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PLAINTIFF'S EXHIBIT

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Industrial Hygiene Digest

INDUSTRIAL HEALTH NEWS

LITERATURE ABSTRACTS

MEDICAL

ENGINEERING

CHEMICAL

TOXICOLOGICAL

LEGAL

JULY, 1960
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INDUSTRIAL HYGIENE FOUNDATION

MELLON INSTITUTE

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INDUSTRIAL HYGIENE FEATURES

See Abst. No. 634 for details on the disinfection of the hands of surgeons and nurses.

The use and abuse of contact lenses is the topic of Abst. No. 636.

Information on the vision, visual acuity, and ocular refraction of young men is given in Abst. No. 637.

The influence of tropical weather on cardiac output is treated in Abst. No. 638.

For the neurological aspects of low back pain see Abst. No. 643.

A discussion on smoking and personality is given in Abst. No. 645.

Oil folliculitis, a study of 200 men employed in an engineering factory is the title of Abst. No. 649.

Data on an outbreak of sporotrichosis in Florida are presented in Abst. No. 650.

Ozone's role in chemistry and technology is discussed in Abst. No. 660.

Abst. No. 661 is concerned with studies on the chemical forms of urinary lead.

For the physical aspects of dust counting consult Abst. No. 671.

How did the term "pneumonokoniosis" originate? Abst. No. 674 tells you.

Pneumoconiosis in makers of artificial grinding wheels is the topic of Abst. No. 678.

Abst. No. 684 presents a report on diffuse lung lesions that mimic pneumoconiosis.

Abst. No. 689 gives a critique of our present noise control engineering efforts and accomplishments.

Abst. No. 706 is concerned with nitrogen oxide formation in the autoignition of liquid fuel sprays.

FOUNDATION FACTS

DR. GROSS PRESENTS PAPER. Dr. Paul Gross, the Foundation's Research Pathologist, presented a paper on "Autocatalysis of Pulmonary Edema", on June 10, 1960 at the Third Conference on Research in Emphysema at Aspen, Colorado.

THRESHOLD LIMIT VALUES. The Threshold Limit Values for 1960, adopted by the American Conference of Governmental Industrial Hygienists, appear in this issue of the Digest. Nine substances were changed from the Tentative List to the Recommended List and eight new substances were placed on the Tentative List. The value for chlorobromomethane was changed from 400 to 200 ppm and manganese from 6 to 5 milligrams per cubic meter. Cyclopropane was removed from the list as lack of published data did not justify previous listed value.

NEW REPRINT. "An Immunologic Approach to the Pneumoconiosis", by Paul Gross, M.D. A.M.A. Arch. Ind. Health, 21, 228-232 (March 1960). This reprint is available from the Foundation upon request.

SILVER ANNIVERSARY MEETING

OCTOBER 26 - 27, 1960

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THRESHOLD LIMIT VALUES FOR 1960¹

Adopted at the Twenty-Second Annual Meeting of the American Conference of Governmental Industrial Hygienists, Rochester, New York, April 23-26, 1960

Threshold limits should be used as guides in the control of health hazards and should not be regarded as fine lines between safe and dangerous concentrations. They represent conditions under which it is believed that nearly all workers may be repeatedly exposed, day after day, without adverse effect. The values listed refer to time weighted average concentrations for a normal work-day. The amount by which these figures may be exceeded for short periods without injury to health depends upon a number of factors such as the nature of the contaminant, whether very high concentrations even for short periods produce acute poisoning, whether the effects are cumulative, the frequency with which high concentrations occur, and the duration of such periods. All must be taken into consideration in arriving at a decision as to whether a hazardous situation exists. Special consideration should be given to the application of these values in the evaluation of the health hazards which may be associated with exposure to combinations of two or more substances.

Threshold limits are based on the best available information from industrial experience, from experimental studies, and, when possible, from a combination of the two. These values are based on various criteria of toxic effects or on marked discomfort; thus, they should not be used as a common denominator of toxicity, nor should they be considered as the sole criterion in proving or disproving diagnosis of suspected occupational disease.

These limits are intended for use in the field of industrial hygiene and should be employed by persons trained in this field. They are not intended for use, or for modification for use, in the evaluation or control of community air pollution or air-pollution nuisances.

These values are reviewed annually by the Committee on Threshold Limits for changes, revisions, or additions as further information becomes available. The Committee welcomes the suggestion of substances to be added to the list and also comments, references, or reports of experience with these materials.

Recommended Values

Gases and Vapors

Substance	PPM	Approx. Mg. per Cu. M.	Substance	PPM	Approx. Mg. per Cu. M.
Acetaldehyde	200	360	Butyl acetate		
Acetic acid	10	25	(n-butyl acetate)	200	950
Acetic anhydride	5	20	Butyl alcohol (n-butanol)	100	300
Acetone	1000	2400	Butylamine	5	15
Acetylene-tetrabromide	1	14	Butyl cellosolve		
Acrolein	0.5	1.2	(2-butoxyethanol)	50	240
Acrylonitrile	20	45	Carbon dioxide	5000	9000
Allyl alcohol	5	12	Carbon disulfide	20	60
Allyl chloride	5	15	Carbon monoxide	100	110
Allyl propyl disulfide	2	12	Carbon tetrachloride	25	160
Ammonia	100	70	Cellosolve		
Amyl acetate	200	1050	(2-ethoxyethanol)	200	740
Amyl alcohol (isoamyl alcohol)	100	360	Cellosolve acetate		
Aniline	5	19	(2-ethoxyethyl acetate)	100	540
Arsine	0.05	0.2	Chlorine	1	3
Benzene (benzol)	25	80	Chlorine dioxide	0.1	0.3
Benzyl chloride	1	5	Chlorine trifluoride	0.1	0.4
Boron trifluoride	1	3	Chlorobenzene		
Bromine	0.1	0.7	(monochlorobenzene)	75	350
Butadiene (1,3-butadiene)	1000	2200	Chloroform		
Butanone			(trichloromethane)	50	240
(methyl ethyl ketone)	250	740	1-Chloro-1-nitropropane	20	100

1. The Threshold Limit Values will be published in the August, 1960 issue of the A.M.A. Archives of Environmental Health (formerly A.M.A. Archives of Industrial Health).

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Gases and Vapors (cont.)

Substance	PPM	Approx. Mg. per Cu.M.	Substance	PPM	Approx. Mg. per Cu.M.
Chloropicrin	0.1	0.7	Hydrogen fluoride	3	2
Chloroprene			Hydrogen peroxide, 90%	1	1.4
(2-chloro-1,3-butadiene)	25	90	Hydrogen selenide	0.05	0.2
Cresol (all isomers)	5	22	Hydrogen sulfide	20	30
Cyclohexane	400	1400	Iodine	0.1	1
Cyclohexanol	100	410	Isophorone	25	140
Cyclohexanone	100	400	Isopropylamine	5	12
Cyclohexene	400	1350	Mesityl oxide	25	100
Decaborane	0.05	0.3	Methyl acetate	200	610
Diacetone alcohol (4-hydroxy- 4-methyl-2-pentanone)	50	240	Methyl acetylene	1000	1650
Diborane	0.1	0.1	Methyl acrylate	10	35
o-Dichlorobenzene	50	300	Methylal (dimethoxymethane)	1000	3100
Dichlorodifluoromethane	1000	4950	Methyl alcohol (methanol)	200	260
1,1-Dichloroethane	100	400	Methyl bromide	20	50
1,2-Dichloroethane (ethylene dichloride)	100	400	Methyl cellosolve		
1,2-Dichloroethylene	200	790	(2-methoxyethanol)	25	50
Dichloroethyl ether	15	90	Methyl cellosolve acetate (ethylene glycol monomethyl ether acetate)	25	120
Dichloromonofluoromethane	1000	4200	Methyl chloride	100	210
1,1-Dichloro-1-nitroethane	10	60	Methyl chloroform (1,1,1-trichloroethane)	500	2700
Dichlorotetrafluoroethane	1000	7000	Methylcyclohexane	500	2000
Diethylamine	25	75	Methylcyclohexanol	100	470
Difluorodibromomethane	100	860	Methylcyclohexanone	100	460
Diisobutyl ketone	50	290	Methyl formate	100	250
Dimethylaniline (N-dimethylaniline)	5	25	Methyl isobutyl carbinol (methyl amyl alcohol)	25	100
Dimethyl formamide	20	60	o-Methyl styrene	100	480
1,1-Dimethyl hydrazine	0.5	1	Methylene chloride (dichloromethane)	500	1750
Dimethylsulfate	1	5	Nomomethyl aniline	2	9
Dipropylene glycol methyl ether	100	600	Naphtha (coal tar)	200	800
Dioxane (diethylene dioxide)	100	360	Naphtha (petroleum)	500	2000
Ethyl acetate	400	1400	Nickel carbonyl	0.001	0.007
Ethyl acrylate	25	100	Nitric acid	10	25
Ethyl alcohol (ethanol)	1000	1900	p-Nitroaniline	1	5
Ethylamine	25	45	Nitrobenzene	1	5
Ethylbenzene	200	870	Nitroethane	100	310
Ethyl bromide	200	890	Nitrogen dioxide	5	9
Ethyl chloride	1000	2600	Nitroglycerin	0.5	5
Ethyl ether	400	1200	Nitromethane	100	250
Ethyl formate	100	300	2-Nitropropane	50	180
Ethyl silicate	100	550	Nitrotoluene	5	30
Ethylene chlorohydrin	5	16	Octane	500	2350
Ethylenediamine	10	30	Ozone	0.1	0.2
Ethylene dibromide (1,2-dibromoethane)	25	190	Paradichlorobenzene	75	450
Ethylene imine	5	9	Pentane	1000	2950
Ethylene oxide	50	90	Pentanone (methyl propyl ketone)	200	700
Fluorine	0.1	0.2	Perchloroethylene (tetrachloroethylene)	200	1350
Fluorotrichloromethane	1000	5600	Phenol	5	19
Formaldehyde	5	6	Phenylhydrazine	5	22
Furfural	5	20	Phosgene (carbonyl chloride)	1	4
Furfuryl alcohol	50	200	Phosphine	0.05	0.07
Gasoline	500	2000	Phosphorus trichloride	0.5	3
Heptane (n-heptane)	500	2000	Propyl acetate	200	840
Hexane (n-hexane)	500	1800	Propyl alcohol (isopropyl alcohol)	400	980
Hexanone (methyl butyl ketone)	100	410	Propyl ether (isopropyl ether)	500	2100
Hexone (methyl isobutyl ketone)	100	410			
Hydrazine	1	1.3			
Hydrogen bromide	5	17			
Hydrogen chloride	5	7			
Hydrogen cyanide	10	11			

Gases and Vapors (cont.)

Substance	PPM	Approx. Mg. per Cu. M.	Substance	PPM	Approx. Mg. per Cu. M.
Propylene dichloride (1,2-dichloropropane)	75	350	1,1,2,2-Tetrachloroethane	5	35
Propylene imine	25	60	Tetrahydrofuran	200	590
Propylene oxide	100	240	Tetranitromethane	1	3
Pyridine	10	30	Toluene (toluol)	200	750
Quinone	0.1	0.4	o-Toluidine	5	22
Stibine	0.1	0.5	Tolylene-2,4-diisocyanate	0.1	0.1
Stoddard solvent	300	2900	Trichloroethylene	200	1050
Styrene monomer (phenylethylene)	100	420	Triethylamine	25	100
Sulfur dioxide	5	13	Trifluoromonomobromo- methane	1000	6100
Sulfur hexafluoride	1000	6000	Turpentine	100	560
Sulfur monochloride	1	6	Vinyl chloride (chloroethylene)	500	1300
Sulfur pentafluoride	0.025	0.25	Vinyl toluene	100	480
Tertiary butyl alcohol	100	300	Xylene (xylol)	200	870
p-Tertiary butyl toluene	10	60	Xylidine	5	25

Toxic Dusts, Fumes, and Mists

Substance	Mg. per Cu. M.	Substance	Mg. per Cu. M.
Aldrin (1,2,3,4,10,10-hexachloro- 1,4,4a,5,8,8a-hexahydro-1,4,5,8- dimethanonaphthalene)	0.25	Lindane (hexachlorocyclohexane, gamma isomer)	0.5
Ammate (ammonium sulfamate)	15	Lithium hydride	0.025
Antimony	0.5	Magnesium oxide fume	15
ANTU (alpha-naphthyl-thiourea)	0.3	Malathion (O,O-dimethyl dithiophos- phate of diethyl mercaptosuccinate)	15
Arsenic	0.5	Manganese	5
Barium (soluble compounds)	0.5	Mercury	0.1
Beryllium	0.002	Mercury (organic compounds)	0.01
Cadmium oxide fume	0.1	Methoxychlor (2,2-di-p-methoxy- phenyl-1,1,1-trichloroethane)	15
Calcium arsenate	0.1	Molybdenum (soluble compounds)	5
Chlordane (1,2,4,5,6,7,8,8-octachloro- 3a,4,7,7a-tetrahydro-4,7-methanoindane)2	0.5	(insoluble compounds)	15
Chlorinated camphene, 60%	0.5	Nicotine	0.5
Chlorinated diphenyl oxide	0.5	Parathion (O,O-diethyl-O-p-nitro- phenyl thiophosphate)	0.1
Chlorodiphenyl (42% chlorine)	1	Pentachloronaphthalene	0.5
Chlorodiphenyl (54% chlorine)	0.5	Pentachlorophenol	0.5
Chromic acid and chromates (as CrO ₃)	0.1	Phosphoric acid	1
Crag herbicide (sodium 2-(2,4-dichloro- phenoxy) ethanol hydrogen sulfate)	15	Phosphorus (yellow)	0.1
Cyanide (as CN)	5	Phosphorus pentachloride	1
2,4-D(2,4-dichlorophenoxyacetic acid)	10	Phosphorus pentasulfide	1
DDT (2,2-bis (p-chlorophenyl)-1,1,1- trichloroethane)	1	Picric acid	0.1
Dieldrin (1,2,3,4,10,10-hexachloro-6,7- epoxy-1,4,4a,5,6,7,8,8a-octahydro- 1,4,5,8-dimethano-naphthalene)	0.25	Pyrethrum	2
Dinitrobenzene	1	Rotenone	5
Dinitrotoluene	1.5	Selenium compounds (as Se)	0.1
Dinitro-o-cresol	0.2	Sodium fluoroacetate (1080)	0.1
EPN (O-ethyl O-p-nitrophenyl thionobenzenephosphonate)	0.5	Sodium hydroxide	2
Ferbam (ferric dimethyl dithiocarbamate)	15	Strychnine	0.15
Ferrovandium dust	1	Sulfuric acid	1
Fluoride	2.5	TEDP (tetraethyl dithionopyrophosphate)	0.2
Hydroquinone	2	TEPP (tetraethyl pyrophosphate)	0.05
Iron oxide fume	15	Tellurium	0.1
Lead	0.2	Tetryl (2,4,6-trinitrophenyl- methylnitramine)	1.5
Lead arsenate	0.15	Thallium (soluble compounds)	0.1
		Thiram (tetramethyl thiuram disulfide)	5
		Titanium dioxide	15

Toxic Dusts, Fumes, and Mists (cont.)

Substance	Mg. per Cu. M.	Substance	Mg. per Cu. M.
Trichloronaphthalene	5	Warfarin (3-(4-acetonylbenzyl)- 4-hydroxycoumarin)	0.5
Trinitrotoluene	1.5	Yttrium	5
Uranium		Zinc oxide fume	15
(soluble compounds)	0.05	Zirconium compounds (as Zr)	5
(insoluble compounds)	0.25		
Vanadium			
(V ₂ O ₅ dust)	0.5		
(V ₂ O ₅ fume)	0.1		

Radioactivity: For permissible concentrations of radioisotopes in air, see U. S. Department of Commerce, National Bureau of Standards, Handbook 69, "Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure", June 5, 1959. Also, see U. S. Department of Commerce, National Bureau of Standards, Handbook 59, "Permissible Dose from External Sources of Ionizing Radiation", September 24, 1954, and addendum of April 15, 1958.

Mineral and Non-Metallic Inorganic Dusts

Substance	MPPCF	Substance	MPPCF
Silica		Miscellaneous, including:	
Quartz		Aluminum oxide	50
high (above 50% free silica)	5	Calcite	50
medium (5 to 50% free silica)	20	Dolomite	50
low (below 5% free silica)	50	Limestone	50
Cristobalite (above 5%)	5	Marble	50
Amorphous	20	Silicon Carbide	50
Silicates			
Asbestos	5		
Mica	20		
Portland Cement	50		
Soapstone	20		
Talc	20		

Tentative Values

Substance	PPM	Approx. Mg. per Cu. M.	Substance	PPM	Approx. Mg. per Cu. M.
Acetonitrile	40	70	Methyl mercaptan	50	100
Allyl glycidyl ether (AGE)	10	45	1-Nitropropane	25	90
Boron oxide		15	Pentaborane	0.005	0.01
n-Butyl glycidyl ether (BGE)	50	270	Perchloromethyl mercaptan	0.1	0.8
Butyl mercaptan	10	35	Phenyl glycidyl ether (PGE)	50	310
Chloroacetaldehyde	1	3	Phosdrin		0.1
Chlorobromomethane	200	1050	n-Propyl nitrate	25	110
DDVP (O, O-Dimethyl-2, 2-dichlorodivinyl phosphate)		1	Systox		0.2
Diglycidyl ether (DGE)	10	55	Teflon decomposition products	0.005	
Ethyl mercaptan	250	640	1, 2, 3-Trichloropropane	50	300
Glycidol	50	150	1, 1, 2-Trichloro-1, 2, 2-trifluoroethane	1000	7600
sec-Hexyl acetate	100	590	Triorthocresyl phosphate		0.1
Isopropyl glycidyl ether (IGE)	50	240			
Ketene	0.5	0.9			

(Signed): William L. Ball Herbert E. Stokinger Hervey B. Elkins William F. Reindollar
W. Clark Cooper Keith H. Jacobson Warren H. Reinhart Allan L. Coleman,
Chairman

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INDUSTRIAL HYGIENE DIGEST
Literature and News

NEWS ITEMS

619 American Public Health Association Meeting.

The 38th annual meeting of the American Public Health Association, scheduled for the Civic Auditorium in San Francisco, October 31 to November 4, will be the largest gathering of public health specialists ever held on the West Coast. Scientific sessions and exhibits will cover a wide variety of health programs and research development. Registration will be open to non-members as well as to members of the Association, which is the largest professional society of public health specialists in the Western Hemisphere. Major sessions will include an opening symposium on man and his changing environment and a closing symposium on present status and future directions of work in malignant diseases. The Association's 14 sections are developing scientific sessions to hear reports on current work in their respective fields. Areas to be covered in the program include genetics, rehabilitation, adolescent development and problems, medical care for children, accident prevention among children, lead poisoning, dental programs for children, costs of pharmaceuticals, medical care and the health department, medical group practice, service to patients in the home, occupational health service in medical care and tuberculosis eradication. At least 60 related health organizations are scheduling meetings in conjunction with the Association's sessions. Among them are the American Association of Public Health Physicians, American College of Preventive Medicine, American National Council for Health Education of the Public, American School Health Association, American Society of Professional Biologists, Association of Business Management in Public Health and Association of Schools of Public Health. Headquarters of the American Public Health Association are at 1790 Broadway, New York 19, New York. The executive director is Berwyn F. Mattison, M.D.

620 Western Industrial Health Conference.

The Fourth Annual Western Industrial Health Conference will be held October 7 and 8, 1960 at the Jack Tar Hotel, San Francisco, California. Attendance at this conference is expected to include approximately 500 physicians, nurses, hygienists and safety engineers representing industry in the western states. Co-sponsors include: Western Industrial Medical Association, Western Industrial Nurses Association, the Northern and Southern California Sections of the American Industrial Hygiene Association, the American Conference of Governmental Industrial Hygienists, and the Western Region Chapter of the American Society of Safety Engineers. Further information may be obtained from Clarence L. Lloyd, M.D., North American Aviation, Inc., Los Angeles 45, California. -- J. Occ. Med.

621 Occupational Health Conference of Western New York.

The Second Annual Occupational Health Conference of Western New York will be held October 27, 1960 in the Rochester Chamber of Commerce, Rochester, New York. The conference will be aimed at the management and non-professional personnel with emphasis on the health problems encountered in factories and business and the encouragement of such organizations to develop medical assistance in their solution. Sponsors of the conference will be the Rochester Chamber of Commerce and the Health Association of Rochester and Monroe County. Further information may be obtained by writing to James H. Sterner, M.D., Eastman Kodak Company, Rochester 4, New York. -- J. Occ. Med.

622 Methyl Acrylate and Ethyl Acrylate.

Properties and essential information for the safe handling and use of methyl acrylate and ethyl acrylate are described in a new chemical safety data sheet published by the Manufacturing Chemists' Association. Methyl acrylate and ethyl acrylate are classified by the Interstate Commerce Commission as flammable liquids. They have low flash points and their vapors form explosive mixtures with air over a wide range of concentrations. Methyl acrylate and ethyl acrylate are irritants for the skin, mucous membranes and gastrointestinal tract. Systemic absorption may lead to degenerative changes in the liver and kidneys. Unless properly inhibited, methyl acrylate and ethyl acrylate polymerize readily, evolving considerable heat and presenting explosive hazards when in closed containers. Copies of SD-79 Methyl Acrylate and Ethyl Acrylate are available at 30 cents each from the Manufacturing Chemists' Association, Inc., 1825 Connecticut Avenue, N.W., Washington 9, D.C.

623 AIHA Cumulative Index.

A cumulative index of the American Industrial Hygiene Association Quarterly from 1940 through 1957 (Volumes 1 through 18) has been completed. This index was compiled in conjunction with the offering of complete sets of bound volumes of the Quarterly and provides a valuable key to a great deal of important information on industrial hygiene published over these 18 years. Because of its value as a reference source, The Cumulative Index is being made available for purchase as a separate item. The Index may be obtained in either soft or hard cover until further notice. The price schedule is: Members, soft cover \$10, hard cover \$15. Non-members, soft cover \$15, hard cover \$20. Orders and inquiries should be directed to Executive Secretary, American Industrial Hygiene Association, 14125 Prevost, Detroit 27, Mich.

OCCUPATIONAL DISEASE STATISTICS

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

	Conn. Apr.	Pa. May-June	Total
Blood poisoning		1	1
Cyanosis		1	1
Fumes (unidentified)		1	1
Dermatitis	41*	35	76
Hepatitis		1	1
Irritation of eyes		1	1
Lead poisoning		2	2
Pneumoconiosis		17	17
Pneumoconiosis (suspected)		4	4
Respiratory congestion		1	1
Silicosis		76	76
Silicosis (suspected)		20	20
Tuberculosis		2	2
Total	41	162	203

* Causes are listed as follows:

Connecticut — solvents (N.O.C.), 9; oils, fats, and waxes, 6; chemicals (N.O.C.), 5; soap solutions, glue, etc., 5; synthetic resins and chemicals, 4; friction, tension, and repeated motion, 3; poisonous plants, 2; abnormalities of temperature, acids, inorganic dust, medications, miscellaneous, "protective creams", and undetermined, each.

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COMING EVENTS

625 Aug. 3-5	St. Joseph's Annual Clinics, Denver, Colo.
Aug. 7-10	American Society of Clinical Hypnosis, Miami, Fla.
Aug. 7-12	Gerontological Society, Inc., San Francisco, Calif.
Aug. 8-11	National Medical Association, Inc., Pittsburgh, Pa.
Aug. 11-13	Rocky Mountain Radiological Society, Denver, Colo.
Aug. 15-18	American Veterinary Medical Association, Denver, Colo.
Aug. 16-18	Biological Effects of Microwave Radiation, 4th Annual Conference, New York, N. Y.
Aug. 16-19	Society of Automotive Engineers, San Francisco, Calif.
Aug. 18-20	Reno Surgical Society, Reno, Nevada.
Aug. 20	American Institute of Ultrasonics in Medicine, Washington, D. C.
Aug. 21-25	American Society of Pharmacology and Experimental Therapeutics, Seattle, Wash.
Aug. 21-26	American Association of Blood Banks, San Francisco, Calif.
Aug. 21-26	American Congress of Physical Medicine and Rehabilitation, Washington, D. C.
Aug. 22-26	American Physiological Society, Stanford University, Calif.
Aug. 23-26	American Statistical Association, Annual Meeting, Palo Alto, Calif.
Aug. 23-26	Biological Photographic Association, Inc., Salt Lake City, Utah.
Aug. 25-27	Conference on the Chemical Organization of Cells: Normal and Abnormal, Madison, Wis.
Aug. 25-27	West Virginia State Medical Association, White Sulphur Springs, W. Va.
Aug. 27-Sept. 1	American Hospital Association, San Francisco, Calif.
Sept. 1-7	International Congress on Nutrition, International Union of Nutrition Scientists, Washington, D. C.
Sept. 11-16	American Chemical Society, 138th National Meeting, New York, N. Y.
Sept. 14-16	National Petroleum Association, Annual Meeting, Atlantic City, N. J.
Sept. 15-18	Drug Chemical and Allied Trades Association, 70th Annual Meeting, Bolton Landing (Lake George), N. Y.
Sept. 25-28	American Institute of Chemical Engineers, Tulsa, Okla.
Sept. 26-30	Instrument Society of America, 15th Annual Meeting and Instrument-Automation Conference and Exhibit, New York, N. Y.

LEGAL DEVELOPMENTS

626 Occupational Disease—Silicosis—Notice to Employer.

Appellee worked for Pond Creek Colliery for some 27 years, during which time he contracted silicosis and was so advised in December, 1952. On June 1, 1955, after appellee's discharge, the mine at which he had been employed was sold to appellant and a few days later appellee was called back to work by appellant, the new owner. He remained in this employment some 84 days. On January 6, 1956, he instituted this litigation by filing a claim against Pond Creek for compensation on account of his silicotic condition. Appellant was made a party by amendment. Judgment was entered against appellant. The finding of fact by the Workmen's Compensation Board that appellant had no notice and was unaware of the fact that appellee was suffering from silicosis until the compensation claim was filed against it was supported by competent evidence and therefore is conclusive. The right of recovery may not be defeated by delay in giving notice where the employer is not prejudiced, but in this case, since the law makes liable the last employer in whose service a silicosis victim

has been injuriously exposed, it can be presumed that appellant would not have employed appellee had it known his condition. Thus there can be no question but that excusing the delay would prejudice appellant, which is innocent of any fraud, negligence or other conduct that could form a just basis for fastening liability upon it in the face of the clear requirement of the statute that notice be given the employer as soon as practicable after an employee has knowledge of his condition. Judgment reversed with directions. Osborne Mining Corporation v. Barrera. Kentucky Court of Appeals. April 22, 1960.

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627 Occupational Disease—Silico-Tuberculosis—Time of Disablement—Finding of Fact.

The rule applicable herein is that the substantive rights of an employee to compensation under the workmen's compensation laws become fixed by the law in force at the time a compensable injury or accident occurs. Where an employee who suffers from silicosis sustains a series of illnesses and is finally incapacitated from silico-tuberculosis, determination of the cause of the prior illness presents a question of fact for determination by the Industrial Commission. Where the evidence reasonably sustains a finding that the last illness (and not the previous ones) brought about the disablement within the meaning of the occupational disease statute and the law in effect at that time governs, the decision will be affirmed. Judgment affirmed. Kress v. Minneapolis-Moline Company. Minnesota Supreme Court. No. 37806. April 14, 1960.

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628 Death from Starch Dust.

The Supreme Court of New Jersey recently decided a workmen's compensation claim that had been pending almost 5 years. Charlotte Kassiski was the widow of a man who worked for the International Paper Company. Kassiski operated a starch-mixing machine. Mrs. Kassiski maintained the dust her husband inhaled from the materials used in the machine caused a coughing spell, that it brought on the ruptured aneurysm which killed him. The problem was to prove it. The paper company said there was no evidence that the dust made Kassiski cough. But Mrs. Kassiski had hospital records to establish the manner and place of Kassiski's injury. Claim allowed. Kassiski v. International Paper Company. Supreme Court of New Jersey, 157 At. 2d 1 December 21, 1959. -- Occ. Hazards

BOOKS, PAMPHLETS AND NOTICES

- 629 Industrial Ventilation Manual. Sixth Edition. American Conference of Governmental Industrial Hygienists, Committee on Industrial Ventilation. P. O. Box 453, Lansing 2, Michigan. (1960). 244 pp. \$7.00 with hardcover and \$4.00 with flexible cover. (discount for quantity purchases).

This edition of the new, enlarged, completely re-edited edition of the Industrial Ventilation Manual contains information on low velocity systems, new hood design diagrams, pressure-volume-horsepower curves for fans, a new table of corrosion resistant properties of plastics, revised section on testing of ventilation systems, new information on radiant heat, high and low temperature psychrometric charts, and numerous other useful features. The first edition of this manual was issued in 1951. Since that time approximately 19,000 copies have been distributed in this country and abroad. The recommended practices contained in this excellent work are recognized and approved by numerous municipal, state, and federal governmental agencies.

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- 630 Ecology and Chemical Pesticides. Notes of Discussions, November 16-17, 1959. Sponsored by The Conservation Foundation, 30 East 40th Street, New York 16, N. Y. 35 pp. (May 1960). No price given.

This pamphlet presents two days of discussion sponsored by the Conservation Foundation in November 1959 on ecology and pesticide use. Papers on the following subjects were given: Pest Control and an Ecological Point of View; Developing New Methods of Insect Control; Biological Control; Wildlife and Pesticide Use; Pesticides and Aquatic Environments; Getting Beyond "Rules of Thumb" in Forest Spraying; Insecticide Resistance; and Criteria for Pesticide Use.

- 631 Health Statistics from the U.S. National Health Survey. Series B-No. 16. Types of Injuries Incidence and Associated Disability. United States July 1958-June 1959. U. S. Department of Health, Education, and Welfare, Public Health Service. PHS Publication No. 584-B16. 36 pp. (May 1960). For sale by Supt. of Documents, U.S. Government Printing Office, Washington 25, D.C. 30 cents.

This report deals with the types of injuries sustained in accidents and the disability resulting from these injuries. Since a person may sustain more than one type of injury in a single accident, the number of injuries shown exceeds the number of persons who were injured during the period covered by this report. Further, since quite frequently more than one person is injured in a single accident, the estimate of the number of injuries is much higher than the actual number of separate accidents resulting in bodily injury that occurred during the corresponding period. Data presented in the report are derived from household interviews obtained in a continuing probability sample of the civilian non-institutional population of the United States during the period July 1958 through June 1959. Interviews were conducted in approximately 37,000 households comprising 120,000 persons. The survey includes data only on persons living at the time of the household interview. Thus the injury experience of persons who died during the two-week period prior to the household interview is excluded from the data. Although the survey questionnaire is designed to obtain reports of all injuries whether major or minor, it should be emphasized that only injuries that were medically attended or resulted in one or more days of disability were tabulated in this report.

INDUSTRIAL MEDICAL PRACTICE

- 632 The Practice of Industrial Medicine—What it Takes. The Sappington Memorial Lecture. W. P. Shepard. J. Occ. Med. 2, 255-259 (June 1960).

The author has summarized the consensus of authoritative sources on present-day desirable qualifications for physicians interested in devoting part of their practice to industrial medicine. These qualifications are seldom, and need not be, attained all at once. The practice of medicine is a learning experience. The good physician never ceases learning. Industrial medicine offers a stimulating challenge for attaining new knowledge. It is no place for the static, complacent physician. The means of attaining these qualifications have been listed briefly. They are within the reach of any who are interested. The present problems in small industry with respect to health service are urgent. On one side, small industries are largely indifferent to, or unaware of, their medical needs. On the other side, they cannot always be provided with qualified part-time physicians. This leads to mediocre industrial health programs, or none at all. It increases industry's indifference to or depreciation of the physician's services. It may be remedied as more physicians become better qualified to make their services more valuable, and better compensated. -- Cond. from author's conclusion

- 633 Problems in the Development of Analgesic Drugs and the Evaluation of Pain. H. S. Kupperman. *J. Occ. Med.* 2, 262-267 (June 1960).

The physician must use discretion in prescribing new drugs. An avalanche of new formulations is continually appearing on the market as the pharmaceutical industry attempts to replace the old with supposedly newer, superior drugs. The alleged superiority may represent over-enthusiasm of the original investigator supported by the pecuniary hopes of the dispensing manufacturer. Many of the newer agents may not show any advantage over the older ones—except to enable a particular pharmaceutical house to enter this highly competitive market. The theoretical advantages emanating from the pens of the advertising and promotion executives should not be the criterion for transferring the medication to the physician's prescription pad until they have been supported and confirmed by well-designed and controlled animal and clinical investigations.

- 634 Disinfection of the Hands of Surgeons and Nurses. E. J. L. Lowbury and H. A. Lilly. *Brit. Med. J.* 1, 1445-1450 (May 14, 1960).

Viable bacteria emerging through pinholes in surgical rubber gloves and deposited inside the gloves after they had been worn for an hour were counted. These counts were used as criteria in a controlled study of several methods of hand disinfection. By both criteria the mean viable counts from 5 subjects were approximately halved after 5 minutes' surgical scrub with soap and water. When the 5-minutes scrub was used as a control it was found that viable counts were reduced usually to less than one-tenth by the inclusion of 5 mg. of neomycin and 5 mg. of bacitracin per gram of glove-powder, by a 3-minutes rinse with 70% alcohol, by a 3-minutes rinse in 70% alcohol containing 0.5% chlorohexidine, and by using hexachlorophane soap or phisoex for the scrub and for all ablutions during the week before the experiment; phisoex was distinctly superior to hexachlorophane soap, and chlorohexidine in alcohol somewhat better than alcohol alone. Mopping the hands with a swab soaked in industrial spirit had a much smaller effect. The regular use of hexachlorophane soap by nurses in 2 accident wards and a burns unit was associated with a mean reduction of about two-thirds in the counts of viable bacteria and of presumptive *Staph. aureus* in hand washings. The use of hexachlorophane during periods of duty only, and of chlorohexidine hand cream 3 or 4 times a day, was associated with much smaller reduction in the hand flora. The combined use of chlorohexidine cream with hexachlorophane soap for all ablutions did not lead to any consistent improvement upon the results obtained with hexachlorophane soap alone. All the staphylococci isolated from hands of nurses were highly sensitive to hexachlorophane. No nurses developed sensitivity to hexachlorophane.

-- Authors' summary

- 635 Antiseptic Cream for use on the Hands in Food Establishments. Doreen L. Wedderburn. *Brit. J. Ind. Med.* 17, 125-129 (Apr. 1960).

An antiseptic cream containing benzalkonium chloride as germicide has been developed for use on the hands. It inhibits growth on agar of staphylococci, *E. coli*, and *S. typhimurium*; it persists on the fingers, kills organisms applied to the skin, and reduces the normal bacterial population of the skin. It is convenient to apply and has been found acceptable by workers in several food factories.

-- Author's abst.

- 636 The Use and Abuse of Contact Lenses. J. A. Dyer. *Proc. Staff Meetings Mayo Clinic* 35, 223-229 (Apr. 27, 1960).

The first contact lens for a patient was made in the late 1890's in Zurich. The first trial set of contact lenses was not made, however, until about 1930, by Zeiss, and not until 1948 was a smaller, or corneal, lens developed; only in the last 2 or 3 years has a more comfortable and more nearly perfect lens been designed. Two types of contact lenses have been made: a scleral type which fits over a portion of the sclera and the cornea, and a corneal type which is smaller in diameter and is designed to cover the cornea only. Scleral contact lenses are seldom used now. There are some contraindications to wearing contact lenses. Any type of acute disease of the eyes, whether it be a mild conjunctivitis, an acute glaucoma,

an iritis, or a keratitis, is certainly a contraindication. Chronic diseases of the cornea, and chronic simple glaucoma, are contraindications. Corneal scars particularly, tend to break down if contact lenses are worn for a long time; it is safer to forget about the lenses than to take a chance of having such a reaction. Climatic conditions may or may not influence the wearing of contact lenses. People in colder climates are happier with contact lenses than are people in warmer climates. Age is another factor. Usually children should not be fitted with contact lenses, since they are unable to handle them properly. Pregnancy may be a contraindication. If in the last trimester there is some edema of the tissues and particularly of the conjunctiva, use of the lenses may have to be discontinued. It is fair to say that anyone interested in having contact lenses, whether young or old, should have an examination to determine whether or not he is a candidate. The desire to wear the lens is one of the prime requisites. Another is a careful evaluation as to whether the patient can or cannot, from the eye standpoint, wear the lenses. If he can, careful fitting of the lenses, careful instruction of the patient, and periodic follow-up examinations are certainly essential. No serious consequences from wearing contact lenses on healthy eyes have been reported as yet.

- 637 Vision, Visual Acuity, and Ocular Refraction of Young Men. Findings in a Sample of 1,033 Subjects. A. Sorsby, M. Sheridan, G. Leary and B. Benjamin.
Brit. Med. J. 1, 1394-1398 (May 7, 1960).

A sample consisting of 1,033 young men called up for National Service showed that some 60% of eyes and 70% of young men have unaided vision of 6/6 or better, while vision only slightly below this, 6/7.5, is found in another 12 to 15%. In the general population, over 80% of young men can therefore be regarded as having full vision unaided by glasses. Only 4% have unaided vision of 6/60 or less. With correction the incidence of vision of less than 6/7.5 is 3%; only 0.4% of young men have corrected visual acuity of 6/18 or less. The range of ocular refraction in this series extended between +10D and -13D. Some 75% of eyes and of men showed refraction between 0 and +2D; some 9% showed myopia of up to 4D, and 2% myopia in excess of this. In all, some 90% of the population have a range of refraction between -1D and +4D. Nearly 20% of the population has astigmatism in excess of 1D. The higher degrees of astigmatism were not yoked to the higher degrees of spherical errors, but were proportionately distributed over the whole range of refractions. Some 4% of the population showed squint, and 0.5% showed amblyopia ex anopsia of a severe type (6/36 or less). The curve of distribution of ocular refraction gives little support for the widely held view that there is an excess of myopia as distinct from an elongation of the myopic tail. Judged against a normal distribution, there is a marked excess of emmetropic and near-emmetropic eyes—an excess that eliminates the belief that the individual components of refraction vary freely. The eye is obviously a correlated organ. On the available data at least 15% and possibly as much as 25 to 30% of men require optical attention during early adult life.

-- Authors' summary

- 638 Influence of Tropical Weather on Cardiac Output, Work, and Power of Right and Left Ventricles of Man Resting in Hospital. G. E. Burch, et al.
A.M.A. Arch. Internal Med. 104, 553 (Oct. 1959).

This article is an extension of observations previously reported. Study of 5 additional adults revealed a greater cardiac output in a warm and humid environment than in a comfortable, air-conditioned room. A greater stroke volume was responsible for the increased cardiac output. Since the blood pressure tended to be lower, there was not a proportionate increase in actual cardiac work. These observations are interpreted, however, as indicating the desirability of providing a cool and comfortable environment for the patient with cardiac disease requiring rest therapy.

-- J. Occ. Med. Absta.

- 639 Cardiovascular Study of 100 Asthmatic Patients with Special Reference to Electrocardiographic Changes. O. A. Robiolo, P. R. Tuero and L. Bentolila.
An. cir. 24, 151-156 (July-Sept. 1959). Spanish.

Asthma of long duration has frequently been incriminated as a cause of heart disease. One hundred patients of either sex with asthma of long duration were observed. Most

of the patients were between the ages of 40 and 70 years, and complained of either cardiovascular or respiratory disorders. Twenty patients had pulmonary emphysema. The electrocardiograms showed changes of either atrial or ventricular overload in 16 of these patients; in the remaining 4 the electrocardiograms were normal. Forty-four patients had arterial hypertension; 9, coronary insufficiency; and 4, chronic cor pulmonale which was associated with pulmonary emphysema. Roentgenologic examination of the heart showed changes proper of overload of the lesser circulation in 7 patients, whereas the electrocardiograms showed this type of changes in 37 patients. Overload of the lesser circulation showed early in the electrocardiograms by changes of the P wave, associated with elongation of the PQ interval by about 0.20 second. The sinus rhythm was regular. The cardiovascular disorders, as shown by changes of the electrocardiograms observed in patients with asthma of long duration depend on the presence of pulmonary hypertension which results from secondary emphysema.

J. Am. Med. Assn. Absts.

- 640 Accidental Acquired Hypersensitivity to Tetanus Antitoxin. I. B. Sneddon.
Brit. Med. J. 1, 1468-1469 (May 14, 1960).

A woman casualty officer developed urticarial swelling of the eyelids after giving tetanus antitoxin. Despite the absence of an allergic history, a test dose of 0.2 ml. of 1 in 10 dilution of tetanus antitoxin precipitated a severe and prolonged allergic reaction. The asthma, urticaria, vomiting, and collapse lasted 48 hours, but subsided after adrenaline, antihistamines, and 1,900 mg. of hydrocortisone. It is presumed that the patient was sensitized by tetanus antitoxin entering the conjunctival sacs. The intense reaction to a test dose of tetanus antitoxin confirmed the high degree of sensitivity which had developed. Such cases can be avoided only if a more vigorous active immunization campaign succeeds in making passive immunization unnecessary.

-- Author's summary

- 641 A Study of the Repeatability of Ventilatory Tests, Anthropometric Measurements, and Answers to a Respiratory Questionnaire in Working Coal Miners. J. R. Ashford, G. D. Forwell and R. Routledge. Brit. J. Ind. Med. 17, 114-121 (Apr. 1960).

A study has been made in working coal miners of the repeatability of ventilatory tests, anthropometric measurements, and the answers to a questionnaire on respiratory symptoms. On the first visit especially, there was evidence of a continuous increase in both forced expiratory volume (FEV) and forced vital capacity (FVC) from the first to sixth expirations at the same visit but it was minimal after the first expiration. No difference between the beginning and end of a shift was found. The effect on the FEV and FVC readings of the day of the week and time of day at which the examination was made was negligible. Observations recorded in Scotland were 15% higher than those obtained in South Wales. Between the beginning and end of shift there was a small reduction in weight and in standing and sitting height measurements. The repeatability of the answers to the questionnaire was good. No consistent difference was found between doctor and clerk observers.

-- Authors' abstr.

- 642 A Study of the Reproducibility of the Forced Vital Capacity of Coalworkers at Two Collieries in Scotland and Two Collieries in South Wales. D. P. Duffield and J. R. Ashford.
Brit. J. Ind. Med. 17, 122-124 (Apr. 1960).

A study of 1,522 coalworkers at two Scottish collieries and two Welsh collieries showed that the forced vital capacity (FVC) was as reproducible a measurement as the forced expiratory volume (FEV) (1 sec.). This applied not only to replicate readings, but also between readings taken before and after a working shift on the same day, and also between readings taken at an interval of one week. An examination of the results of FEV (1 sec.) and FVC readings taken on the entire colliery populations at a colliery in Ayrshire, Scotland, and one in South Wales showed that replicate readings of FVC and FEV (1 sec.) were equally reproducible and that reproducibility was virtually unaffected by the presence or absence of bronchitic symptoms or the different prevalence of pneumoconiosis at the two collieries.

-- Authors' abstr.

- 643 Neurological Aspects of Low Back Pain. K. Frankel.
J. Occ. Med. 2, 282-284 (June 1960).

From the neurological standpoint, herniated nucleus pulposus is a frequent cause of low back pain which can usually be differentiated clinically from low back pain due to other causes. Since the dislodged structure exerts pressure on spinal nerve roots, the resulting pain follows the anatomical distribution of the involved nerves. Treatment should be started with simple measures: bed rest on a firm mattress and local heat at spaced intervals of time. Drug therapy should start with salicylates and move on to the use of codeine sulfate and meperidine (demerol) hydrochloride if necessary. Reduction of associated paravertebral muscle spasm is simply achieved with isopropyl meprobamate (soma). Psychotherapy is required in varying amount, but a very minimum requirement in the industrial case is the avoidance of suspicion and hostility between patient and physician. Opaque myelography and surgical correction are reserved for cases in which conservative measures fail. -- Author's summary

- 644 The Employment of Epileptics in New Zealand Factories. J. F. Copplestone.
New Zealand Med. J. 58, 658-667 (Oct. 1959).

Eight hundred and eighteen questionnaires were sent to factory managers, who were asked to return the form within a fortnight of receipt. Three hundred and fifty (42.8%) were received during this period and only 12 after it. Since the latter were in no way atypical and counting had already begun they were excluded. The survey covered 14,105 registered factory workers. Returned questionnaires covered 9,153 (65.3%) of these workers. The coverage of the survey was very satisfactory. The question remaining open is the attitude of those who did not reply. This survey seems to indicate that the stigma of epilepsy is a real entity but, as far as employers are concerned, it may not be as great as many epileptics think. There are employers in every trade who are willing to give the epileptic a trial if he compares favorably with other applicants for a job. There are many others who are undecided and for these much can be done by education. However, not all the education should be directed at the employers. There is also need to educate the epileptic, for he often shares the public prejudice against himself. If more epileptics, even those who no longer have fits, were willing to reveal themselves, without prejudice, in the jobs that they are doing now, this would be a most valuable and enlightening lesson for employers and would tend to make them more favorably disposed to other epileptic applicants. Further investigation seems to be needed along the following lines: (1) What is the real number of epileptics employed in industry, and what are they doing? (2) How many accidents actually occur, and to what type of epileptic? (3) How much do personality defects in epileptics contribute to the general prejudice? The solution of the problem of the employment of epileptics is dependent on a sympathetic and responsible approach by employers. This survey indicates that there is a reservoir of sympathy and that it can be enlarged by education along the right lines.

- 645 Smoking and Personality. H. J. Eysenck, Mollie Tarrant, Myra Woolf and L. England.
Brit. Med. J. 1, 1456-1460 (May 14, 1960).

The theory that smoking causes lung cancer has received much support. The investigation here reported was carried out to test certain deductions from an alternative theory, according to which both smoking and lung cancer are symptoms of one and the same underlying factor, related to genotypic differences between smokers and non-smokers. It was hypothesized that cigarette smokers would be (1) more extraverted, (2) less rigid, and (3) more neurotic than non-smokers. An empirical investigation of 2,360 male subjects, selected so as to conform to a predetermined sampling scheme, and stratified according to age, social class, and smoking habits, strongly confirmed the first of these hypotheses, weakly confirmed the second, and failed to confirm the third. Pipe smokers were found to be quite different from cigarette smokers from the point of view of personality, being the most introverted group studied. On the whole the data confirm the view that genotypic differences exist between smokers and non-smokers, and between cigarette smokers and pipe smokers. -- Authors' summary

- 646 A 5-Year Follow-Up Roentgenologically Detected Lung Cancer Suspects. L. W. Guiss.
Cancer 13, 82-90 (Jan.-Feb. 1960).

During 1950 chest minifilms were taken of a total of 1,867,201 persons, or almost 60% of the Los Angeles County population over 15 years of age. Although the chief purpose of this survey was the detection of tuberculosis, 3,500 lung tumor suspects were found; these were incorporated into a tumor registry and have been followed up to determine what might be the natural history of such a group. In 1955 a paper was published summarizing the experience of this closed group during the first 3 years after the survey, together with certain conclusions about the effectiveness of roentgenographic screening as a lung cancer control measure. This current and final report reviews the status of the same group at the end of 5 years or more from the time of minifilming. A rather large segment of the original 3,500 patients (620, or almost 18%) were lost to follow-up, and 748 (21%) were known to be dead at the end of 5 years. The incidence of, and death rate from, bronchogenic carcinoma appears to increase annually. The salvage from this disease by surgical treatment has not improved during the past 10 years, largely because of relatively late diagnosis and treatment and, to a lesser degree, because of limitations inherent in current surgical techniques. Any improvement in cure rates for lung cancer will stem, not from extensions of scope of surgical treatment, but rather from earlier treatment of curable cases. Periodic repetitive roentgenography of the chest is currently the only generally available and practical method of detecting lung cancer before it becomes symptomatic or incurable. If pulmonary screening programs are restricted to selected groups and to men over 45 years of age, the yield in lung cancer cases may be increased immensely.

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

- 647 Artificial Respiration. A Guide to Current Practice. L. M. Croton.
J. Inst. Sci. Technol. 5, 16-24 (Oct.-Dec. 1959).

This article describes briefly the methods of artificial respiration which are known as the Holger Nielson, Schafer, Silvester and mouth-to-mouth insufflation. Interest in this subject at the moment centers on the powerful claims being made that the mouth-to-mouth method produces a far bigger tidal volume of air in the lung than is obtained by any push and pull method. In consequence there is a very much more rapid transference of oxygen to the blood of the asphyxiated subject. The author, in a written communication, tells of an opportunity he has had to convince himself of the validity of this claim by giving artificial respiration to an anesthetized and curarized patient before a surgical operation. Training of first-aid workers in the mouth-to-mouth method presents some difficulties on social grounds but it is hardly justifiable to call them "obvious ethical disadvantages"—no doubt the author meant aesthetic. In any case these difficulties are being surmounted and many in England are already trained to the mouth-to-mouth method.

-- Bull. Hyg.

- 648 Clinical Application of Large-Scale Electronic Data Processing Apparatus. (1) New Concepts in Clinical Use of the Electronic Digital Computer. J. E. Schenthal, J. W. Sweeney and W. Nettleton, Jr. J. Am. Med. Assn. 173, 6-11 (May 7, 1960).

The uses and advantages of a digital computer system in medical research were explored in a pilot study of 138 records from an out-patient clinic. Information was coded with the help of the Standard Nomenclature of Diseases and Operations, the Cornell Medical Index, and other aids, and it was found possible to punch a history of 195 questions on International Business Machine cards in 40 seconds. Manual punching can be avoided by a procedure (mark-sensing) whereby information recorded on blanks by electrographic lead pencils can be transferred directly to punch cards by machine. Data in this form can be stored easily and retrieved quickly. The study demonstrated the possibility of locating rapidly, in a very large collection of records, a group of charts meeting any desired combination of requirements.

-- Editor's summary

SKIN DISEASES AND BURNS

- 649 Oil Folliculitis. A Study of 200 Men Employed in an Engineering Factory. J. S. Finnie. Brit. J. Ind. Med. 17, 130-140 (Apr. 1960).

Occupational skin disease is a problem of major importance in the engineering industry. Little is known about the occupational distribution of oil folliculitis and its varying degree of severity. This investigation was undertaken in an attempt to discover which occupations are at risk and why. The study was conducted at an engineering factory where 200 men, whose daily work brought them in contact with mineral oils, petroleum products, or greases, were surveyed. The survey comprised a personal interview and clinical examination. The object was to determine the severity of the folliculitis and the nature of certain environmental factors which might be associated with the development of this condition. It was found that in the occupations of capstan lathe operator and automatic lathe operator there was a significantly higher proportion of men with the more severe degree of oil folliculitis. It was also demonstrated that in these occupations men were exposed to oil to a significant degree. The apparent inefficiency of personal hygiene as a preventive measure was thought to be due to insufficient cleansing so that oil was not properly removed from the skin. This type of occupational skin disease will remain prevalent until machines can be so designed as to eliminate or reduce contamination of the workers' skin by oil. -- Author's abstr.

- 650 An Outbreak of Sporotrichosis in Florida. L. Crevasse and P. D. Ellner. J. Am. Med. Assn. 173, 29-33 (May 7, 1960).

Sporotrichosis infections occurred in 8 workers at two separate pine tree nurseries in northern Florida. In one patient the infection was limited to the site of inoculation, and the others had the localized lymphatic type; all were cured by administration of iodides. This was the first incidence of the disease at either of the nurseries, one having been in operation for 4 years, the other for 8. Both have used the same procedures in planting, growing, harvesting, and shipping the young trees. The only change in routine that might be related to appearance of the disease was in the source of their supply of sphagnum moss, which is packed around the tree roots before they are shipped. Whether the moss, purchased from a different part of Wisconsin than before, contained the parasitic Sporotrichum schenckii has not yet been determined. -- Editor's summary

- 651 Protection from Ultraviolet Carcinogenesis. J. M. Knox, A. C. Griffin and R. E. Hakin. J. Invest. Dermatol. 34, 51-58 (Jan. 1960).

The authors cite evidence obtained by other investigators to the effect that the incidence of cancer in different regions of the skin is roughly proportionate to the amount of sunlight reaching those regions, and that sunlight is a major cause of skin cancer. In the Southwest outdoor workers receive large amounts of solar radiation, and skin cancer of both the squamous and the basal-cell type is quite common in such persons. Topical sun screens have been applied to the skin to prevent sunburn in swimmers, sun bathers, fishermen, etc., but have not been generally recommended for protection from ultraviolet carcinogenesis. Various substances of the benzophenone family have been shown to be excellent sun-screening agents; therefore, a representative benzophenone, 3-benzoyl-4-hydroxy-6-methoxy-benzene-sulfonic acid (BSA), was chosen for evaluation as to its ability to prevent the development of ultraviolet-induced skin cancers in albino mice. In selected experiments BSA was compared with p-aminobenzoic acid (PABA), the experiments demonstrating that ultraviolet carcinogenesis can be reduced by the topical application of BSA or PABA. These findings in experimental animals may or may not be applicable to man. Physicians should probably begin by recommending a good sun screen for fair-skinned patients who are chronically exposed to

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sunlight. For once the process of ultraviolet carcinogenesis is initiated, it proceeds without further exposure, and damage that has already been done cannot be reversed. Moreover, in many persons it is important to prevent additional damage. The earlier the protective measures are instituted in susceptible persons, the less prone they should be to develop actinically induced skin cancer.

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

- 652 Porphyria Cutanea Tarda and Occupation. H. Ippen.
Berufsdermatosen 7, 256-266 (Oct. 1959). German.

The rising incidence of cutaneous porphyria in later life has aroused the suspicion that exogenous as well as congenital factors may play some part in its development. The author describes the case of a man aged 65 in whom the typical skin lesions of late porphyria occurred after 20 years as an electric welder and 14 years as a repairer and welder of lead-containing tools, during which period he was exposed to lead vapor. He had no clinical symptoms of lead poisoning, but a higher than normal excretion of copro- and uroporphyrin; the bone marrow showed increased erythropoiesis and laparoscopy of the liver hemosiderotic fatty cirrhosis. There was also an increased sensitivity to ultraviolet light. It was concluded that the exposure to lead and ultraviolet light had been determining factors. Porphyria cutanea tarda seldom causes an incapacity for work greater than 30%, but in rare cases lesions resembling sclerodactyly may follow. A close association between cutaneous porphyria and many industrial conditions is difficult to demonstrate, but the author believes lead to be the most important underlying factor. He recommends that in such cases there should be a change of occupation, and in all cases, abstention from alcohol.

-- Cond. from Bull. Hyg.

- 653 Local Treatment of Burns. V. Bergonzelli and A. Fontana.
Minerva chir. 14, 1535-1542 (Dec. 31, 1959). Italian.

The authors report on their experience with the local treatment of burns in a series of patients observed at the clinic for general surgery of the University of Turin. They conclude that the "open air method" is the most satisfactory one for the local treatment of 1st-degree, 2nd-degree, and 3rd-degree burns. The authors give first the most appropriate treatment for combating pain, shock, infection, and hemodynamic, protein, or electrolytic imbalances. The patient who has suffered burns is considered as suffering from multiple lesions, each differing from the others in pathogenesis, pathological structure, prognosis, therapeutic indication, and reparative capacity. In cases of local septic complications the crust is removed, and wet therapy, by means of packs containing an antiseptic solution of the Dakin type, is applied. The proper treatment of 3rd-degree and 4th-degree burns consists in an early excision of the eschar, followed by grafting. When early excision is not possible because the patient is in a state of shock, surgical decompression by means of deep incisions in the devitalized areas is advised. In a case of severe trauma and collapse, it is advisable to perform excision of the eschar and to rehabilitate the patient by the method most suitable in his case. Bleeding areas are covered with skin grafts applied as early as possible, with autoplasmic material. It is suggested that the application of homoplasmic skin be reserved for very rare cases, especially when the patient is in a grave condition.

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

- 654 Burns Following Accidental Exposure to High Energy Radiation. L. M. Cramer et al.
Ann. Surg. 149, 286 (Feb. 1959).

A radiation burn involving most of the abdominal skin resulted from an accidental exposure of a physicist to a Van de Graaff accelerator beam. The skin dose is estimated to be 7,200 rep of electrons with a peak energy of 0.6 mev. No symptoms or signs of acute-whole-body-radiation syndrome were seen. The skin developed erythema within 10 minutes, vesiculation and bulla formation on the 10th day, and progressive skin necrosis until the end of the 4th month. Skin grafting was performed from 2 to 4 months after the accident. The patient returned to full activity 6 months after his injury. Early excision and skin grafting perhaps should be considered in future burns of this type. The pathologic changes of the skin are described in surgical specimens obtained 46, 68, and 98 days following exposure.

-- J. Occ. Med. Absts.

- 655 Measures for the Prevention of Percutaneous Poisoning with Phenol and Aniline. E. Schütz. Berufsdermatosen 7, 266-274 (Oct. 1959). German.

The greatest hazard of poisoning from skin contamination arises from phenols, aniline compounds, nitrobenzene and some plant insecticides. A table lists the substances recommended and not recommended for cleansing the skin from phenol and aniline. Animal experiments were carried out to determine which could be regarded as fulfilling the criteria of being non-toxic in themselves, capable of dissolving, emulsifying and facilitating the removal by washing, and of not furthering absorption of the toxic compounds by the skin. The substances tested were applied to the shaved abdominal skin, both intact and abraded, of rats, after preliminary application of phenol and aniline in lethal doses. For phenol, the substances tested were water, ethyl alcohol, glycerin, olive oil and a polyethylene glycol; for aniline, the same with the exception of glycerin and olive oil. With phenol, only the glycol compound had an ameliorating effect on the symptoms of poisoning when applied to injured as well as intact skin; 40% ethyl alcohol had a protective effect with injured but not with intact skin; glycerin and olive oil were both practically ineffective. With aniline also the polyethylene glycol gave the greatest protection; ethyl alcohol prevented the death of 3 out of 5 rats with unbroken skin but was ineffective when the skin was injured; tap water was quite ineffective.

-- Bull. Hyg.

- 656 Allergic and Toxic Skin Injuries in the Production and Use of Benzene Hexachloride. P. Behrbohm and B. Brandt. Arch. Gewerbepathol. Gewerbehyg. 17, 365-383 (1959). German.

Crude benzenehexachloride (BHC) is a mixture of isomers. It can be absorbed by the skin, gastrointestinal canal and by inhalation. Skin injuries in man have been almost exclusively observed in workers employed in its production. The authors have investigated 26 cases, some described as "probably allergic" and some as "probably toxic" eczema. The allergic cases occurred especially in the department where the gamma isomer is obtained from the crude product; the majority of the toxic cases where a mixed insecticide known as "cotton dust" (DDT, BHC, sulfur and a filler) was handled, particularly during the summer months. The lesions were localized especially in folds of the skin, such as the elbows, where sweating was most marked. This is attributed to the decomposition of BHC by the alkaline sweat; it is not known which component was responsible. Allergic eczema was partly associated with the severity and duration of the first attack; it sometimes recurred after an interval away from work when clothes which smelt of technical BHC were re-worn. Patch tests showed no positive reaction to pure, alpha, beta, gamma and delta isomers but increased with increasing grades of impurity, suggesting, in contrast to other observations—including those of the American Committee on Pesticides in 1951—that the cause of the allergic contact eczema is not the gamma or delta isomer but the impurities in the so-called "benzine layer" formed during the crystallization of the technical product. Protective measures which have greatly reduced the incidence of severe contact eczema are avoidance of the production of cotton dust during the warm season; powdering with talcum after bathing; frequent changes of clothing and increased removal of dust by exhaust ventilation. Allergic dermatoses are to be expected only with the use of impure preparations of BHC.

-- Cond. from Bull. Hyg.

CHEMICAL HAZARDS

- 657 Suggested Method for Boron Determination with 1,1'-Dianthrimide. F. H. Rainwater. J. Am. Water Works Assn. 51, 1046-1050 (Aug. 1959).

Sources of boron in water and requirements for satisfactory analytical method are briefly discussed. Details of test procedure using dianthrimide are given; the procedure has been routinely used by various laboratories of the U.S. Geological Survey since 1951. Recovery tests indicated a standard error of 0.012 mg./liter. There are 3 tables in the text.

-- Public Health Eng. Absts.

- 658 Screening of Fluorine-Containing Compounds for Acute Toxicity. F. A. Smith, et al. *Toxicol. Appl. Pharmacol.* 2, 54-58 (Jan. 1960).

The maximal tolerated dose and the minimal lethal dose in mice are estimated for a series of 20 fluorine-containing organic compounds, 4 inorganic compounds of fluorine, and 3 nonfluorine-containing organic compounds. -- Nuclear Sci. Absts.

- 659 Zirconyl-Alizarin Chelate in Spectrophotometric Determination of Trace Amounts of Fluorine. R. P. Ashley. *Anal. Chem.* 32, 834-836 (June 1960).

The preliminary separation of the fluoride ion from fluoride-bearing materials by the Willard-Winter steam distillation invariably yields a distillate which is slightly contaminated with the acid used for the distillation. This free acid is an undesirable feature of absorptionometric procedures requiring precise control of pH. A simplified method for the determination of microgram quantities of the fluoride ion involving a zirconium-sodium alizarin sulfonate reagent is presented. Good precision and accuracy are obtained without the tedium of pH adjustment, and adequate sensitivity coupled with strict observance of the Beer-Lambert law in the fluoride range 0 to 1.9 micrograms per ml. makes possible the precise measurement of concentrations of the order of 0.05 microgram per ml. -- Author's summary

- 660 Ozone's Role in Chemistry and Technology. G. A. Lutz. *Battelle Tech. Rev.* 9, 9-15 (June 1960).

The author discusses ozone under the following subject headings: physical properties, chemical properties, ozone in the laboratory, ozonolysis equipment, analysis, industrial ozone generators, feed gas requirements for ozonators, auxiliary equipment, power requirements and cost data, water purification, oxidation of plant wastes, control of atmospheric odors, bleaching, intermediates for polymers and lubricants, perfumes, flavors, pharmaceuticals, rocket fuels, miscellaneous reactions, ozone as an analytical tool, problems associated with ozone, and the future of ozone. Conflicting reports have appeared as to the actual toxicity of ozone. These discrepancies have been due in part to the use of crude ozonizers with fluctuating current densities, contaminants in feed gas, and the use of unreliable methods of analysis, and organic materials readily attacked by ozone. Repeated exposures to 2 to 3 ppm by volume of ozone induced some hemorrhage and edema in lungs of rats. Chronic exposure to ozone decreased the weight of young rats, and concentrations greater than about 1 ppm significantly affected their growth. Four factors that seem to modify the toxicity of ozone toward small animals are youth, physical exertion, alcohol, and respiratory infection. Studies on the toxic effect of ozone on man indicate that concentrations as low as 2 ppm may cause severe irritations of the respiratory tract within less than one hour. Liquid ozone especially in concentrations greater than 30% by weight is extremely unstable and will explode in a most violent and, usually, unexpected way. In handling liquid ozone, all the precautions for liquid oxygen, plus precautions for an extremely sensitive explosive are necessary. Generally, ozonides are unstable and should be handled with great caution until reliable studies of their stability have been made. The uncontrollable decomposition of ozonides is frequently accelerated by impurities and elevated temperature.

- 661 Studies on the Chemical Forms of Urinary Lead. G. T. Dinischiotu, et al. *Brit. J. Ind. Med.* 17, 141-145 (Apr. 1960).

Lead in urine has been determined by an ashing technique to give total lead and by a standard co-precipitation technique to give precipitable lead. In 44 normal subjects values obtained by both methods were the same. In 72 subjects exposed to lead, of whom 57 had clinical lead poisoning, the precipitable lead was significantly less than the total lead. As much as 40% of urinary lead can escape determination by the co-precipitation methods of estimation. Preliminary findings suggest that the non-precipitable lead may be present as a natural chelate. The significance of these observations is discussed. The danger is stressed that cases of threatened lead intoxication may be overlooked if only co-precipitation methods of estimating lead in urine are used. -- Authors' abstr.

- 662 The Value of Periodic Medical Examinations in the Prevention of Lead Poisoning in a Foundry. An Attempt to Classify the Subjects According to the Degree of Lead Absorption. M. Oltramare. *Z. Präventivmed.* 4, 302-309 (Sept. 1959). French.

Periodic medical examinations, including basophil granular counts as the main criterion, were undertaken in a brass foundry in Geneva, as some of the measures to assess and control the lead hazard when several cases of lead poisoning had suddenly occurred. Production at higher temperatures had been increased, though the same bronze alloy, which contained 25% of lead, had been made for 25 years. Atmospheric concentrations of lead are shown in a plan to have been well above the MAC and near the furnace to have reached 12 mg./cu.m. Additional and improved ventilation hoods were installed, a partition was built and workers were provided with masks to be worn during certain processes. While improvements were being made and others planned, the periodic examinations and the trend of blood changes assumed great importance. No new cases of poisoning developed. Workers exposed to lead were classified into 5 groups from safe to severely poisoned. The critical basophil granular picture, which separated those with slight lead absorption or possible unobtrusive poisoning from those with slight poisoning or evident absorption, was a quantitative or a qualitative one: a total of 5 granular cells per 1,000 red blood cells; or 2 per 1,000 with medium or coarse granules; or 1 per 1,000 with coarse granules. By means of this examination it was possible to pick out those with marked absorption before symptoms appeared. A graph shows the correlation between basophil granulation and lead exposure in a worker after he had returned to work following recovery from severe poisoning.

-- Cond. from Bull. Hyg.

- 663 Enumeration of Punctate Basophil Cells in Periodical Examinations of Workers Exposed to Lead. M. Oltramare, R. Lang and Jacqueline LeCoultré. *Z. Unfallmed. Berufskrankh.* 52, 235-242 (Sept. 15, 1959). French.

In examining punctate basophil cells, which though not pathognomonic of lead poisoning, are particularly numerous and characteristic, the authors classify the granulations, according to their size, as large, medium, and fine. They consider punctate cells specific to lead absorption when they number between 1 and 10 per 1,000 erythrocytes. They prefer staining by alkaline methylene blue to May-Grünwald-Giemsa since the former makes nearly twice as many visible as the latter. They also prefer direct light to dark-ground illumination on the grounds that the latter makes it more difficult to distinguish the size of the granulations, which vary with the severity and acuteness of the absorption. Among 50 lead workers, those with no symptoms showed almost entirely fine or medium granulations; in those with slight symptoms of nervousness, constipation, occasional abdominal pain and a hemoglobin level not lower than 80%, some cells contained large granulations; with overt intoxication—*anemia, colic and renal symptoms*—the punctate count was never below 8 per 1,000, and coarse granulations were always present. It is concluded therefore that an increase in the number of punctate cells practically always precedes the appearance of manifest clinical symptoms and that the special value of this enumeration lies in the prevention of the passage of those showing fine and medium granulations to those with coarse. A typical case is quoted of a workman who felt well and had a hemoglobin level of 85%, but who showed 10.6 per 1,000 punctate basophils, of which 2% had coarse granulations. He was therefore removed immediately from all contact with lead.

-- Cond. from Bull. Hyg.

- 664 Effects of Chronic Dieldrin Ingestion on the Muscular Efficiency of Rats. M. Khairy. *Brit. J. Ind. Med.* 17, 146-148 (Apr. 1960).

Several cases of dieldrin poisoning were reported among sprayers following repeated exposure to this insecticide. The symptoms developed by some of the most severe cases of poisoning included epileptiform convulsions. The effect of dieldrin on muscular efficiency of rats was studied. A state of chronic toxicity was produced by maintaining two groups of rats on a diet containing 25 ppm and 50 ppm of dieldrin respectively. A third group receiving a diet containing no dieldrin acted as a control. Muscular efficiency was measured by training the rats to pull weights of increasing magnitude in a 250 cm. runway. The time taken to pull weights through the standard distance was recorded. Dieldrin appeared to have

no effect on body weight, food intake, or learning, but muscular efficiency (as measured here) seemed to be affected by this compound. A progressive deterioration in muscular efficiency was observed, and was related to the amount of dieldrin administered. Although the nature of the deterioration cannot be deduced from this study, the results obtained here suggest possible lines of investigating the early effects on human beings of exposure to dieldrin.

-- Author's absts.

- 665 Intoxication with Parathion in Agricultural Workers: Observations and Notes in 41 Cases. G. Battiato. *Minerva med.* 50, 4086-4094 (Dec. 12, 1959). Italian.

The author reports on 27 agricultural workers who were moderately or severely poisoned by the insecticide, parathion. The most common symptoms of moderate intoxication, which appeared suddenly in these workers, were: abdominal pain; vomiting, frequently accompanied by vertigo; a slight degree of asthenia; headache; and bradycardia. Mild sweating was present in 7 patients, and mild fever in 11. The latter symptoms are apparently nonspecific, but to workers handling parathion spraying substances, they are a warning of possible imminent eruption of the poisoning effects. Severe intoxication with parathion had similar initial symptoms as the instances of moderate intoxication, and the onset was sudden and acute. Unlike the moderate form, however, marked adynamia, impaired consciousness developing sometimes into coma, profuse sweating, pulmonary edema, and arterial hypertension appeared within 2 hours after the onset of the symptoms. The arterial hypertension gradually decreased, and became normal within a few days. It seems that the same quantity of parathion may produce either moderate or severe symptoms of intoxication according to the individual reaction of the patient. Treatment with atropine is suggested at the onset of the symptoms, because initially, it is not known whether a mild or a severe form of intoxication will follow.

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

- 666 Parathion Poisoning. H. B. Klugman. *S. African Med. J.* 33, 899-901 (Oct. 24, 1959).

This is an account of 4 cases of accidental poisoning by parathion; the patients were members of a family who had eaten contaminated stew. The author discusses modern work on this condition and advocates the following system of treatment (in which pyridine-2-aldoxime methiodide (P2-AM) is used) as recommended by Grob and Johns. (1) Terminate exposure by removal from site of poisoning, removal of contaminated clothing, copious washing of skin and eyes, and gastric lavage. (2) Maintain a patent air-way by endotracheal intubation or tracheotomy if necessary. (3) Apply artificial respiration manually or by the use of the poliomat, artificial lung, or bellows on closed circuit anesthetic machine. (4) Administer atropine 2-4mg. (1/30-1/15 gr.) intravenously, followed by 2 mg. every 3-8 minutes until muscarine-like symptoms disappear, and whenever they reappear; a total of 24-48 mg. may be required the first day. In less severe intoxications give 2 mg. intravenously or intramuscularly, and repeat at 20-minute intervals until muscarine-like symptoms are relieved; maintain a mild degree of atropinization for 24-48 hours. (5) In severe intoxication give 2,000 mg. of 2-PAM (P2-AM) (500 mg. per minute) intravenously, and repeat the dose if weakness is not relieved or recurs. In moderate intoxication give 1,000 mg. intravenously and repeat if necessary.

-- Cond. from Bull. Hyg.

- 667 The Failure of Absorption of DC Silicone Fluid 703 from the Gastrointestinal Tract of Rats. J. Paul and W.F.R. Pover. *Brit. J. Ind. Med.* 17, 149-154 (Apr. 1960).

The intestinal absorption of silicone fluid 703, a methyl phenyl polysiloxane, has been studied in the rat. This silicone was chosen for the present investigation because of its lipid-like character and its solubility in olive oil. The experimental findings demonstrate that very little, if any, silicone is absorbed when fed in olive oil. No silicone was found in the lymph lipids of cannulated rats fed the silicone, and balance experiments by recovery of the organosilicon compound and triglyceride after feeding to rats for 3 hours showed that 85% of silicone fluid 703 was recovered from the gastrointestinal tract, whereas 70% of the fed

triglyceride was absorbed. The unabsorbed silicone was concentrated chiefly in the intestinal lumen. Balance experiments by recovery of the organosilicon compound after long-term feeding gave recoveries of 96% of the silicone. This amount was recovered entirely from the lower part of the gastrointestinal tract and the feces. No silicon fluid 703 was found in the liver, kidneys, or fat depots. The urine contained no soluble silica.

-- Authors' abstr.

- 668 Pigments and Lacquers, the Basic Ingredients of the Paint Industry. M. Hochweber. Z. Unfallmed. Berufskrankh. 52, 197-217 (Sept. 15, 1959). German.

Modern painting operations require low-boiling, rapidly volatile, potent solvents with components for preventing formation of film, pigments, binding materials, solvents and thinners, adhesives, emulsifiers, and disinfectants. Solvents are usually mixtures of aliphatic and aromatic hydrocarbons; cyclohexane, methylcyclohexane, tetralin, decalin, alcohols, ethers and esters, and the nitroparaffins have now to some extent replaced the once ubiquitous turpentine. Glycol and furfuran derivatives are much used as lacquer solvents. Binding materials have undergone much development during the last 30 years with the introduction of nitrocellulose lacquers and of synthetic resins obtained by polymerization; isocyanates and epoxy compounds and silicones are the most recent examples of this development. The main hazards from all these materials are summarized according to the processes in which they are used. Scraping of old paint involves inhalation of lead compounds and burning paint involves inhalation of zinc fume and decomposition products such as acrolein. Paint stripping with alkalis causes skin contact and in stripping with mixed solvents, both inhalation and skin contact occur. Sand blasting with quartz can cause silicosis. Chemical derusting and fluorizing bring contact with phosphoric and hydrofluoric acid and its salts. All methods of paint application involve inhalation of solvent vapors and volatile components; spraying carries the additional hazard of fine pigment particles, and hand cleansing with thinners, the risk of defatting the skin.

-- Cond. from Bull. Hyg.

- 669 Bibliography on the Biological Effects of Thorium. E. Hutchinson. UR-563. Rochester, N. Y. Univ. Atomic Energy Project. 48 pp. (Jan. 18, 1960). Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D. C.

Five hundred thirty references are presented on the biological effects of thorium.

-- Nuclear Sci. Absts.

INDUSTRIAL DUSTS

- 670 Sampling Microbiological Aerosols. H. W. Wolf, et al. Public Health Monograph No. 60. Public Health Service. 58 pp. (1959). For sale by Supt. of Documents, U.S. Government Printing Office, Washington 25, D. C. 45 cents.

Samples and equipment for use in bacterial air sampling are described and illustrated. Various methods for bacterial air sampling are discussed. It is pointed out that consideration should be given to the determination of particle size when studying air-borne microorganisms and their relation to respiratory infections, since the amount of particulate material and bacteria retained in the respiratory system is largely dependent upon the size of the inhaled particles. Some examples are included of air-borne bacterial concentrations likely to be found in various environmental situations. Factors influencing the concentrations of air-borne bacterial particulates are discussed.

-- Nuclear Sci. Absts.

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

This paper is concerned with the application of statistical methods to the problem of evaluating samples of air-borne dust obtained with the thermal precipitator. A brief description is given of the nature of the dust sample, followed by an outline of the techniques employed to estimate the number of particles deposited. The three main sources of counting variation: systematic differences between observers, basic counting error, and random distribution of particles in the dust deposit, are then considered. The effect of size distribution on counting errors is examined and it is shown that this factor may lead to appreciable variation in the recorded counts. Following a short description of various properties of the dust deposit which, although not strictly associated with the counting process, have a bearing on the reported concentration, recommendations are made about optimum procedures for counting thermal precipitator samples. -- APCA Absts.

- 672 Fundamental Studies on the Thermal Precipitator. Karlheinz Schmitt.
Staub 19, 416-421 (Dec. 1, 1959). German.

Research is described on the behavior of aerosol particles in a thermal gradient. The device used was an ingenious combination of a thermal precipitator and a Millikan oil drop apparatus. The effects of pressure and of carrier gas were investigated. Mathematical description of the results is possible only for particles with radii substantially larger or smaller than the mean free path in the gas. The results are discussed in terms of their application to practical thermal precipitators. -- Public Health Eng. Absts.

- 673 Investigation of Dust Samples with the Phase Contrast Microscope, Especially with the Use of Membrane Filters. K. G. Schmidt and G. Heidermanns.
Staub 19, 413-416 (Dec. 1, 1959). German.

A process is described for the quantitative mineralogical determination of different types of dusts on membrane filters, using the phase contrast microscope. This permits evaluation of the dusts without changing their state of aggregation. Mixtures of cinnamaldehyde and diethyl oxalate are used; these swell the filter and make it transparent without dissolving it. The technique permits examination of samples on the membrane in media with refractive indices ranging from 1.42 to 1.62. Composition of the mixtures are tabulated as a function of the resulting refractive index for one type of German-made membrane filter. -- Public Health Eng. Absts.

- 674 The Origin of the Term "Pneumonokoniosis". A. Meiklejohn.
Brit. J. Ind. Med. 17, 155-160 (Apr. 1960).

Throughout the literature on the dust diseases of the lungs, reference is frequently made to the fact that Professor Friedrich Albert Von Zenker (1825-1898) of Erlangen, introduced the term "pneumonokoniosis". A translation of the original German article in which the name "pneumonokoniosis" was coined is reprinted prefaced by a biographical sketch of its author, Professor F. A. Zenker. The article, entitled Ueber Staubinhalationskrankheiten der Lungen (Diseases of the Lungs due to the Inhalation of Dust) published in Dtsch. Arch. klin. 2, 116 (1867), is a general review of current knowledge of the subject. It incorporates original observations on Die Eisenlunge (iron lung) or Siderosis pulmonum (pulmonary siderosis). It is at the conclusion of this section that Zenker discusses nomenclature and suggests the generic term pneumonokoniosis. The manuscript was passed for publication in July, 1866, but the work was not published until 1867. These facts are mentioned because throughout the literature, the reference is usually dated 1866, when, in fact, it should be 1867.

- 675 The Clinical Significance of Cavitation in Anthracosilicosis. P. A. Theodos.
Ind. Med. & Surg. 29, 238-242 (June 1960).

Anthracosilicosis is the type of silicosis found in hard coal miners. It is characterized by a nodular, coalescent nodular or conglomerate form on the x-ray. The conglomerate form is the most common and is manifested by fibrotic masses of varying sizes, generally symmetrically distributed in both lungs. When the distribution is asymmetrical or when localization in one part of the lung occurs, the presence of associated infection is generally considered to be the cause. This infection is frequently tuberculous in nature and it is often accompanied by cavitation. The presence of tuberculosis can be confirmed by recovery of tubercle bacilli from the sputum. Treatment of silicosis with tuberculosis is similar to that for tuberculosis in general. Chemotherapy has been effective in controlling the manifestations of toxemia but has had very little effect on cavity closure and conversion of sputum. Collapse measures have seldom produced cavity closure and their use is limited by the reduced pulmonary reserve. No specific treatment is required when cavitation due to ischemic necrosis is present. Treatment is similar to the noncavitated cases utilizing such modalities as bronchodilators, cardiac drugs, antibiotics and intermittent positive pressure breathing. Recognition of the nontuberculous nature of cavitation is important so that unnecessary hospitalization in a tuberculosis facility can be avoided. A miner with ischemic necrosis can be permitted to live in normal relationship to his family and community and may even be gainfully employed depending on the adequacy of his pulmonary function.

- 676 Dust Content, Radiology, and Pathology in Simple Pneumoconiosis of Coalworkers. Part 1: General Observations. D. Rivers, M. E. Wise, E. J. King, and G. Nagelschmidt.
Part 2: Detailed Analysis of the Data. D. Rivers and M. E. Wise.
Brit. J. Ind. Med. 17, 87-108 (Apr. 1960).

Lungs from 45 coalworkers with simple pneumoconiosis have been compared with chest films obtained within 2 years of death. The carbon, quartz, mica, and kaolin content of the lungs was determined chemically. Large lung sections were used to assess the type and severity of emphysema and the presence of fibrous dust nodules. Histological sections were used to grade the amounts of reticulin and collagen in the simple dust foci. By using averages of 4 independent readings of each radiograph, subdivisions of the I.L.O. 1950 scale of categories were related to amounts of dust in the lungs. It was found that the mean weight of total dust in the right lung was: category 0, 4.3 g; category 1, 10.5 g; category 2, 14.5 g; category 3, 26.7g; and that the mineral and carbon contributed about equally to the radiological changes but, weight for weight, mineral contributed about 9 times more than carbon. A physical explanation for this is suggested, in terms of relative absorptions of x-rays by carbon and mineral; the coefficients of absorption of the various dust components and "wet tissue" are compared at various wavelengths, and the effects on radiograph are discussed. An explanation in terms of tissue reaction to dusts was also investigated but was not found to be plausible. "Mean ages of dust foci" (periods of dust retention) were studied from records of work underground, and compared with the radiological changes, the gradings for reticulin and collagen, and the presence of fibrous dust nodules. Observer variability in readings of x-ray films was greater when fibrous dust nodules were present. The application of the results to the interpretation of studies of progression of simple pneumoconiosis judged from the radiograph is described.

-- Authors' abst.

- 677 Critical Observations on the Diagnosis of Emphysema in Coal Workers. G. Worth, et al.
Arch. Gewerbepathol. Gewerbehyg. 17, 442-456 (1959). German.

The difficulty of defining and classifying emphysema is well recognized. This paper presents the results of clinical, radiological and physiological indices of the condition in a group of 1,521 coal miners with and without silicosis and 240 workers employed in various industries on equally heavy jobs but not exposed to dust. For their clinical index the authors accepted the classical, if unreliable, physical signs based on shape and mobility of the thorax. The radiological index was determined by the position, contour and movement of the diaphragm

and degree of radiolucency of the lung fields on inspiration and expiration. A residual volume of 35% and over of the total lung volume was used as the physiological index. The results of each index separately and then in combination are given and from the somewhat confused pattern that inevitably emerges the authors conclude that emphysema is commoner in miners without silicosis than in non-miners; that miners with silicosis have more emphysema than miners without and that this is to some degree related to the stage of silicosis.

-- Cond. from Bull. Hyg.

- 678 Pneumoconiosis in Makers of Artificial Grinding Wheels, Including a Case of Caplan's Syndrome. E. Posner. Brit. J. Ind. Med. 17, 109-113 (Apr. 1960).

Mass miniature radiography surveys in a factory producing artificial grinding wheels detected cases of pneumoconiosis, mostly of the silicotic type. All cases were traced to the department where the so-called "bond" is prepared and mixed with abrasive grains of carborundum and artificial corundum. This ceramic-vitrified bond, similar in composition to English general earthenware, contained until recently a significant proportion of free silica. The miniature film survey was followed up by an investigation on full-sized films, in which 92% of all workers in the bond department participated. The radiographs were subjected to dual independent viewing and it was found that 66% of the men who had worked in the bond department for more than 10 years showed radiological evidence of pneumoconiosis with a high proportion of progressive massive fibrosis. Recently the amount of free silica in the ceramic bond has been reduced by the introduction of "frits" in place of powdered flint and part of the factory has been rebuilt and new methods of dust suppression and dust extraction have been introduced. One of the cases presented with the rheumatoid-pneumoconiotic syndrome, first described by Caplan. It is suggested that some of the cases of pneumoconiosis, attributed to carborundum, may be due to the binding materials of artificial grinding wheels.

-- Author's abstr.

- 679 Increased Resistance of Silicotics to Type A Asian Virus Infection. E. C. Vigliani and M. Finulli. Med. lavoro 50, 517-522 (Aug.-Sept. 1959). Italian.

Asian virus Type A influenza was prevalent in Lombardy from September 1957 to April 1958. The authors studied the incidence of clinical infection among silicotics and compared it with that among the rest of the working population of the area. They based their diagnosis of influenza on a pyrexia above 38°C lasting at least 2 days with headache, pharyngeal congestion and asthenia. In the Clinica del Lavoro, Milan, there were 5 cases of influenza among 123 silicosis patients, an incidence of 4%, when 100 other (non-silicotic) patients in the same institution produced 20 (20%). The history of 334 patients who had been admitted for silicosis within the period of September 1, 1957 to March 31, 1958 suggested an infection with Asian influenza in 35 (10.5%), compared with an incidence of 41% in the whole insured working population of 540,985 in Milan Province. The lower incidence of Asian influenza among silicotic patients is statistically significant. The authors compare the increased resistance to Asian virus A shown by silicotic patients with a somewhat similar behavior in cases of tuberculosis. They suggest that the quartz which is inhaled stimulates the reticulo-endothelial system with an antibody response to antigenic agents; the quartz would destroy the endothelial cells by which it has been phagocytized, with the liberation of lipopolysaccharides of endotoxin-like properties.

-- Cond. from Bull. Hyg.

- 680 Clinical and Roentgenologic Observations on the Silicosis-Scleroderma Association. A. Francia, G. Monarca and A. Cavallot. Med. lavoro 50, 523-540 (Aug.-Sept. 1959). Italian.

Various European authors have written about the association of rheumatism with silicosis, sometimes complicated by sclerodermic manifestations. South African workers reported 16 cases of scleroderma in 8,000 gold miners, whereas 25,000 other patients seen at the Pretoria Hospital in the course of 4 years produced not a single case. The authors of

the present paper found 6 cases of scleroderma among 1,000 patients with silicosis. Scleroderma is likely by itself to impair the respiratory system and cause lung fibrosis which it may be difficult at first to differentiate from silicosis; and, in its turn, scleroderma may escape diagnosis for a time after it has supervened in a case of pre-existing silicosis. Both diseases involve more especially the connective tissue system. These authors discuss the clinical, x-ray and pathological aspects of the two diseases, and the reciprocal modification of the changes when both conditions are associated in the same patient, which they believe to be more common than is realized. They give an account of each case, including the findings in one autopsy. The onset of scleroderma in the course of pneumoconiosis accelerates the process of fibrosis and favors the supervention of tuberculosis. The authors endeavor to fit Vigliani's immunological theories of silicosis into the picture. -- Cond. from Bull. Hyg.

- 681 Silicosis: (2) Study of Sense of Taste and Pain Threshold. K. Yü-P'U & L. Yin-Tseng. Chinese Med. J. 79, 329-332 (Sept.-Oct. 1959). English.

The authors report on 417 patients, between the ages of 23 and 59 years, who were hospitalized in the Union Hospital in Peking, China; 278 of them had silicosis, 56 were suspected of having silicosis, and 83 had silicosis associated with pulmonary tuberculosis. All these patients had been working in a mine in South China, and had been exposed to silicon dioxide particles for periods ranging from 2 to 36 years. Estimations of the sense of taste and of the pain threshold were made in these 417 patients and in 115 healthy men who served as controls. Estimation of the sense of taste was made by rubbing the tongue with cotton swabs which had been soaked in sugar solutions of various concentrations. Estimation of the pain threshold was made with the aid of a tubular device in which a needle, carrying a weight, could be brought perpendicularly into contact with the skin to be tested. This test was applied to the flexor surface of the forearms, dorsum of the hands, and inner aspect of both thighs, and was repeated several times. The results showed that during the early stage of silicosis, even before there is definite radiologic evidence, there is an appreciable reduction in the ability to taste sweet substances and to feel pain, or an elevation of the respective thresholds has occurred. These observations confirm the known fact that patients with silicosis show disturbances of various types of analysors.

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

- 682 Silicosis: (3) Study of Vegetative Functions. K. Yü-P'U & L. Yin-Tseng. Chinese Med. J. 79, 332-335 (Sept.-Oct. 1959). English.

The same group of patients with silicosis and the same healthy controls, reported on in the preceding paper, were studied by the authors regarding the reaction of the skin to ultraviolet ir adiation. The dermographic reactions of the silicotics and of the controls also were studied. Both groups were subjected to water absorption tests, and their oculocardiac reflexes were studied. The results of these various examinations confirmed that patients with silicosis show a drop in autonomic nervous (vegetative) function (protective inhibition) in an early stage of their disease before a radiologic diagnosis of silicosis can be made. These findings, together with determination of the patient's occupation and his other symptoms, would be of value in the early diagnosis of silicosis.

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

- 683 Roentgen Study of Silicosis in Ceramic Workers Who Have Received McIntyre Aluminum Powder. J. W. G. Hannon, P. G. Bovard, and L. R. Osmond. Ind. Med. & Surg. 29, 286-289 (June 1960).

The authors have come to the following conclusions: (1) The inhalation of McIntyre aluminum powder can help protect the worker from silicosis for more than 15 years. (2) The use of McIntyre aluminum powder will prevent or decrease the rate of severity of the usual progression of ceramic silicosis. (3) There was no evidence that the inhalation of McIntyre aluminum powder was harmful in any manner to the workmen who took this type of additive prophylaxis in the prevention of silicosis.

- 684 Diffuse Lung Lesions that Mimic Pneumoconiosis. H. S. Van Ordstrand.
Ind. Med. & Surg. 29, 243-246 (June 1960).

Although new types of pneumoconiosis have been reported in recent years, non-occupational diffuse lung diseases have also been discovered, or have become better recognized. Some of the latter diseases can occur in workers in dusty trades, and the roentgen appearance of the lesions may mimic the roentgen evidence of occupational diseases of the chest. Some diffuse lung diseases that can so suggest a work relationship include the Hamman-Rich syndrome, pulmonary alveolar proteinosis, pulmonary alveolar microlithiasis, the collagen diseases, lymphomas, sarcoidosis, bronchiolar carcinoma, and metastatic malignant neoplasms. Examples of such mimicry have been shown. At a recent conference there were presented roentgen evidence and histologic examples of diffuse lesions due to mineral oil, periarteritis, miliary carcinomatosis, lymphoma, and farmer's lung, along with illustrations of comparable roentgenograms of some of the occupational lung diseases, including stannic oxide pneumoconiosis, talc pneumoconiosis, asbestosis, and both chronic berylliosis and the acute chemical pneumonitis of beryllium workers. -- Author's summary

PHYSICAL ASPECTS OF THE ENVIRONMENT

- 585 Human Cardioaccelerative Responses to Hypoxia in Combination with Heat. H. B. Hale.
Air University School of Aviation Medicine, USAF, Report 60-14. (Sept. 1959).

Human adaptation and performance during exposure to combined environmental stresses is an interesting and relatively unexplored field of physiology. The purpose of this study was to determine whether heat imposed either simultaneously or sequentially with hypoxia augments or suppresses the usual cardioaccelerative response to hypoxia. In all experiments the subjects were exposed to an air temperature of 49°C (120°F) and a relative humidity of 20%. In two experiments hypoxia was equivalent to an altitude of 18,000 feet and in two others to 14,000 feet. In 12 of 19 subjects heat exposure augmented the cardioaccelerative response to hypoxia. In the others, however, heat antagonized this response with a resulting bradycardia and, in some cases, frank syncope. Another unusual reaction to combined heat and hypoxia was a progressive fall in systolic blood pressure. Adverse adaptive responses to combined heat and hypoxia in a substantial proportion of otherwise healthy subjects thus justifies measures to prevent heat exposure in pilots prior to or during flights.
-- J. Occ. Med. Abstr.

- 586 Effect of Painting on Sound Transmission Loss of Lightweight Concrete Block Partitions.
H. J. Sabine and The Riverbank Staff. Noise Control 6, 62-66 (Mar.-Apr. 1960).

Masonry partitions built of lightweight concrete block are widely used in many types of buildings, such as schools, offices, hospitals, dormitories, and motels. In most cases, an adequate degree of sound insulation between rooms is an important requirement. Experience with lightweight concrete block partitions has shown, in general, that when they are left unpainted or unplastered on both sides, their sound transmission properties are quite variable and may often be wholly unsatisfactory. This is on account of the porous structure of the block, which allows sound to penetrate more or less freely. It is well known that plastering one or both sides of a partition having an abnormally low transmission loss will effect a considerable improvement, and similar results have been noted when a heavy paint coating is applied in such a manner as to seal the surface. In the present investigation it was found that the sound transmission loss of any lightweight concrete block wall having its surface porosity thoroughly sealed with paint does not depend on the pore structure, but is determined only by the weight and stiffness of the wall. The transmission loss of a painted porous wall is essentially equal to that of nonporous masonry of the same weight and stiffness.

- 687 Report on the Consistency of Sound Transmission Loss of Air-Borne Laboratory Measurements. R. Huntley. Noise Control 6, 80-82 (Mar.-Apr. 1960).

An attempt to answer the question: How well do 3 laboratories agree with each other in measurements on the same or similar specimens? The 3 laboratories are the National Bureau of Standards, the National Research Council of Canada, and the Riverbank Acoustical Laboratories.

- 688 Dynamic Mechanical Properties of Rubber-Like Materials with Reference to the Isolation of Mechanical Vibration. J. C. Snowdon. Noise Control 6, 74-79 (Mar.-Apr. 1960).

This is essentially a mathematical treatise of the subject. It may be concluded from this discussion that, ideally, the real part of the complex elastic modulus and the damping factor possessed by an anti-vibration mount material should vary only slowly with frequency, while at the same time the damping factor of the material should be large.

- 689 Critique of Our Present Noise Control Engineering Efforts and Accomplishments. C. H. Allen. Am. Ind. Hyg. Assn. J. 21, 130-135 (Apr. 1960).

Practically all of the engineering noise exposure limits are based upon the effects of long-term exposure to relatively continuous broad band noise. There is need to determine the effects of other types of noise upon the hearing of exposed persons. Pure tones and impulsive noises are found in many industrial situations. The relative effects of short exposures to high level noises as compared to extended exposure lower level noise also needs further study. The problem of measuring impulsive noise has not yet been solved satisfactorily. A punch press noise may have a maximum level as measured with the "fast" sound level meter only 3 to 5 db above the average "slow" reading but the true peak levels actually may be 8 to 12 db higher than this. When the true peak is measured, the width and the frequency content of an impulse is still elusive. Engineering noise control should embrace cooperative effort between plant management, engineering, and medical services and should include advanced planning for noise control in all new processes and new construction. Noise control is such a complex engineering problem that in general it is not economically practical for each industrial plant to train or maintain an engineering staff to solve these problems. However, it should be the responsibility of the engineering and medical staff to be able to recognize the existence of noise hazards through suitable monitoring of working conditions and to advise management as to the need for corrective action. -- Cond. from author's summary

RADIOACTIVITY AND X-RADIATION

- 690 Increased Skin Tolerance to High-Voltage X-Radiation in Patients Given Methoxsalen: Clinical Observation on 30 Cases. C. M. Levin and A. J. Bajek. Radiology 74, 300-301 (Feb. 1960).

Skin tolerance to high-voltage x-radiation exposure was substantially increased by giving methoxsalen to patients undergoing radiotherapy. Radiation sickness was also less frequent and less intense than in previous similarly treated patients. Induration or thickening of skin and subcutaneous tissues was also less marked.

-- Nuclear Sci. Absts.

- 691 The Effect of Radiation Upon the Heart. Mary Catterall.
Brit. J. Radiol. 33, 159-164 (Mar. 1960).

Twenty-six patients were investigated clinically, radiologically, and electrocardiographically, before and after radiation. The position of the heart relative to the beam of radiation was demonstrated radiologically and the dose received by the left ventricle was calculated. When the left ventricle received a dose of between 2,200 and 3,200 r in 3 weeks, electrocardiographic changes limited to the T wave occurred and indicated organic injury to the myocardium. This injury was temporary and the lesion behaved in an entirely innocent way. Pre-existing cardiac disease of severe degree may possibly be permanently worsened and it may be thought better to subject such patients to radical surgery rather than radiotherapy. From dissections, an intimate relationship between the heart and internal mammary lymphatics was seen in the majority of cases. In these it appeared that radiation, either by the glancing technique or by the use of a direct field over the internal mammary lymphatics would, unavoidably, deliver to the left or right ventricle a significant dose of radiation if the lymphatics were treated adequately. On dissecting some specimens, and radiologically in one patient, a wedge of lung tissue was seen lying between the lymphatics and the heart. In such cases this lung tissue was probably responsible for protecting the heart against receiving sufficient x-rays to cause electrocardiographic change.

-- Nuclear Sci. Absts.

- 692 Radiological Hazards in Veterinary Practice. D. C. Trainor, W. E. Foskett and L. F. Larsen. Australian Veterinary J. 8-13 (Jan. 1960).

According to the authors it is clear that there is a need for improvement in the techniques used in private practice and also a need for a proper appreciation of the dangers of ionizing radiation. It may be stated that the danger of leukemia from whole body radiation is remote but the danger of skin cancer is very real. Reference to the radiation readings taken at the University of Sydney show that the dosage to the skin (on the basis of 20 films per week) may be easily double the maximum allowable safe exposure of 1.5 roentgens per week. The following precautions are recommended: (1) A cone should always be used to keep the beam of rays to the smallest useful area. (2) A suitable disc filter will cut out all the softer rays without interfering in anyway with the more penetrating ones which are useful for radiography, and should always be used. (3) Protective clothing should be worn at all times. An apron protects the body from stray radiation and the gloves save the hands from direct beams. (4) The animal should be anesthetized or held by someone using suitable protective covering (gloves and apron). If sufficient people are engaged in the practice, those holding the animal should be rotated so that no one person gets too many exposures. (5) The x-ray apparatus should be checked from time to time. (6) Special care should be used in fluoroscopy as the operator is in the direct beam of rays and it is quite possible to get a large amount of direct radiation as well as scatter. The time should also be watched as there is a tendency to screen the patient for too long.

- 693 Determination of Strontium-90 Distribution in Human Bone. R. Björnerstedt and S. Häggroth. Nature 185, 366-367 (Feb. 6, 1960).

Various methods for the determination of strontium-90 in bone samples are discussed. The feasibility of using autoradiographic methods for measurements of strontium-90 concentration in human bones is likewise discussed. It is concluded that present levels of environmental strontium-90 in human bone as the result of fall-out would require an exposure time of one year to get a weak radioautogram. This assumes a concentration equivalent to one sunshine unit diffusely distributed and corresponds to the distribution in bones from children younger than 15 years.

-- Nuclear Sci. Absts.

- 694 Original Signs and Symptoms in Patients Surviving Five Years After Atomic Bomb Exposure Under 1,000 Meters. J. J. Lewis and Helen A. Patterson. *Am. J. Surg.* 98, 12-19 (July 1959).

Atomic bomb victims who were exposed under 1,000 meters and survived over 5 years were investigated. There were 619 patients who comprised a total sample. Mechanical, blast, burn, and radiation injuries were evaluated as to onset, duration, severity, body area affected, and type of healing. The model patient experienced severe radiation and mild trauma. Results were compared with similar earlier studies. The possibility that patients exposed within 1,000 meters with radiation or thermal injuries have been dying at a faster rate than those with mechanical or no injuries is discussed. -- Nuclear Sci. Absts.

ENVIRONMENTAL MEASUREMENTS

- 695 The Efficiency of Absorbers in Industrial Hygiene Air Analysis. J. C. Gage. *Analyst* 85, 196-203 (Mar. 1960).

The principles involved in the use of liquid absorbers for air sampling in the analytical control of atmospheric contamination have been reviewed. The effects of the volume of air sampled, the rate of sampling, and the design of the absorber on the efficiency of absorption have been studied by using test atmospheres containing ethylene oxide and chlorobenzene as examples of systems involving absorption by solution and by reaction. -- Author's abstr.

- 696 Organic Acids in a Selected Dialysate of Air Particulate Matter. Ethel D. Barber, et al. *J. Chromatography* 2, 615-619 (Nov. 1959).

Because of the difficulty of interpreting partition chromatograms of acids from air particulate samples, selective dialysis through cellophane was investigated as a means of simplifying the elution patterns. Five samples of particulate matter collected on glass fiber filters, and 2 samples of soot from the combustion of simple fuels were analyzed. The procedure consisted of extraction, dialysis, and column chromatography, followed by paper chromatography of radioactive anilides of unresolved portions of eluate. The results are presented, together with evaluation of the technique, and recommendations for further study. -- Public Health Eng. Absts.

- 697 Tolerance and Cross-Tolerance Development to Atmospheric Pollutants Ketene and Ozone. R. M. Mendenhall and H. E. Stokinger. *J. Appl. Physiol.* 14, 923 (Nov. 1959).

Tolerance to oxidants of rapid onset and a high degree of protectiveness, has been demonstrated in mice exposed briefly to ketene. Exposure to concentrations of ketene in excess of 5 ppm for 10 minutes protected mice 3 to 14 days later against otherwise-lethal exposures. A pre-exposure to ketene also protected mice against lethal concentrations of ozone (crossed tolerance). Ozone produced a cross tolerance for lethal exposures to ketene. The 10-day LC50 of ketene is about 17 ppm, with production of pulmonary edema. Pulmonary edema of lesser degrees resulted at lower exposure concentrations but was not present to a significant extent in mice exposed to lethal concentrations of the oxidants, provided the mice had first received a tolerance-producing pre-exposure of the oxidant.

-- J. Occ. Med. Absts.

- 698 Separation and Characterization of Polynuclear Aromatic Hydrocarbons in Urban Air-Borne Particulates. E. Sawicki, W. Elbert, T. W. Stanley, T. R. Hauser and F. T. Fox. Anal. Chem. 32, 810-815 (June 1960).

A simplified procedure is described for the characterization of polynuclear hydrocarbons in air-borne particulates. The method involves one pass through a chromatographic column and subsequent ultraviolet, visible, and fluorescence studies on the fractions thus obtained. The final step then involves a destructive method of analysis—e.g., spectral analysis in sulfuric acid—or a color test. The ultraviolet-visible absorption spectra of analogous fractions obtained from different communities are closely similar. In the air-borne particulates of some 100 communities pyrene, fluoranthene, benzo (a) fluorene and benzo (b) fluorene, chrysene, benz (a) anthracene, benzo (a) pyrene, benzo (e) pyrene, benzo (k) fluoranthene, perylene, benzo (g,h,i) perylene, anthanthrene, and coronene are found consistently.

-- Authors' summary

- 699 Abundance of Nitrous Oxide in Ground-Level Air. J. W. Birkeland and J. H. Shaw. J. Opt. Soc. Am. 49, 637-638 (June 1959).

The abundance of nitrous oxide in ground-level air was measured directly by a mass-spectrograph to analyze air samples. The values varied from 0.25 to 0.65 ppm with an average value of 0.5 ppm. The amount of nitrous oxide in ground-level air at Columbus, Ohio, was measured by comparing the absorption of the 4.5 micron nitrous oxide P-branch in atmospheric spectra with the corresponding absorption in the spectra of gas samples containing known amounts of nitrous oxide. The atmospheric absorption was found to correspond to a nitrous oxide abundance of 0.27 ± 0.05 ppm. No variation in abundance was detected over a 3-month period.

-- APCA Absts.

PREVENTIVE ENGINEERING

- 700 How to Control Gaseous Emissions to Abate Air Pollution. Anon. Heating, Piping and Air Conditioning 31, 111-126 (Dec. 1959).

In this report the basic methods for controlling emissions of gases and vapors are presented. These methods include source control, dispersal by means of stacks, collection with suitable equipment and zoning. The various types of equipment used to collect gases, how they perform, and where they have been used for air pollution control are also presented. The following topics are discussed in detail: What gases are considered contaminants. Criteria for control of gaseous emissions. Control of gaseous emissions. General methods for controlling objectionable emissions. Several aspects of air pollution control have not been discussed in this report, byproduct recovery being one of these. Many examples of profitable air pollution abatement systems can be mentioned in which the product recovered has sufficient value to pay for the cost of control. In a previous report the general aspects of air pollution control were discussed and four possible types of controls presently practicable were given. These included source control, effluent gas treatment, effluent gas dispersal, and zoning. There are 34 references to the subject.

- 701 What's New in Industrial Ventilation. G. M. Hama. Air Engineering 1, 43-46, 50 (May 1959).

Four new concepts in industrial ventilation are described. These include control of dusts from stationary and portable grinding wheels, control of fumes from traveling foundry ladles, and drycleaning solvent fume removal and recovery. Improvement in control of dust

from stationary grinding wheels is by a new hood design. The hood has a slot across the top of the wheel that generates a horizontal air curtain to protect the workers' breathing zone. Two vertical slots on either side of the wheel generate similar curtains to collect side splash and reduce pollution of the general environment. For portable grinding wheels, a low volume, high velocity dust control system is used. The small volume of exhausted air used is applied by close fitting hoods directly to the point of generation of dust where the dust is captured with very high air velocities. Small diameter flexible hoses convey the dust away from the tools to suitable collectors. The ventilating system for collecting fumes from traveling foundry ladles features an efficient portable hood which rides the ladle conveyor crane and effects local exhaust control during skimming, conveying, and pouring molds. The traveling hood is connected by a mobile transition box and flexible duct to a main collector duct extending the entire length of the conveyor line. For solvent fume removal and solvent recovery in dry-cleaning plants, an activated carbon adsorber is used. The solvent is recovered by passing live steam through the activated carbon. The vaporized solvent and steam is then passed through a condenser and into a separator.

-- Public Health Eng. Absts.

- 702 Coast's Largest Steel Plant Keeps Air Clean. Part 1 and 2. J. Smith.
Air Engineering 1, 21-24 (Nov. 1959); 31-34 (Dec. 1959).

An integrated steel plant creates a large variety of gaseous and particulate air-pollutants. Fourteen major sources, the pollutants of each, and solutions for each are briefly described; multiple approaches are required for many individual problems. The organization of the Air Control and Research Department and some activities of that department are presented. The author discusses application of air cleaning equipment to the open hearth stacks, at the car dumpers, and at the sinter plant. A unique phase of the air pollution control activities is a premium paid to the operating employees of the coke ovens if their ovens do not show visible smoke during frequent inspections by personnel of the Air Control and Research Department.

-- Cond. from Public Health Eng. Absts.

- 703 Settling Chambers for the Collection of Grit. R. Jackson.
Bull. Brit. Coal Utilization Research Assn. 23, 349-365 (Aug.-Sept. 1959).

A major problem in selecting a grit collector is to achieve a satisfactory balance between cost and efficiency. One of the oldest and simplest, and cheapest type of grit collector to install and operate, is a settling chamber. Particles settle through the gas under the action of gravity at a speed dependent on the size of the particle, its density and shape, also upon the density and viscosity of the suspending gas. An important advantage in the use of settling chambers is that, being simple in design, there is little limitation on the materials of construction. Ducts that transmit hot gases, such as blast furnace gas, are made from or are lined with refractory material both to retain the heat in the gases and to protect the supporting structure. A simple chamber that is merely an enlarged flue can be made of the same materials with no engineering complications.

-- APCA Absts.

COMMUNITY AIR HYGIENE

- 704 History of the Air Pollution Control Association. W. G. Christy.
J. Air Pollution Control Assn. 10, 126-137, 174 (Apr. 1960).

This article discusses the events in the history of the Air Pollution Control Association. Smoke control in the United States dates back to 1864. In 1880 the first city ordinance passed by City Council in Chicago failed, but it was adopted in 1881. By 1906 several cities

had smoke inspectors and a meeting was held with the idea of forming an association. The active membership was limited to municipal smoke inspectors and officers were elected. Membership broadened. Smoke ordinances were enacted. Conferences were organized. Regional sections formed as the association continued to grow during the past 50 years.

-- APCA Absts.

- 705 Aerosol Formation from Gaseous Air Pollutants. M. J. Prager, E. R. Stephens and W. E. Scott. *Ind. Eng. Chem* 52, 521-524 (June 1960).

Earlier research at relatively high concentrations has yielded condensed products in ozone-olefin or photochemical nitrogen-dioxide olefin reactions. These have been held responsible for reduced visibilities during smog attacks in the Los Angeles area. In this study aerosols have been formed in such reactions at parts-per-million concentrations only with highly substituted or cyclic olefins or diolefins. When sulfur dioxide is added to irradiated nitrogen dioxide-olefin systems, aerosols were obtained with all types of olefins. The hydrocarbon and oxide of nitrogen concentrations found in the Los Angeles area are insufficient to cause the reduced visibility. Reactions between olefins, oxides of nitrogen, and sulfur dioxide could conceivably account for the aerosol, but whether they do remains to be established.

-- I. E. C. Brief

- 706 Nitrogen Oxide Formation in Autoignition of Liquid Fuel Sprays. G. J. Mullaney. *Ind. Eng. Chem.* 52, 529-532 (June 1960).

Formation of nitrogen oxides in complex flames has been studied using a shock tube technique. The data obtained may be helpful in considering methods of reducing nitric oxide, which is an important factor in air pollution. At an air temperature of 950 K. before fuel injection, air pressure of 17 atmospheres, and a time interval of about 25 msec., the nitric oxide yield varied markedly with the fuel. 2-Propanol and ethyl alcohol, for example, because of their long ignition lag relative to the paraffins, produced much lower yields. There is some evidence that nitrogen-oxygen reaction kinetic data at high temperature can be used to estimate the amount of nitric oxide formed in the diffusion flame following autoignition. Its exponential dependence on temperature suggests that control of the maximum combustion temperature in engines will have a large effect on nitric oxide formation.

-- I. E. C. Brief

- 707 Effect of Synthetic Smog on Spontaneous Activity of Mice. R. D. Boche and J. J. Quilligan, Jr. *Science* 131, 1733-1734 (June 10, 1960).

Mice allowed to run in a revolving-drum activity cage are sensitive indicators of air pollution. They respond to the presence of synthetic smog by diminishing their 24-hour activity in the revolving wheels. The reduction in wheel activity is comparatively greater for larger amounts of smog.

-- Authors' abstr.

- 708 The Areas Within Concentration Isopleths Downwind of Continuous Point Source. W. P. Elliott. *Internatl. J. Air Pollution* 2, 115-126 (Oct. 1959).

Empirical formulas for estimating the area covered by concentration of gas equal to or exceeding a given value are presented. These formulae are derived from regression lines of the value of the logarithm of the area against the logarithm of the concentration divided by the source strength and multiplied by the wind speed at 2 m. The results are shown in the form of tables of the regression coefficients and illustrated in a graph. The data used to arrive at the results were taken over level prairie land with short grass. The tracer was sulfur dioxide emitted continuously from a point source about 1/2 m. from the surface. Measurements were out to a distance of about 800 m. from the source. The problem is to determine the area which will be subjected to concentrations equal to or greater than a specified value, and to discover some of the meteorological factors influencing this area.

-- APCA Absts.

- 709 Control of Smoke and Dust Emission from Existing Coal Equipment. H. J. Rose. Smokeless Air (London) 30, 190-193 (1960).

The major approach to controlling smoke emission from fuel beds has been the proper application of secondary air over the fuel bed to prevent smoke and soot formation at the source. An extensive program of engineering research, plus experience with many field installations, resulted in a technical bulletin as the standard engineering reference on the subject. Various city clean-air ordinances require that overfire-jet installations must conform with the recommendations of this BCR manual. Full information is given for blower jets, steam air jets, plain steam jets, and their operation. Smoke and dust emission are discussed in detail.

-- APCA Absts.

- 710 Note on the Exchange of Iodine between the Atmosphere, Land, and Sea. B. Bolin. Internatl. J. Air Pollution 2, 127-131 (Oct. 1959).

The deposition of I-131 as observed in small scale experiments and also after the Windscale incident, are interpreted in the light of available measurements of I-127 in the atmosphere and in plants. It is shown that the deposition velocity deduced from deposition of radio-iodine is representative of the gross transfer while the net flux from the atmosphere to a land surface is several orders of magnitude smaller. The observations show that plants use atmospheric iodine for their assimilation and that this may be their major source in spite of the indication that a larger portion of the atmospheric iodine is present in organic form and not readily available for assimilation. Finally a residence time of 20 days for iodine in plants is deduced.

-- Author's abst.

MANAGEMENT ASPECTS

- 711 How to Plan for Unexpected Disasters. F. J. Burgoyne. Safety Maintenance 119, 14-18, 47 (June 1960).

In June of 1953, Central Massachusetts, a normally tornado-free area, was struck by the devastating force of a tornado. Passing through residential towns and industrial areas, it left 10,000 people homeless, killed 94, injured hundreds, and left 60 million dollars worth of damage in its wake. In Worcester, Massachusetts, among the industrial plants badly hit was the Norton Company's new Machine Division Plant which had been opened only two months before. In a few brief minutes, important sections of the plant were immobilized and many of the employees were killed, injured, or made homeless. The author discusses Emergency Measures and Emergency Planning under the following headings: The Injured, Hazards from High Voltage Systems, Danger of Fires, Communications, Sightseers, Cleaning Trees and Debris, Machine Protection, Organization, Mutual Aid Program, Emergency Equipment, Pass System, Building Construction, and Roof Anchoring. Because of the changing long-term weather pattern, some experts believe that tornadoes and heavy winds are likely to be more frequent in the future. Whether or not this trend exists, they are certainly a normal part of the weather. Actually, there is no such thing as complete protection against tornadoes, but sensible planning by those who are responsible for plant maintenance and safety can save human life and protect millions of dollars worth of buildings and equipment.

- 712 Changing Concepts in Nutrition and Dietetics: Some Possible Applications to the Feeding of Native Mine Labors. F. W. Fox. Proc. Mine Med. Officers' Assn. (Johannesburg) 39, 1-18 (May-June 1959).

This is the text of an address given to medical officers of the mines by the doyen of South African nutritionists. The first part ranges widely over the changes in our attitude

toward the science of nutrition in the last 50 years. It is suggested that the standards of requirements of nutrients laid down in textbooks are often too high and could be reduced. High intakes, far beyond minimal needs, are not necessarily advantageous. The second part of the lecture gives a brief resume of trends in the policy of feeding miners on the compound. It is emphasized that there is need for research on the relationship between diet and physical efficiency. Enough attention may not have been paid to providing a variety of dishes and to meeting the miners' accustomed likes and prejudices. -- Bull. Hyg.

ACCIDENTS AND PREVENTION

713 More Power for Paint. Anon. Natl. Safety News 81, 38-39 (Apr. 1960).

Advertising men many years ago discovered that color sells. Not long after, safety men learned it also protects. So industrial plants began applying strong colors freely where high visibility was needed—to mark fire-fighting equipment, obstacles, exits, and points of high hazard. The power of color got a tremendous boost with the introduction of fluorescent coatings and pigments four times brighter than conventional paints. These dazzling colors have come into increasing use for advertising displays, and their eye-catching power explains the reason. Conspicuous applications of fluorescent colors include barricades, "low clearance" warnings, high-voltage wires and connections, switch boxes, floor hopper areas, loading platforms, explosives vaults, first-aid stations, valves, fire-fighting equipment, and industrial trucks. Where relatively large areas are to be covered, fluorescent colors are most effective when contrasted with regular colors. An example is diagonal stripes of fluorescent yellow or orange and regular black. Where hard hats are painted in various color schemes for safety "conspicuity" and identification of the wearer's occupation, fluorescent colors are often used. Gloves in these colors are also helpful in occupations where hand signals are used, as in crane operation. Fluorescent coatings are available in a variety of formulations for application by brush, spray, or roller. They can be obtained in any size container from a pint to a drum and in aerosol cans. Properly applied, fluorescent coatings should last a year, even when exposed to weathering. The most durable colors—red-orange and yellow-orange—will last up to 20 months. Indoors, even longer service may be expected. The paints are relatively low in toxicity.

714 A Million Fires and How to Prevent Them. Anon. Occ. Hazards 22, 23-24 (Apr. 1960).

Managements as a whole tend to overlook the danger from fire. They settle plants in rural areas, even in deep woods, without bothering to make sure of enough water to fight fires. They let scrap lumber, piles of paper, even flammable scrap metal, accumulate in yards and grounds. They don't worry when weeds and brush grow close to wooden sheds. If they do arrange for outside hydrants or standpipes, they are likely to shut off water flow during cold weather. The article contains a checklist of "do's" and "don'ts" for outdoor plant housekeeping. Following are some of the precautions suggested: Never store materials within 15 feet of blank masonry wall buildings, or within 50 feet of frame buildings. Don't handle repair jobs inside the storage yard, unless it is done inside a masonry wall building. Don't let the storage yard simply peter out; keep it inside fully fenced, well-defined limits. Don't leave empty drums, paint cans, and similar castoffs inside the storage yard; dispose of them daily. Don't park vehicles that contain gasoline or liquefied petroleum gas inside the storage yard. Don't clutter up roadways and aisles, even temporarily, with rubbish or inoperative equipment. Leave enough 15-foot-wide driveways to let fire-fighting equipment reach all parts of the storage area. Keep down weeds, brush, and grass in the storage yard and in nearby areas from which fire may spread to stored materials.

715 Sprinkler System Inspections. Anon. Safety Maintenance 119, 39-40, 56 (June 1960).

A sprinkler system may not be called upon to operate over a period of years, but to be effective it must be ready for operation at any time. This necessitates the use of high quality materials and devices, a high grade of installation, and good care and maintenance. The inspection in general is to check the maintenance of the system, to compile records from which determination of the sprinkler system's value in case of fire might be made, and to work out fire department methods which will obtain the fullest value in preventing loss by fire or excess water damage. Knowledge of the water supply of a sprinkler system as to where the supply comes from, its adequacy and pressure, may be obtained from plant engineers, and in most cases the local fire insurance inspectors will also have these data. Valves controlling the water supply for sprinklers should be kept open at all times. The pressure on the system should be recorded and checked against previous inspections. Height of water in elevated tanks, water level and air pressure in pressure tanks and provisions to prevent freezing are features to be looked into. Inspection should include a check on those features which might prevent the proper distribution of water upon the burning material; these should include partitions, shelving and decking, and piling of stock too close to sprinklers. A clearance of at least 18 inches should be maintained below sprinklers. Under certain storage conditions greater clearances up to 36 inches may be required. All new construction should be specially surveyed as to the protection required. In locations where there is much moisture or chemical fumes, piping and hangers are subject to corrosion and deterioration and should be protected by painting with an approved material. Sprinklers should not be painted. Temperatures maintained at the line of sprinklers determine the type of sprinkler to be used.

716 What Type of Glove? J. W. Simmons. Natl. Safety News 81, 37, 64-65 (Apr. 1960).

Hand protection is becoming more and more specialized. Unless the worker is provided with gloves designed for his specific job—for protection against cuts, abrasions, and toxic or corrosive chemicals—the hand program may be excessively expensive and provide little protection. In most cases, even the wrong glove is probably better than no glove, especially when the hands are exposed to solvents and chemicals that would cause immediate injury on exposure. But in other exposures, where skin damage is caused by prolonged exposure, the worker might have a false sense of security. As a result he might neglect protective and hygienic measures. This can be dangerous if, because of premature deterioration, the gloves should develop tears or punctures that would allow toxic substances to seep through and become trapped inside. Such measures do little to reduce lost time and compensation costs resulting from injuries and occupational skin diseases. If a glove is used in a solution for which it is not intended, its service life may be shortened to the point where replacement costs get out of control. When this happens, the natural reaction on the part of the glove specifier is to blame the supplier. Fortunately, most of these complaints have a happy ending. Testing services, available from most glove manufacturers at no charge to the user, are offered in several forms. The responsibility of the glove manufacturing industry is to provide dependable hand protection at lowest cost. With improved formulations, materials, and designs, today's industrial gloves are capable of providing better protection than ever before. To realize these benefits, gloves must be selected on the basis of function. Responsible glove manufacturers retain qualified specialists to help select the right glove for the specific job.

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MISCELLANEOUS

- 717 Mobile Laboratory for Assaying Refinery Wastes. M. T. Edmison.
Ind. Eng. Chem. 51, 69A-70A (Aug. 1959).

The Oklahoma Refiners' Waste Control Council has sponsored a mobile bio-assay laboratory operated by the Oklahoma State University Research Foundation for the on-site study of refinery wastes. The air conditioned mobile laboratory is equipped with polyethylene tanks and oxygen equipment for bio-assay operations, and chemical testing equipment. Each of the 13 cooperating refineries has permanent parking facilities with utility outlets for use by the laboratory during the periodic testing intervals. Studies thus far have shown the value of the bio-assay techniques for measuring efficiencies of refinery waste treatment methods and facilities.

-- Cond. from Public Health Eng. Absts.

- 718 A Review of the Literature of 1958 on Sewage, Waste Treatment, and Water Pollution. Part 3.
H. Heukelekian, et al. Sewage and Ind. Wastes 31, 763-803 (July 1959).

(See IHD Abst. 618, June 1960). This section covers water pollution, and includes the following major topics: biology, microbiology, slime growths, chemistry, oxygen sag, and stream self-purification, stream studies and surveys, stream standards, effects on water supplies, abatement and control. There are 235 references.

-- Public Health Eng. Absts.

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