosion inhibitors, and antiknock compounds has shown the desirability of developing highly sensitive detector devices for use in industry, agriculture, food distribution centers, and the home. This paper deals with some theoretical considerations in microchemical detection of toxic chemical agents, in the form of aerosols or gases, in the absence of concentration or sampling devices. It appears that, even if the kinetics of a stoichiometric reaction between toxic gases or aerosols and porous solid detectors is assumed to be adequate, a sufficient amount of reaction to produce visible color in seconds will be possible only in regions of very high air flow velocities. -- Public Health Eng. Absts.

PREVENTIVE ENGINEERING

- 503 Experimental Verification of Ventilation Equations. T. W. Kethley and W. B. Cown. Am. Ind. Hyg. Assn. J. 25, 67-68 (Jan.-Feb. 1964).

The authors have verified experimentally the theoretic equations for the rate of dispersion or removal of a contaminant by a known rate of air flow relative to chamber volume. They also verify equations for calculating concentrations and exposures from intermittent sources of contamination. -- Authors' abst.

- 504 Humidity Studies and Respiratory Infections in a Public School. J. Sataloff and H. Menduke. Clin. Pediat. 2, 119-121 (March, 1963).

The present pilot study was initiated to explore the possibility of altering the frequency of upper respiratory infections in school children by increasing the amount of moisture in classroom air during the winter months, while heating units are turned on. No reduction in respiratory illness could be demonstrated under the circumstances of the experiment, but this does not disprove the benefit of physiologic temperature and humidity conditions in guarding the health of school children. With so many environmental factors beyond the reach of this experiment—clothing, home conditions, weather, epidemics, etc., — it would be unrealistic to expect any substantial difference in student health solely from the use of humidifiers in school rooms. This study of air humidification in schools serves to stimulate curiosity concerning what results might be encountered if both schools and homes could be more scientifically "air conditioned" in the winter time. -- Am. Rev. Resp. Dis. Absts.

03121473

- 505 Your Compressed Air: Fit To Breathe? F.S. Venable and E.D. Polick.
Natl. Safety News 89, 28-32 (April, 1964).

Use of compressed air systems for supplying breathing air has greatly increased in recent years due to the popularity of scuba diving, a sport which has gained over 3 million devotees. Along with the recreational uses of compressed air, there has been a steady growth of supplied-air breathing systems in industry resulting from the need for increased protection against highly toxic materials used in missile fuel units, atomic energy installations, and various chemical operations throughout industry. On the basis of studies of central compressed air systems and portable compressors of a representative variety of types, it is possible to draw reasonably valid conclusions concerning the factors affecting compressed air quality: (1) Centralized compressed air systems used to provide breathing air require careful selection of compression equipment and location. (2) Maintenance of compressors and filters must be of a high quality. (3) High-temperature shut-off or alarms to warn of overheating of the compressor are desirable. (4) System integrity must be preserved to avoid entrance of undesirable or toxic contaminants. (5) Supplied-air respirators obtaining air from such systems should not be used in environments immediately dangerous to life. (6) Portable compressors utilizing gasoline engines are more likely to recycle significant quantities of carbon monoxide from the engine exhaust, so their use is not recommended. If, however, they must be used, they should be provided with extensions to the exhaust stacks, crankcase vents, and compressor intakes; checked carefully for exhaust manifold leakage; and properly oriented with regard to wind direction. (7) Diesel-engine powered compressors have less serious exhaust-recycle problems, but engine exhaust stacks should be extended to prevent recycling insofar as possible. (8) Selection of compressor types favor the selection of rotary or rotary-screw types over piston or reciprocating types, although replacement of filters, compressor maintenance, and degree of compressor overheating remain important factors. (9) Age of the compressor unit is of less importance than the quality of maintenance of such units.

COMMUNITY AIR HYGIENE

- 506 Analysis by Ion Current. R.A. Morris, et al.
Instr. Control Systems 36, 108-111 (Nov. 1963).

Small concentrations of smokes, dusts, and other particulate matter produce a drop in ion current. By reacting the gas with a suitable reagent to form a smoke, and measuring the current decrease caused by the smoke, high sensitivity to specific gases and vapors is achieved. An ionization chamber can be used for the detection of airborne contaminants in the ppm range. The method consists of reacting the contaminant, or its pyrolysis products with another gas to form particles (smoke or mist), and observing the effect of the particles on the conductivity of the ion chamber.

-- APCA Absts.

- 507 United States Air Quality. R.I. Larsen.
Arch. Environmental Health 8, 325-333 (Feb. 1964).

Particulate pollutant parameters are given for 20 particles measured in United States urban air. Gaseous pollutant parameters are given for sulfur dioxide concentrations measured in Chicago, Cincinnati, Los Angeles, Nashville, New Orleans, Philadelphia, San Francisco, and Washington. Data for carbon monoxide and nitrogen

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oxide concentrations in some of these cities are also presented. Pollutant concentration is related to city size and distance from city center. Sulfate particulate concentration is related to sulfur dioxide concentration. Pollutant concentrations are discussed in terms of relative effects and absolute units. Means are presently available or are being developed to control the emission of all these pollutants except the nitrogen oxides, which come from all combustion sources. There is no known easy method for controlling nitrogen oxides. In the decades ahead, the ultimate solution to pollution from the nitrogen oxides as well as the other pollutants may be the use of much less high-temperature combustion, in homes, vehicles, and industry. Fuel cells and atomic fission or fusion might then power the nation electrically.

-- Author's summary

- 508 Air Pollution. The Human Problem. Mary Catterall.
Smokeless Air (London) 34, 142-148 (1963).

As industry spreads there are indications that bronchitis and lung cancer are increasing. The effects of air pollution on the urban population, and the respiratory system in relation to the influence of air pollution on bronchitis and cancer of the lung, and the psychological effects of air pollution are discussed. The correlation between lung diseases and air pollution by industry, domestic chimneys, and cigarette smoke is of importance to the human race and especially in the densely populated areas.

-- APCA Absts.

- 509 Meteorology and Air Pollution Problems in Industry. G.V. Williamson.
J. Air Poll. Control Assn. 14, 78-79 (March, 1964).

Quite properly the field of air pollution has been designated by meteorologists to that of applied micrometeorology. A meeting of minds between those in industry and meteorologists, cannot help but be of truly significant help in our efforts for clean air. The value of a great deal of meteorological work, however, will be limited unless it is applicable to community problems, and unless it is couched in terms understandable to reasonably proficient managers in industry. The meteorologist will advance the cause as a whole if his reports of research, and in fact all studies and reports, be couched or translated into commonly understood terms. Isn't "daily" just as accurate description of a certain kind of temperature inversion as "diurnal?" Industry's studies of its air environment then, may well come to call upon the applied micrometeorologist more and more. With mutual understanding there is good promise of advancing toward further improvement in industry's relations to problems of the air.

- 510 Meteorological Tools for Air Pollution Control. M.E. Smith.
J. Air. Poll. Control Assn. 14, 80-82 (March, 1964).

Examination of the meteorological tools available for air pollution studies leads to the conclusion that important advances have been made in the utilization of meteorological knowledge in this field. This has come about largely through numerous field studies providing empirical data, and rapid development of automatic processing and computing. Data for such studies, both current and past, can sometimes be obtained at least partially from U.S. Weather Bureau sources, although most installations require some local environmental study. Instruments and techniques for the latter are readily available, at least insofar as general background data are concerned. Important deficiencies lie in the number of trained personnel now in the field and anticipated for the future. The practical knowledge of the profession needs expansion and clarification, especially in respect to deposition and terrain problems. Finally, more effort needs to be expended in providing instrumentation for direct measurement (or conversion) of parameters necessary in air pollution studies.

-- Author's summary

03121475

- 511 Meteorological Tools in Evaluating and Reducing Effects of Air Pollution. D.H. Pack.
J. Air Poll. Control Assn. 14, 83-85 (March, 1964).

It is expected that the use of meteorology in air pollution programs will increase. More effort will be made to determine city ventilation rates and how best to measure them. Meteorological and air quality measurements within cities will be extended to greater altitudes in an attempt to determine the city air pollution "budget." Better instrumentation and increased use of computers will lead to more and better air pollution potential forecasts. More study will be given to the problems of interurban air pollution in the several rapidly developing megalopolis areas of the country. The author would summarize by saying that meteorological ideas must accompany meteorological instruments, and that this combination of instruments and ideas, in the setting of an interdisciplinary air pollution program can be used to achieve, more rapidly and more efficiently, cleaner air. There are 20 references.

- 512 Acid Soaked Soot Flakes in Flue Gases— Their Formation and Prevention.
W. Grimm. Combustion 35, 38-47 (Sept. 1963).

Burning sulfur-containing fuels can result in discharge of acid-soaked soot flakes with the flue gas and cause a serious air pollution problem. Two solutions are possible: (1) prevent the discharge of unburned carbon, and (2) prevent the temperature of the flue gas from dropping below the sulfuric acid dewpoint. Both solutions involve improvements in design and operation of firing equipment, such as: (1) increase degree of atomization, (2) preheat combustion air, (3) arrange nozzles to match furnace shape, (4) prevent air leaking into flue gas path, (5) insulate metal stacks, (6) reduce excess combustion air, and (7) use low sulfur content fuels. The chemistry and mechanics of soot formation and deposition are discussed in detail as is the determination of acid dewpoint. -- Public Health Eng. Absts.

- 513 Pollution Control in a Phosphoric Acid Plant. H. O. Grant.
Chem. Eng. Progr. 60, 53-55 (Jan. 1964).

A program of modernization and expansion of a phosphate chemical company was designed to obtain desired improvements in fume emission control. The three major steps in the process were digestion, filtration, and evaporation. A bag-type dust collector with a capacity of 4,000 cubic feet per minute, and 99% efficiency was installed. Absorption was established as the most economical method of silicon tetra fluoride removal. Spray and packed towers, venturi, cyclone, and impact scrubbers were used. -- APCA Absts.

- 514 Cancer and Atmospheric Pollution. F.C. Pybus. Sanitarian 72, 169-180 (Dec. 1963).

A review of 50 years clinical experience of cancer in man and animals, and 30 years of personal research, shows that 90% of the disease was due to benzpyrene or other carcinogens in the smoke contaminated atmosphere. The objectionable smell of exhaust fumes and smoke from motor vehicles polluting the main thoroughfares, streets of cities, and towns, has been a matter of complaint. This smoke contains cancer producing benzpyrene and does cause cancer when tested on animals. Total coal and tobacco smoke benzpyrene content of the air, benzpyrene as a universal carcinogen, its distribution, leaf and wood smoke, and smoking and cancer are discussed. Results of studies made in England and Wales are shown. -- APCA Absts.

- 515 Further Investigations of Atmospheric Concentration of Lead. J. Cholak.
Arch. Environmental Health 8, 314-324 (Feb. 1964).

The results of the investigations described in this paper indicate that the average concentration of lead in the air of certain American cities is of a low order of magnitude and that it varies with the size of the city and with a variety of other general and localized

factors. Prolonged investigations involving programs of continuous monitoring indicate that the over-all levels of the concentration of lead in the air appear to have decreased during recent years. Air over heavily traveled streets contains more lead than does air over lightly traveled streets, and considerably more than the ambient air of representative large areas of the community. Alkyl lead compounds may be detected in the air in certain areas of gasoline service stations. Such compounds may also be detected at times in the atmosphere of heavily traveled streets. In any of the situations investigated, with respect to the presence of these compounds in the air in relation to the handling of leaded gasoline and the operation of automobiles, positive findings have been inconstant, and the levels of concentration found have been low, representing, as a rule, between 1% and 5% of the total lead in the atmosphere.

-- Author's summary

ACCIDENTS AND PREVENTION

- 516 Safety Glasses. Editorial (Cond.) New Engl. J. Med.
New Engl. J. Med. 270, 744 (Apr. 2, 1964).

The National Society for the Prevention of Blindness has recommended the use of safety lenses and frames by all—especially by children, students, persons with impaired sight and industrial workers. Recommended nonindustrial safety lenses (American Safety Code Z80) are of 2-mm. minimum thickness, shatter-resistant heat-tempered glass, in fracture-resistant frames. These glasses weigh a few grams more than orthodox types and cost \$3 to \$5 more. Resistance of these frames and lenses to accidental damage often makes the net cost equal to nonsafety glasses, even for growing children needing changes at relatively frequent intervals. Industrial safety lenses (American Safety Code Z2) are made of optical quality glass or plastic with a minimum thickness of 3mm. Frames for industrial use must be stronger and must be fire resistant. Such lenses can withstand the impact of a steel ball 7/8 inch in diameter dropped from a height of 50 feet.

- 517 History and Problems of Occupational Health in New England. G. F. Wilkins.
Arch. Environmental Health 8, 483-486 (March, 1964).

Efforts to protect the health of workers as a group were first undertaken and directed at the regulation of working conditions in the 19th century. In this field, the New England states had numerous firsts. New Hampshire passed the first law limiting hours of work. Massachusetts passed the first safety law applicable to steam operated machinery. Vermont employed the first industrial nurse. Connecticut passed legislation forbidding the employment in bakery shops of workers with contagious diseases. The first recorded example of physical examination on groups of workers took place in Rhode Island. In spite of the progress in the field of occupational health, numerous problems remain. Some are old; some are old with new variations; many are new, resulting from the rapid introduction of modern industrial processes and materials. The author includes specific examples of problems in each category.

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

- 518 Pathology of Light-Aircraft Accidents. W. J. Reals, W. H. Davidson, and H. H. Karnitschnig.
Aerospace Med. 35, 133-135 (Feb. 1964).

One hundred seventy-eight fatalities in accidents of light aircraft accessioned at the Armed Forces Institute of Pathology (AFIP) from 1944 through 1962, are reviewed. Pre-existing disease, environment and traumatic factors are studied. Visceral trauma

is a major factor in deaths in this category of aircraft, as are head injuries and incapacitating fractures. Complete autopsy examination of all victims of air crashes are of utmost importance in the promotion of general aviation safety.

-- Authors' summary

MISCELLANEOUS

- 519 Pollutional Effects of Outboard Motor Exhaust—Laboratory Studies.
J.N. English, G.N. McDermott, and C. Henderson.
J. Water Pollution Control Fed. 35, 923-931 (July, 1963).

A preliminary appraisal of the pollutional contribution of outboard motors was made by operating low-horse-power outboard motors in small tanks of water in the laboratory. Data indicate that exhausts from outboard motors have a variety of polluting effects. Based on the results of this study, an estimate of the total quantity of fuel constituents contributed to water by outboard motor exhausts in the United States in 1959 was made. These values were placed at 3 to 13 mil. gal. (11,400 to 49,300 m³) of gasoline, 7 to 15 mil. gal. (26,500 to 56,900 m³) of oil, and 0.2 to 0.7 mil. lb. (0.09 to 0.3 mil. kg.) of lead. The quantity of water diluting the exhaust materials is of major significance. Unusually low water volume per unit of fuel consumed appears to be necessary for severe pollution to result from outboard motor operation alone. A field study of the actual contributions of materials by outboard motor exhausts and their damaging effects on quality of water for particular uses is planned. The project should be carried out where the ratio of motor operation (fuel consumption) to volume of water is high and could be calculated approximately. The persistence or build-up of the pollutants and their damaging effects under field conditions would be important aspects of the study.

-- Public Health Engr. Absts.

- 520 Treatment of Petrochemical Wastes by the Activated Sludge Process. Part 1.
R.S. Engelbrecht and B.B. Ewing.
Ind. Water & Wastes 8, 36-39 (May-June, 1963).

Petrochemicals constitute a major portion of the chemical market today. Their production results in a myriad of wastes of varying composition and unusual characteristics. The authors have described the treatment of these organic chemical wastes by two methods, physical stripping and biological oxidation. Physical stripping of acetone and butanone, compounds deemed representative of the waste, by aeration, as in an activated sludge aeration basin, has been intensively studied; the physical constants of the chemical reactions of the process have been established. Biological oxidation of these compounds by use of the activated sludge process was investigated with the aid of the Warburg apparatus and the biological removal rates determined along with the overall efficiency of the process. Field experience with a petrochemical producer's waste are compared with laboratory results.

-- Public Health Eng. Absts.

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120 bd. St. Germain,
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Sanitarian

Association of Public Health Inspectors
19 Grosvenor Place
London S.W. 1
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Smokeless Air (London)

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