Industrial Hygiene Digest

INDUSTRIAL HEALTH NEWS

LITERATURE ABSTRACTS

MEDICAL

ENGINEERING

CHEMICAL

TOXICOLOGICAL

LEGAL . . . decisions and trends

OCTOBER, 1959
(Vol. 23, No. 10)

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

Industrial Hygiene Features

Litigation breeders in industrial medicine are discussed in Abst. No. 990.

The disease concept of alcoholism is the subject of Abst. No. 993.

The topic of Abst. No. 997 is the treatment of low back pain.

For a series of papers concerned with epilepsy see Abst. Nos. 998, 999, and 1000.

See Abst. No. 1005 for changes in the ten commonest dermatoses in private practice.

A discussion on gamma-globulin therapy in chronic staphylococcic dermatoses is presented in Abst. No. 1007.

For hazards in the manufacture and use of plastics see Abst. No. 1010.

The subject of Abst. No. 1011 is the toxicity of boron oxide.

Abst. No. 1015 is concerned with experimental cancers in rats produced by chromium compounds.

Information on the biochemical mechanisms in chronic carbon disulfide poisoning is contained in Abst. No. 1024.

Farmer's lung in mushroom workers is the objective of Abst. No. 1028.

See Abst. No. 1040 for details on the medical problems of shift-work.

Data on an improved cascade impactor measuring aerosol particle sizes are given in Abst. No. 1060.

Considered in Abst. No. 1064 are the veterinary aspects of air pollution.

The theme of Abst. No. 1072 is how to improve safety through organization.

Details on laboratory hoods are given in Abst. Nos. 1076 and 1077.

Foundation Facts

NEW TRUSTEE ELECTED TO I-H-F BOARD. Mr. Newell R. Johnson, General Manager of the American Mutual Insurance Alliance, has been elected to the Board of Trustees of the Industrial Hygiene Foundation.

THRESHOLD LIMIT VALUES. The Threshold Limit Values for 1959, adopted by the American Conference of Governmental Industrial Hygienists, appear in this issue of the Digest. The limit value for bromine was changes from 1.0 to 0.1 ppm, chloroform from 100 to 50 ppm, and chloropicrin from 1.0 to 0.1 ppm. The list now contains 250 compounds plus 25 tentative values.

24th ANNUAL MEETING THIS MONTH. The program and registration cards for the 24th Annual Meeting were mailed on September 17, and the number of registration cards returned has been most gratifying. We hope that the broad scope of subject matter and the distinguished roster of speakers will appeal to representatives of all of our member companies. We look forward to a profitable and interesting meeting. The officers of the Foundation also have a full program, with meetings scheduled for the Executive Committee and two meetings for the Board of Trustees.

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THRESHOLD LIMIT VALUES FOR 1959[1]

Adopted at the Twenty-First Annual Meeting of the American Conference of Governmental Industrial Hygienists, Chicago, April 25-28, 1959

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 diseases.

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

1. Copied from A.M.A. Archives of Industrial Health, September 1959.

* Change in value previously listed.

Gases and Vapors (cont.)

Substance	PPM	Approx. Mg. per Cu.M.
Chloroprene (2-chloro-1, 3-butadiene)	25	90
Cresol (all isomers)	5	22
Cyclohexane	400	1400
Cyclohexanol	100	410
Cyclohexanone	100	400
Cyclohexene	400	1350
Cyclopropane	400	690
Decaborane	0.05	0.3
Diacetone alcohol (4-hydroxy-4-methyl-2-pentanone)	50	240
Diborane	0.1	0.1
o-Dichlorobenzene	50	300
Dichlorodifluoromethane	1000	4950
1,1-Dichloroethane	100	400
1,2-Dichloroethane (ethylene dichloride)	100	400
1,2-Dichloroethylene	200	790
Dichloroethyl ether	15	90
Dichloromonofluoromethane	1000	4200
1,1-Dichloro-1-nitroethane	10	60
Dichlorotetrafluoroethane	1000	7000
Diethylamine	25	75
Difluorodibromomethane	100	860
Diisobutyl ketone	50	290
Dimethylaniline (N-dimethylaniline)	5	25
Dimethylsulfate	1	5
Dioxane (diethylene dioxide)	100	360
Ethyl acetate	400	1400
Ethyl acrylate	25	100
Ethyl alcohol (ethanol)	1000	1900
Ethylamine	25	45
Ethylbenzene	200	870
Ethyl bromide	200	890
Ethyl chloride	1000	2600
Ethyl ether	400	1200
Ethyl formate	100	300
Ethyl silicate	100	850
Ethylene chlorohydrin	5	16
Ethylenediamine	10	30
Ethylene dibromide (1,2-dibromoethane)	25	190
Ethylene imine	5	9
Ethylene oxide	50	90
Fluorine	0.1	0.2
Fluorotrichloromethane	1000	5600
Formaldehyde	5	6
Furfural	5	20
Gasoline	500	2000
Heptane (n-heptane)	500	2000
Hexane (n-hexane)	500	1800
Hexanone (methyl butyl ketone)	100	410
Hydrazine	1	1.3
Hydrogen bromide	5	17
Hydrogen chloride	5	7
Hydrogen cyanide	10	11
Hydrogen fluoride	3	2
Hydrogen peroxide, 90%	1	1.4
Hydrogen selenide	0.05	0.2
Hydrogen sulfide	20	30
Iodine	0.1	1
Isophorone	25	140
Isopropylamine	5	12
Mesityl oxide	25	100
Methyl acetate	200	610
Methyl acetylene	1000	1650
Methyl acrylate	10	35
Methyl alcohol (methanol)	200	260
Methyl bromide	20	80
Methyl cellosolve (2-methoxyethanol)	25	80
Methyl cellosolve acetate (ethylene glycol mono methyl ether acetate)	25	120
Methyl chloride	100	210
Methylal (dimethoxymethane)	1000	3100
Methyl chloroform (1,1,1-trichloroethane)	500	2700
Methylcyclohexane	500	2000
Methylcyclohexanol	100	470
Methylcyclohexanone	100	460
Methyl formate	100	250
Methyl isobutyl carbinol (methyl amyl alcohol)	25	100
α-Methyl styrene	100	480
Methylene chloride (dichloromethane)	500	1750
Monomethyl aniline	2	9
Naphtha (coal tar)	200	800
Naphtha (petroleum)	500	2000
Nickel carbonyl	0.001	0.007
Nitric acid	10	25
p-Nitroaniline	1	6
Nitrobenzene	1	5
Nitroethane	100	310
Nitrogen dioxide	5	9
Nitroglycerin	0.5	5
Nitromethane	100	250
2-Nitropropane	50	180
Nitrotoluene	5	30
Octane	500	2350
Ozone	0.1	0.2
Paradichlorobenzene	75	450
Pentane	1000	2950
Pentanone (methyl propyl ketone)	200	[illegible]
Perchlorethylene (tetrachloroethylene)	200	1350
Phenol	5	19
Phenylhydrazine	5	22
Phosgene (carbonyl chloride)	1	4
Phosphine	0.05	0.07
Phosphorus trichloride	0.5	3
Propyl acetate	200	840
Propyl alcohol (isopropyl alcohol)	400	980
Propyl ether (isopropyl ether)	500	2100

Gases and Vapors (cont.)

Substance	PPM	Approx. Mg. per Cu. M.
Propylene dichloride (1,2-dichloropropane)	75	350
Propylene imine	25	60
Propylene oxide	100	240
Pyridine	10	30
Quinone	0.1	0.4
Stibine	0.1	0.5
Stoddard solvent	500	2900
Styrene monomer (phenylethylene)	100	420
Sulfur dioxide	5	13
Sulfur hexafluoride	1000	6000
Sulfur monochloride	1	6
Sulfur pentafluoride	0.025	0.25
Tertiary butyl alcohol	100	300
p-Tertiary butyltoluene	10	60
1,1,2,2-Tetrachloroethane	5	35
Tetrahydrofuran	200	590
Tetranitromethane	1	9
Toluene (toluol)	200	750
o-Toluidine	5	22
Tolylene-2,4-diisocyanate	0.1	0.7
Trichloroethylene	200	1080
Triethylamine	25	100
Trifluoromonobromomethane	1000	6100
Turpentine	100	560
Vinyl chloride (chloroethylene)	500	1300
Vinyl toluene	100	480
Xylene (xylol)	200	870
Xylidine	5	25

Toxic Dusts, Fumes, and Mists

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
Ammate (ammonium sulfamate)	15
Antimony	0.5
ANTU (alpha-naphthyl-thiourea)	0.3
Arsenic	0.5
Barium (soluble compounds)	0.5
Beryllium	2Y/m³
Cadmium oxide fume	0.1
Calcium arsenate	0.1
Chlordane (1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a-tetrahydro-4,7-methanoindane)	2
Chlorinated camphene, 60%	0.5
Chlorinated diphenyl oxide	0.5
Chlorodiphenyl (42% chlorine)	1
Chlorodiphenyl (54% chlorine)	0.5
Chromic acid and chromates (as CrO_3)	0.1
Crag herbicide (sodium 2-(2,4-dichlorophenoxy) ethanol hydrogen sulfate)	15
Cyanide (as CN)	5
2,4-D(2,4-dichlorophenoxyacetic acid)	10
DDT (2,2-bis(p-chlorophenyl)-1,1,1-trichloroethane)	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
Dinitrobenzene	1
Dinitrotoluene	1.5
Dinitro-o-cresol	0.2
EPN (O-ethyl O-p-nitrophenyl thionobenzenephosphonate)	0.5
Ferbam (ferric dimethyl dithiocarbamate)	15
Ferrovanadium dust	1
Fluoride	2.5
Hydroquinone	2
Iron oxide fume	15
Lead	0.2
Lead arsenate	0.15
Lindane (hexachlorocyclohexane, gamma isomer)	0.5
Magnesium oxide fume	15
Malathion (O,O-dimethyl dithiophosphate of diethyl mercaptosuccinate)	15
Manganese	6
Mercury	0.1
Mercury (organic compounds)	0.01
Methoxychlor (2,2-di-p-methoxyphenyl-1,1,1,1-trichloroethane)	15
Molybdenum (soluble compounds)	5
(insoluble compounds)	15
Nicotine	0.5
Parathion (O,O-diethyl-O-p-nitrophenyl thiophosphate)	0.1
Pentachloronaphthalene	0.5
Pentachlorophenol	0.5
Phosphorus (yellow)	0.1
Phosphorus pentachloride	1
Phosphorus pentasulfide	1
Picric acid	0.1
Pyrethrum	2
Rotenone	5
Selenium compounds (as Se)	0.1
Sodium fluoroacetate (1080)	0.1
Sodium hydroxide	2
Strychnine	0.15
Sulfuric acid	1
TEDP (tetraethyl dithionopyrophosphate)	0.2
TEPP (tetraethyl pyrophosphate)	0.05
Tellurium	0.1
Tetryl (2,4,6-trinitrophenylmethylnitramine)	1.5
Thallium (soluble compounds)	0.1
Thiram (tetramethyl thiuram disulfide)	5
Titanium dioxide	15
Trichloronaphthalene	5

Toxic Dusts, Fumes, and Mists (cont.)

Substance	Mg. per Cu. M.	Substance	Mg. per Cu. M.
Trinitrotoluene	1.5	Warfarin (3-(α-acetonylbenzyl)-4-hydroxycoumarin)	0.5
Uranium		Zinc oxide fumes	5
(soluble compounds)	0.05	Zirconium compounds (as Zr)	5
(insoluble compounds)	0.25		
Vanadium			
(V_2O_5 dust)	0.5		
(V_2O_5 fume)	0.1		

Radioactivity: For permissible concentrations of radioisotopes in air, see "Maximum Permissible Amounts of Radioisotopes in the Human Body and Maximum Permissible Concentrations in Air and Water," Handbook 52, U. S. Department of Commerce, National Bureau of Standards, March, 1953. In addition, see "Permissible Dose from External Sources of Ionizing Radiation," Handbook 59, U.S. Department of Commerce, National Bureau of Standards, September 24, 1954.
U. S. Department of Commerce Handbook 52 has been superseded by Handbook 69, "Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure," subsequent to the presentation of this report.
Handbook 59, U. S. Department of Commerce, has been revised by addition of addendum, Apr. 15, 1954.

Mineral Dusts

Substance	MPPCF	Substance	MPPCF
Aluminum oxide	50	Silica	
Asbestos	5	high (above 50% free SiO_2)	5
Dust (nuisance, no free silica)	50	medium (5 to 50% free SiO_2)	20
Mica (below 5% free silica)	20	low (below 5% free SiO_2)	50
Portland cement	50	Silicon carbide	50
Talc	20	Soapstone (below 5% free SiO_2)	20

Tentative Values

Substance	PPM	Approx. Mg. per Cu.M.	Substance	PPM	Approx. Mg. per Cu.M.
Allyl glycidyl ether (AGE)	10	45	sec-Hexyl acetate	100	590
Boron trifluoride	1	3	Isopropyl glycidyl ether (IGE)	50	240
n-Butyl glycidyl ether (BGE)	50	270	Lithium hydride		25γ/m³
Butyl mercaptan	10	35	Methyl mercaptan	50	100
Chlorine dioxide	0.1	0.3	Perchloromethyl mercaptan	0.1	0.8
Chloroacetaldehyde	1	3	Phenyl glycidyl ether (PGE)	50	310
Chlorobromomethane ($ClBrCH_2$)	400	2,100	Phosphoric acid		1
Diglycidyl ether (DGE)	10	55	n-Propyl nitrate	25	110
Dimethyl formamide	20	60	1,2,3-Trichloropropane	50	300
1,1-Dimethyl hydrazine	0.5	1	Triorthocresyl phosphate		0.1
Dipropylene-glycolmethyl-ether	100	600	Yttrium & inorganic compounds		5
Ethyl mercaptan	250	640	Teflon decomposition products	*	*
Furfuryl alcohol	50	200	Pentaborane (B_5H_9)	*	*
Glycidol	50	150			

* Until more data are forthcoming, it is important that atmospheric concentrations of these materials to which workers are exposed must be kept as near 0 as possible.

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

October, 1959
Volume XXIII
No. 10

Industrial Hygiene Foundation
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INDUSTRIAL HYGIENE DIGEST

Literature and News

NEWS ITEMS

976 National Fire Protection Association Conference.

Topics ranging from school and hospital fire safety to rural protection problems will be covered at the forthcoming Annual Fall Conference of the National Fire Protection Association. The meeting, to be held in Des Moines, Iowa, November 11-13, will bring together several hundred fire safety experts from the United States and Canada. Morning and afternoon sessions of the 3-day conference will treat a wide variety of subjects in the fire prevention and protection field. Among them are safe handling of flammable anesthetics in hospital operating rooms, fire alarm systems and extinguishers, electrical fire safety, and successful community fire prevention campaigns. Arrangements for the conference are being handled by a sponsoring committee made up of Iowa members of the National Fire Protection Association. Chairman is Ed. J. Herron, Iowa State Fire Marshal, with George C. Whitmer, manager of the Iowa Inspection Bureau, Des Moines, serving as co-chairman.

977 Industrial Nurses Conference.

The New York State Association of Industrial Nurses will hold its Eighth Annual Health Conference in New York City, November 6-8, 1959, at the Commodore Hotel. The Greater New York Association of Industrial Nurses will be the hostess group with Miss Elizabeth Van Steenburgh of Johns-Manville, Inc., as the Conference Chairman. Educational programs are being arranged for Friday and Saturday. The annual business meeting will be held Saturday afternoon and new officers will be announced. At the banquet that evening Miss Fannie Hurst, noted author and lecturer, will be the speaker. At the Sunday breakfast meeting the speaker will be Miss Caroline Simon, Secretary of State for the State of New York.

-- Am. Ind. Hyg. Assn. J.

978 Emergency Methods to Handle Victims of Radiation Accidents.

A special emergency procedure to handle victims of radiation accidents is being established at the University of Michigan Medical Center. A team of specialists, including physicians, surgeons, nurses, medical technicians and health physicists will work together to provide prompt diagnosis and treatment for patients exposed to extensive radiation. Dr. W. H. Beierwaltes, chief of the U-M clinical radioisotope unit and team coordinator, said the new plan was developed in light of the growing use of radioactive substances by industries and research laboratories throughout Michigan and northern Ohio. As now envisioned, radiation emergencies will be handled separate from the U-M's regular Emergency Service because of the different apparatus required and the expected nature of the injury. The victim of a radiation accident will be monitored for radioactivity by a Geiger counter at the emergency entrance of the medical center. If the patient is wounded, a surgeon and anesthetist will be on hand to treat him. For several days, samples of the patient's blood, sputum and urine will be checked for evidence of radiation effects. Doctors will also check for radioactivity in the victim's thyroid, the creases of his skin, his clothing and the vehicle which brought him to the hospital. At the accident scene physicists will calculate the amount of radiation which the victim might have received. These calculations will be given to attending physicians to help them decide the appropriate type of treatment.

979 "Our Nuclear Future".

Top spokesmen in the field of nuclear science from all parts of the United States will gather in Jackson, Miss., October 21-22 for a series of presentations on industrial and commercial uses of nuclear power. Industrialists and businessmen from every section of the country are expected to attend the sessions, jointly sponsored by ten Mississippi institutions with "Our Nuclear Future" as the theme. Although all the sponsors are Mississippi institutions, the subject matter to be presented is nationwide in scope. This is the first program of its kind to be held in Mississippi and one of the first in this category to be held in the South. Attendance will be limited to 350-400. A registration fee of $25 per person will cover the cost of attendance at all sessions, plus an informal gathering on the evening of October 20, luncheon, reception and dinner on October 21, and luncheon on October 22. Reservations are to be mailed to "Our Nuclear Future", care of the Mississippi Industrial Research Center, P. O. Box 1037, Jackson, Miss.

980 Action of Chlorinated Hydrocarbons.

At the Federation of American Societies for Experimental Biology, D. N. Calvert and T. M. Brody, of the University of Michigan Medical Center reported a 2 1/2 year study of the toxic effects of carbon tetrachloride. They reported that this compound and probably other chlorinated hydrocarbons are not poisonous but that they trigger a massive and prolonged discharge of adrenalin within the body. The resulting overload of adrenalin can severely damage the liver and prove fatal. The wholesale discharge of adrenalin somehow breaks down the body's stored fat and fills the bloodstream with fatty acids. At the same time, it impairs the flow of blood to the liver so that the organ cannot function normally. This chain reaction can be interrupted by blocking the signals from the brain and test animals show no ill effects from otherwise near-fatal doses of carbon tetrachloride. -- Am. Ind. Hyg. Assn. J.

981 Medical Documentation in Germany.

The Deutsche Gesellschaft für Dokumentation has established a sub-unit for medical sciences headed by Dr. O. Nacke, Stapenhorstrasse 62, Bielefeld, Germany. This medical section is primarily concerned with the organization of published information in the medical sciences, but is also interested in the organization of medical and hospital records and medical statistics. In the latter fields, members of the section have explored a number of new possibilities of deriving information from patients' records. The section publishes a quarterly journal, Dokumentation in Medizin und Biologie, now in its third volume. The journal is available on application to Dr. Nacke. -- Science Information News

COMING EVENTS

982

Nov. 1-5 -	American Fracture Association, New Orleans, La.
Nov. 2-4	Atomic Industrial Forum, Annual Conference, Washington, D.C.
Nov. 4-6	American Nuclear Society, Washington, D.C.
Nov. 4-6	Industrial Management Society, 23rd Annual Industrial Engineering and Management Clinic, Chicago, Ill.
Nov. 4-6	Seventh Annual Symposium on Antibiotics, Washington, D.C.
Nov. 8-10	National Fertilizer Solutions Association, St. Louis, Mo.
Nov. 8-11	Association of Military Surgeons of the United States, Washington, D.C.
Nov. 9-11	American Petroleum Institute, 39th Annual Meeting, Chicago, Ill.
Nov. 12-13	National Industrial Research Conference, Chicago, Ill.
Nov. 12-14	Gerontological Society, Inc., Detroit, Mich.
Nov. 15-20	Radiological Society of North America, Inc., Chicago, Ill.

Nov. 16-18	International College of Surgeons, Mid-Atlantic Meeting of the U. S. Section Hot Springs, Va.
Nov. 16-20	American Rocket Society, 14th Annual Meeting, Washington, D.C.
Nov. 16-20	Fifth International Automation Congress and Exposition, New York, N.Y.
Nov. 19	Society of Plastics Engineers, San Francisco, Calif.
Nov. 24	Manufacturing Chemists' Assn., 9th Semiannual Mid-Winter Meeting, New York, N.Y.
Nov. 29-30	American College of Chest Physicians, Dallas, Texas.
Dec. 5-10	American Academy of Dermatology and Syphilology, Chicago, Ill.
Dec. 6-10	American Inst. of Chemical Engrs., Annual Meeting, San Francisco, Calif.
Dec. 7-9	Chemical Specialties Manufacturers Assn., Annual Meeting, Washington, D.C.
Dec. 7-10	American Medical Association, Clinical Meeting, Dallas, Texas.
Dec. 9-12	New York State Society of Anesthesiologists, Inc., Postgraduate Assembly in Anesthesiology, New York, N.Y.
Dec. 11-12	Association for Research in Nervous and Mental Disease, Inc., New York.
Dec. 11-12	New York Heart Assn., Symposium on Salt and Water Metabolism, New York.
Dec. 28-29	American Chemical Society, Division of Industrial and Engineering Chemistry, Christmas Symposium, Baltimore, Md.

OCCUPATIONAL DISEASE STATISTICS

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

	Colo. June-July	Pa. Aug.-Sept.	Tenn. Aug.	Total
Anthraco-silicosis		39		39
Bronchiectasis		1		1
Bronchopulmonary		1		1
Carbon monoxide	1			1
Cement poisoning			2	2
Chlorine	1	1		2
Cyanide	1			1
Dermatisis	23	58	11	92
Fibrosis		1		1
Fumes (unidentified)		3		3
Lead poisoning	2	1		3
Oxides of nitrogen	1			1
Parathion	2			2
Pneumoconiosis	1	7		8
Pneumoconiosis (suspected)		21		21
Pneumonitis (in mushroom workers)		18		18
Respiratory irritation		2		2
Silicosis	3	98		101
Silicosis (suspected)		15		15
Silico-TB		2		2
Silico-TB (suspected)		2		2
Weed spray (unidentified)	3			3
Miscellaneous	4			4
Total	42	270	13	325

LEGAL DEVELOPMENTS

984 Registration Required by Radiological Health Service Act.

The General Assembly of the State of Tennessee passed during its last session an act designated as the Radiological Health Service Act to regulate the manufacture, use, receipt, possession, storage, and disposal of radiation sources. The Act provides for establishment of a Radiological Health Service within the Department of Health, the functions of which include: (1) collection and dissemination of information relative to radiological health; (2) encouragement, participation in, and the conducting of studies, training, research, and demonstrations relating to the control of radiation hazards and related research or studies as may be deemed advisable; (3) the application of controls necessary for protection of the health and well-being of people; (4) authority to require reporting of unexpected or unplanned incidents of excessive exposure and to take such action as necessary to cope with the resultant hazard; (5) adoption of rules and regulations pertaining to the manufacture, use, receipt, possession, storage, and disposal of radiation sources; and (6) inspection and examination of premises and operations involving radiation. The Act also requires that every person who owns or possesses one or more radiation sources on or after July 1, 1959 register with the Radiological Health Service. The Act provides for possession without registration of certain sources of radiation believed to be without undue risk such as naturally occurring radioactive material of very low activity; electrical equipment designed to produce radiation, but which may produce very low levels of radiation; self-luminous elements in such items as timepieces, instruments, and novelty items, but not exempting the manufacture of such; and radiation sources being transported in conformity with regulations of a Federal Agency having jurisdiction over such transport. -- Tennessee Ind. Hyg. News

985 Occupational Disease—Common-Law Action—Compensation Act Exclusive Remedy.

The employer's motion for summary judgment was granted because the claimant's petition spelled out facts which entitled her to a recovery for an occupational disease and not for damages in a common-law suit. The court noted that the claimant sought to recover for injuries which occurred over a period of time; that she alleged that these injuries were caused by her working in close proximity to certain baking ovens which sent forth large quantities of noxious and harmful paint and enamel fumes; that she breathed and inhaled these fumes many times each day and absorbed them constantly each day. The court ruled that the claimant's petition read in conjunction with the pertinent sections of the Occupational Diseases Act indicated an attempted recovery for an occupational disease. Motion for summary judgement granted. Oggesen v. General Cable Corporation. United States District Court, Eastern District of Missouri, Eastern Division. No. 58 c79(3). June 19, 1959.

BOOKS, PAMPHLETS AND NOTICES

986 Pneumoconiosis Abstracts, Volume 3—1951 to 1955. Anon. Pitman Medical Publishing Co., Ltd., 39 Parker St., London, W.C. 2, England. 176 pp. (1959). 65/-net.

This volume is a sequel to the two preceding volumes which were published in 1953 and 1954. These volumes contain abstracts which first appeared in the Bulletin of Hygiene;

the first volume covered the years 1926 to 1938, the second 1939 to 1950, and the present volume covers the years 1951 to 1955 inclusive. The set of three volumes therefore contains a comprehensive collection of abstracts of the important papers published in this field during a period of 30 years. In addition to abstracts on the various forms of pneumoconiosis, abstracts of articles are included which deal with standards of air dustiness; with concentrations of dust from various processes; with technical methods of measurement of dust; and with the study of the physical properties of dusts and of their chemical and mineralogical characters. All persons concerned with the study and control of dust diseases will find these volumes an invaluable source of information. -- JM

987 Manual of Industrial Radiation Protection. Part 2. Model Code of Safety Regulations (Ionising Radiations). Anon. International Labor Office, Washington Branch 917-15th St., N.W., Washington 5, D.C. 54 pp. (Geneva 1959) 75 cents.

This booklet contains the text of Chapter XI, Section 2, of the Model Code of Safety Regulations for Industrial Establishments for the Guidance of Governments and Industry (published by the International Labour Office in 1949) as amended in 1957. It also constitutes Part 2 of the Manual of Industrial Radiation Protection which the International Labour Office is in the course of publishing. The provisions in the present booklet incorporate the most recent knowledge on industrial radiation protection. They are of great value at the present time when radiation techniques are spreading very fast throughout industry—faster probably than the spread of knowledge of the precautions that they require. However, they impose no obligations on anyone. These provisions, like all the other provisions of the Model Code, are designed as an aid to governments and industry when drafting or revising their own regulations and safety codes. -- JM

988 Workmen's Compensation Problems. Proceedings—44th Annual Convention of the International Association of Industrial Accident Boards and Commissions, Seattle, Washington. September 7-11, 1958. U. S. Department of Labor, Bureau of Labor Standards. Bulletin 201. 212 pp. (1958). For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C. 60 cents.

The proceedings of this convention were prepared for publication by the staff of the Bureau of Labor Standards. Some of the papers in the proceedings, selected at random, are on The Evaluation of the Cardiacs' Work Potential, The Need for Workmen's Compensation Statistics, a panel discussion on Back Injuries, Management's Viewpoints on the Present Status and the Future of Workmen's Compensation Laws, Workmen's Compensation in Review, and similar important and interesting topics of current significance. -- JM

INDUSTRIAL MEDICAL PRACTICE

989 Pathological Reports for Mortality Statistics. C. L. Erhardt, L. Weiner and Grace McAvoy. J. Am. Med. Assn. 171, 33-36 (Sept. 5, 1959).

It has been supposed that the accuracy of mortality statistics could be improved by requiring that statements of the cause of death, as originally reported on the death certificate, be subsequently revised in the light of the autopsy report. This hypothesis was tested in a study of 5,217 autopsy reports in the year 1956. Of this number, only 794 (15.2%) indicated changes in the stated cause of death. The impact on the final statistics was practically negligible, and the gain in accuracy did not seem sufficient to justify the labor expended in making the proposed changes. Improvements in procedure are still possible, especially in some localities. Physicians should be encouraged to review gross autopsy findings before completing death certificates, but the proposed requirement that the pathologist submit a later report has evident disadvantages. -- Editor's Summary

990 Litigation Breeders in Industrial Practice. J. L. Barritt.
Ind. Med. & Surg. 28, 393-397 (Sept. 1959).

Once the regular routine progression of an industrial case from injury to recovery or settlement is interfered with, the door is open for litigation. The injuries described are sources of controversy out of proportion to their numerical frequency. Some of these "litigation breeders" simulate other conditions. Some tend to merge with and overlap nonindustrial ailments so that segregation of the disability resulting from each is almost impossible. The fact that many of these conditions flourish only in a climate of emotional instability does not lessen the surgeon's responsibility in many of these cases, and early diagnosis and a realization of the dangers involved will minimize controversy and litigation.
-- Author's summary

991 Pulmonary Infiltration with Eosinophilia, Loeffler's Syndrome, Due to Smoke Inhalation: Report of a Case and Comment on Pathogenesis. W. Tschumy.
Ann. Internal Med. 49, 865-872 (Sept. 1958).

A fireman had complained of chest tightness, weakness, shortness of breath, and increasing unproductive cough for a period of two weeks after having been overcome by smoke at the scene of a fire in a fabric and upholstery store, two weeks prior to the onset of the symptoms. Originally the x-ray findings were negative, but later a widespread and patchy infiltration was indicated throughout both lungs except for the apices. This transitory pulmonary infiltration and an eosinophilia, Loeffler's syndrome, quickly cleared and returned to normal following administration of Prednisone. The clinical course of the illness suggested as the pathogenesis for this syndrome a delayed type of allergic response in the lungs to an unknown antigen in the smoke. -- APCA Absts.

992 Evaluation of Disability in Coal Miners with Chronic Pulmonary Disease. W. H. Anderson and W. F. Schmidt. J. Am. Med. Assn. 171, 145-150 (Sept. 12, 1959).

At the present time the maximum breathing capacity test provides the most significant correlation between symptoms and history of ability to work without pulmonary symptoms, as compared with the vital capacity or three-second timed vital capacity tests. As a study that can be readily performed in the general hospital or physician's office, it offers the most practicable objective guide to evaluation of dyspnea in relation to hard manual labor in coal mining. This conclusion is based on studies carried out in 482 persons, most of whom were soft-coal miners, divided into seven groups by varying degrees of breathlessness in association with physical activity. Similar studies should be done to serve as disability guides for other groups of workers. -- Editor's summary

993 The Disease-Concept of Alcoholism. D. Parr.
Trans. Assn. Ind. Med. Officers 9, 65-68 (July 1959).

In diagnosing chronic alcoholism in individuals, doctors should keep firmly to clinical criteria, and avoid being lured into the indiscriminate application of this term to all who, by social or moral standards abuse alcohol. To limit the medical concept of alcoholism in this way is in no sense reactionary, for it leaves physicians with the formidable tasks of treating those alcoholics who ask for treatment and of persuading the others to ask for it. As doctors, the main concern with problem drinkers who are not alcoholics is to recognize the incipient addicts amongst them, and at the least to tell them something of the risks they run. -- Cond. from author's conclusions

994 A Small Outbreak of Epedemic Keratoconjunctivitis. M. Perria.
Igiene Moderna 51, 762-769 (Sept.-Oct. 1958). Italian.

The author reports a small outbreak of epedemic keratoconjunctivitis which occurred in the summer of 1955 at Genoa. In all, 68 cases were detected, including 52 among the clerical staff of an insurance office and a navigation society, with 16 secondary cases in the families

of some of the patients. The outbreak started in mid-July and cases followed at the rate of 1 to 2 per day until September 9. Clinically there were conjunctival hyperemia; hypertrophy of the lower fornix, preauricular lymphadenitis, and nummular keratitis on the 3rd to 4th day. Both eyes were affected in about 70% of the patients. Forty-seven patients recovered completely in 15 to 30 days without any sequelae, but in the remainder corneal irritation lasted for nearly one year. Although the insurance society had an eye clinic, the author considers that having regard to the great care taken at the clinic in the sterilization of instruments, etc., the only possible method of infection from one person to another was through the papers, files and even the typewriters and calculating machines passed or used by one clerk after another. -- Bull. Hyg.

995 Routine Chest X-Ray in Industry. D. L. Caldwell.
Trans. Assn. Ind. Med. Officers 9, 76 (July 1959).

If a routine yearly x-ray could be instituted on a wide scale, particularly concentrating on the older male age group, then there should be an increasing number of early carcinomata diagnosed, and cases of chronic infectious pulmonary tuberculosis would also be discovered and treated and in many cases rendered non-infectious. It is suggested that if such examination could be made compulsory, there could be an agreement between the Trade Unions and the employers that any disease discovered in this way could be treated while the employee is given a long period of sick leave on full pay. This would enable employers to retain the services of their employees and would in the long run probably reduce periods lost from work by sickness because of early detection. This could perhaps be arranged either locally with individual firms, or even on a national scale.

996 Living and Working with Heart Disease. L. J. Goldwater. Ind. Hyg. Rev. 2, 10-15 (May 1959).
(The original paper appeared in J. Maine Med. Assn. 50, 78-80 (Mar. 1959).

The purpose of this article is to summarize the results of a series of studies which were started in 1941 and have been continued up to the present time. All of these studies deal with the occupational potentialities of persons who have heart disease. The term "cardiac rehabilitation" has been applied to this work although this may be something of a misnomer. For the cardiac who wants to work, the outlook today is far brighter than it was a decade ago. Strong evidence is now available that most persons with heart disease who are intelligently placed and who remain under medical supervision can look forward to many years of gainful employment. The outlook for them is certainly no worse, and is probably better than it would be if employment were to be terminated. Medical research is constantly adding to the knowledge available to physicians and at the same time forcing the modification or rejection of older beliefs. It is now definitely known that the time-honored advice to cardiacs to "take it easy" may do more harm than good.

997 Low Back Pain. G. S. Hackett. Ind. Med. & Surg. 28, 416-419 (Sept. 1959).

Ligament and tendon relaxation (incompetency) is the cause of more low back disability than any other entity and is the cause of more referred pain as far as the toes and more sciatica than from all other conditions combined. Dermatomes of referred pain areas from specific disabled ligaments and tendons have been constructed from observations while giving approximately 18,000 injections (intraligamentous) in the diagnosis and treatment of 1,706 patients over a period of 19 years. The dermatomes are valuable in diagnosis by directing attention to the ligament as the origin of pain. Treatment by prolotherapy has been successful in 82% of the patients treated. -- Author's summary

998 Epilepsy and the Employers Liability. C. Beaumont.
Trans. Assn. Ind. Med. Officers 9, 53-56 (July 1959).

The author is an English attorney. He discusses epilepsy and employer's liability as this applied to British law. The question of employer's liability is divided into three distinct but related parts: (1) His liability to the servant himself. (2) His liability to fellow

servants and might be injured by a servant's negligence. (3) His liability to third parties who might be injured by a servant's negligence. Words and terms are defined and court cases involving injuries or damages resulting from attacks of epilepsy are cited.

1000 Out-Patient Management of the Epileptic. C. Edwards.
Trans. Assn. Ind. Med. Officers 9, 51-53 (July 1959).

It cannot be too firmly stated that the majority of the sufferers from epilepsy and certainly nine-tenths of those who come to an average hospital neurological clinic, are psychologically normal. Any therapeutic management which begins with an assumption of psychological abnormality, albeit hidden, is bound to fail. Broadly the aim is to safeguard these people from doing serious injury to themselves, or to others, in their attacks. It is obvious that no epileptic should do work where the sudden loss of consciousness is going to expose him, or others, to the risk of serious injury. He cannot work at heights, he should not work at the water's edge, he must not control machinery, and, in particular, moving machine-driven vehicles, he cannot be a stoker and he cannot do many other obviously dangerous jobs. But there are numerous jobs he can do, and do as well as the next man, but from which he is debarred simply by ignorance, prejudice, superstition and fear. The fear which other people have when they see an epileptic suffering a fit is very variable but it is very considerable in some people and cannot be ignored. For that reason those who are subject to frequent epilepsy should not do jobs where they are constantly meeting the public. It is true that many of them succeed in holding such jobs and that is because many people have attacks which occur exclusively at night or first thing in the morning. One of the principal aims is to achieve regularity of time-table for epileptics. Regularity is more important to them than to most patients. Hence shift-work is unwise for epileptic patients, that is shift-work which changes every week or two. Regularity of meals is also very important for the epileptic, and it is most important that he should never go for more than five of his waking hours, at most, without taking food.

1001 The Difficult Epileptic and his Social Environment. D. Hill.
Trans. Assn. Ind. Med. Officers 9, 49-51 (July 1959).

The great majority of patients with epilepsy are psychologically normal people and with the exception of the avoidance of obvious hazards such as working at heights, near heavy machinery or in intense heat, or driving vehicles, there should be no restrictions placed on their lives. When the 15% of epileptics who have personality disorders are considered, it is found that the majority of these are sufferers from temporal lobe epilepsy. These patients have suffered brain damage, usually early in life, but a proportion, particularly those in whom the fits start in adolescence or later, have small focal lesions in the temporal lobe which may be operable. In these cases it is the level of intelligence and in particular the severity of the personality disorder which determines their social adjustment. The need for a comprehensive study of the epileptic patient whose work record is failing or who has developed personality disorder is apparent. Such a study not only includes the physiological, clinical and pathological aspects of his disorder but also involves an assessment of the personality disorder, the intelligence level and the social relationships of the patient. This sort of work involves a team of people having different techniques and disciplines. The Cohen Report on the Medical Care of Epileptics (1956) recommended the establishment in England of a number of such investigatory units which would have just this function. The number of patients for whom such units would cater may not be great—there are probably about 50,000 temporal lobe epileptics in Britain—but there can be no doubt that their existence constitutes a considerable medico-social problem. --Cond. from author's conclusions

1001 Occupational Lung Cancer: A Review. R. Doll.
Brit. J. Ind. Med. 16, 181-190 (July 1959).

The history of industrial lung cancer has shown that a specific industrial hazard may be overlooked for many years by both management and employees. The first indication of a risk has usually been an acute medical observation that a disproportionate number of the patients presenting with lung cancer have been employed in a particular industry; alternatively

evidence has been provided by the occupational mortality statistics for the whole country or by an analysis of the occupations recorded on the death certificates in the locality in which the industry was situated. Sometimes this evidence has been overwhelming, as in the case of the Schneeberg miners; but usually, to obtain proof of the existence of a risk, it has been necessary to carry out a detailed study of the fate of selected workers over a number of years and to compare the mortality among them with that recorded for other populations. Lung cancer is a rapidly fatal disease and although it is now a common cause of death, its prevalence is so low that, even in the presence of a major risk, the examination of as many as 1000 workers may fail to reveal any cases at all on a single occasion. In recent years, the mortality from lung cancer due to nonindustrial causes has increased enormously; now in Britain, lung cancer accounts for more than 10% of all deaths among men aged from 45 to 64 years, the ages at which a risk of industrial cancer may most readily be detected. In these circumstances, the discovery of a new risk by simple clinical observation is difficult and if any additional risks remain to be discovered it is probable that they will be revealed by planned prospective studies, undertaken with the special object of finding out whether any risks exist. In this respect, detailed studies of the relationship between exposure, incidence, and duration of latent period may be of particular value.

-- Cond. from Author's Conclusions

1002 Evaluation of an Oxygen Therapy Unit. R. C. Balagot and M. S. Sadove. J. Am. Med. Assn. 171, 36-40 (Sept. 5, 1959).

A portable tank with a capacity of 56 liters of compressed oxygen is equipped with control valves, pressure gauge, plastic bag, and mask for use in short-period oxygen therapy. A unit of this sort was tested on 9 subjects under conditions permitting continuous determinations of oxygen concentration of the air of the oropharyngeal passage and of oxygen saturation in the blood of the ear. In addition, blood samples were obtained for determinations of arterial oxygen and carbon dioxide concentration in 4 subjects asleep under thiopental. The flow from the tank was initially about 6 liters per minute and declined as the pressure fell. It gave satisfactory oxygen and carbon dioxide values in unconscious persons for about 12 minutes. When the rate of flow declined below 4 liters per minute the elimination of carbon dioxide from under the mask was inadequate, so that after the 12th minute there was a significant degree of hypercarbia.

-- Editor's summary

SKIN DISEASES AND BURNS

1003 A Contribution to the Study of Delayed Injury by Pneumatic Tools. G. Brehm and H. Holzman. Berufsdermatosen 6, 309-316 (Dec. 1958). German.

A case is described of a man of 47 who in 1958 presented sclerodermatic changes in the palmar aspects of all fingers, shrinkage of the terminal phalanges of both index and little fingers and the middle finger of the right hand associated with attacks of acroasphyxia provoked by exposure to cold. Although the face, the rest of the skin and the cardiovascular system appeared to be normal it was possible to demonstrate some delay in the recovery of normal surface temperature, after chilling, on the distal part of the left upper extremity. The question had arisen as to how far this man's condition, which interfered with his manipulation of tools and prevented his riding a motorcycle, could be attributed to military service. He had evidently not himself attributed it to vibration because he did not disclose that he had ever worked with a pneumatic drill until he was asked specifically about it. During his service, however, he had had several severe attacks of tonsillitis one of them associated with arthropathy. The case was not typical of constitutional sclerodermia or of Raynaud's disease and yet at least 7 years had elapsed between the employment and the development of any symptoms and the characteristic predilection for the left hand was lacking. In giving their opinion the authors seem to have accepted the possibility that the vibration which, by the way, preceded the tonsillitis, might have combined in some way with the latter to produce the clinical picture they describe.

-- Cond. from Bull. Hyg.

1004 Dermatitis in the South Wales Mining Industry: A Report of a Survey of Two Collieries. B. F. Matthews. Brit. J. Ind. Med. 16, 200-207 (July 1959).

A survey to determine the prevalence of dermatitis in collieries and to investigate the etiology of the condition has been carried out in South Wales. Two collieries were chosen because of a marked variation between them in the incidence of claims for dermatitis compensation. The method was to examine the entire colliery populations and to submit the cases found to detailed study. The cases were classified as occupational and non-occupational, and a third group was reserved for doubtful cases possibly related to occupation. The prevalence of occupational dermatitis was almost the same in the two collieries. The incidence of claims for benefit does not therefore appear to reflect the true prevalence of the disease. A correlation between the contrasting claim rates and variation in the severity of occupational dermatitis in the two collieries was established. Occupational dermatitis most commonly developed on the lower limbs; this tendency was greatest in coal face workers. The special distribution of the rash corresponded to the areas most exposed to frictional damage at work.

-- Cond. from author's abstract

1005 Changes in the Ten Commonest Dermatoses in Private Practice. E. F. Corson, H. A. Luscombe and J. K. Corson. A.M.A. Arch. Dermatol. 79, 179 (Feb. 1959).

The authors compare the diagnosis of the 10 most commonly encountered skin diseases in private practice circa 1930 with an equal number of dermatosis seen in 1955. The trend is of general interest. For example, contact dermatitis advanced from 3.1% to 11.1% in the 1955 series. The reason for its advance was twofold, according to the authors: (1) increased diagnostic ability, and (2) the many new allergies in industry and everyday use. Impetigo, 4.7%, and scabies, 3.2% in the 1930 study, did not qualify in 1955 as among the top 10. Better personal and public hygiene was said to accout for the latter findings. The Tineas (all types) dropped from about 13%, first place in 1930, to 6.1%, sixth place in 1955. There is considerable doubt as to what may have produced this decrease. The authors suggest that perhaps the well-advertised proprietary preparations sold over the counter have allowed more patients to treat themselves successfully. -- J. Occ. Med. Absts.

1006 The Growth of Aerobic Bacteria in Metal-Cutting Fluids. C. O. Tant and E. O. Bennett. Appl. Microbiol. 2, 388-391 (Nov. 1958).

A variety of bacteria that had been isolated from industrial machine cooling fluids were grown in artificial media, suspended in saline and inoculated into freshly prepared coolants, held at room temperature. Pseudomonads grew in all products and Proteus vulgaris in all but one. The growth of other coliform organisms was variable, depending on the strain and coolant. In most cases Staphylococcus aureus and Streptococcus pyogenes failed to grow, or to survive for more than a few days. -- Bull. Hyg.

1007 Gamma-Globulin Therapy in Chronic Staphylococcic Dermatoses. W. J. Morginson, D. C. Wood and L. Burgess. A.M.A. Arch. Dermatol. 79, 305 (Mar. 1959).

Chronic staphylococcic infection associated with eczematoid dermatitis, seborrheic dermatitis, intertrigo, pyoderma, folliculitis, furunculosis, and acne vulgaris were studied in a series of patients to determine whether the list showed a lowered antibacterial titer or a lowered gamma-globulin level, and to determine patient response to treatment with gamma-globulin. The majority of patients studied revealed that they had a marked hypogammaglobulinemia and a lowered serum antibacterial titer. This latter finding was further subdivided into a complement-depending factor (properdin) and a non-complement-depending factor or factors—both were found to be lower. Not all cases fitted this general pattern; hence a diagnostic generalization must not be made at this time. Most patients with low gamma-globulin levels were helped by treatment with gamma-globulin intragluteally in 20 ml. doses at 3 to 4 week intervals.

-- J. Occ. Med. Absts.

1008 A Hand Cleanser Derived from Soybean. C. Strutzler.
Ind. Med. & Surg. 28, 420-421 (Sept. 1959).

A cleansing agent in the form of a cream made up of colloidal lipid materials derived from soybean in an acid mantle base was used as a cleansing agent in 134 patients with contact dermatitis of the hands. In 75% of these, it proved an adequate cleansing agent while the patient was undergoing investigation and treatment to determine the cause of the dermatitis, with little or no interference with the healing of the eruption; in 21% there was little interference with the dermatitis, but the patients did not consider the cream to be an adequate cleanser for the paints, inks and greases with which they were in contact; while in 4%, the patients could not tolerate the cleanser (seven of 134 patients). Two groups of 50 workers in an industrial plant were studied: one used the soybean cleanser, the other an abrasive cleanser; there were 2.2% (two) cases of dermatitis of the hands due to turpentine in the first group; while in the second, there were 7.8% (seven) cases of hand dermatitis, two due to turpentine, two due to cutting oils and three due to chromates. The belief is that the use of this skin cleanser during episodes of dermatitis in which the workers continued at work contributed to the fact that they were able to remain at their work posts.
-- Author's summary

1009 Occupational Dermatoses Produced by Formaldehyde and Its Industrial Derivatives.
J. Bourret, F. Tolot, M. L. Pollet and M. Genevois.
Arch. maladies profess. 19, 611-615 (Nov.-Dec. 1958). French.

Attention is drawn to the extensive industrial use of formaldehyde in the processing of plastics, glues, leather, rubber and crease-resisting textiles. A useful clinical description is based on the detailed observation of 13 cases of dermatitis. French law which works on a system of limiting indexes does not at present envisage compensation for the results of allergy to formol and it is therefore urged that there is a strong case for adding this allergen, for so long notorious in the pathological laboratory, to the schedule. -- Bull. Hyg.

CHEMICAL HAZARDS

1010 Some Hazards in the Manufacture and Use of Plastics. D. K. Harris.
Brit. J. Ind. Med. 16, 221-229 (July 1959).

The expansion of the plastics industry during the last few years has introduced the possibility of hazards from new polymers and from modifications to old products. The first two sections of this paper deal with the diminishing incidence of dermatitis in synthetic resin plants using formaldehyde and with the toxic properties of some chemicals added during the manufacture of polyvinyl chloride compositions. After a brief reference to the hazards of catalysts used in the manufacture of new polymers in the polythene series, an account is given of the dangers of polytetrafluoroethylene. At high temperatures this important new polymer gives rise to decomposition products that may be harmful when inhaled, and smoking contaminated tobacco is one of the commonest ways in practice by which workmen may be affected. There is an increasing demand for the use of plastics by the general public and in specialized fields. They are widely used in the food industry and for domestic articles so that it is important that both the raw materials and the final article will not contaminate food or beverages. The most difficult application in which to ensure freedom from danger is probably in the surgical use of plastics. Surgeons already have wide experience of the technique of handling and using plastics. Although the effects of a few selected plastics have been investigated and described, the response of living tissue to these materials is often unpredictable. The results of implantation in many patients will not be available for several years and it is suggested that the misuse of plastics in this field presents dangers that may not always be appreciated.
-- Cond. from author's abstract

1011 The Toxicity of Boron Oxide. J. L. Wilding, W. J. Smith II, P. Yevich, Mary E. Sicks, Stella G. Ryan and C. L. Punte. Am. Ind. Hyg. Assn. J. 20, 284-289 (Aug. 1959).

Rats have been exposed to aerosols of boron oxide in dynamic exposure chambers for as long as 24 weeks. The highest concentration was 470 mg/m³ for a period of 10 weeks. Dogs have been exposed to a concentration of 57 mg/m³ for 23 weeks. No toxic signs have been shown in any of the animals. Chemical analyses of dog blood and rat blood and urine have shown no changes from control values, except for an increased urinary excretion of creatinine in rats, lower pH, increased volume, and increased boron content of rat urine. No changes have been found as a result of aerosol exposures in the following: rat tissues and organs, bone fragility, roentgenograms of rat bones, hematology of dog blood, sulfobromophthalein retention, and rat organ weights. Rats refused to drink water containing 1.0 or 1.5% boron oxide and, therefore, lost weight. Intragastric intubation of a 10% slurry of boron oxide into rats did not retard their growth rate nor cause any noticeable effect.
-- Authors' summary

1012 The Laboratory Detection of Carbon Monoxide Poisoning. L. S. Letourneau. Am. J. Med. Technol. 25, 175-178 (May-June 1959).

The chemistry of carbon monoxide poisoning is primarily the chemistry of the combination of carbon monoxide gas with the respiratory pigment, hemoglobin. Relatively low concentrations of this gas inhibit the oxygen uptake in the lungs. However, carboxyhemoglobin must reach rather high concentrations—generally in the order of 50% or more of the total hemoglobin in non-anemic persons, in order to cause death. The author discusses some of the physical chemistry of carbon monoxide poisoning and presents some simple chemical and spectroscopic methods for the detection of carboxyhemoglobin. -- APCA Absts.

1013 Effects on Growing Animals of a Continuous Exposure to Experienced Concentrations of Nitrogen Dioxide. L. A. Ripperton and D. R. Johnston. Am. Ind. Hyg. Assn. J. 20, 324-326 (Aug. 1959).

Weanling rats were exposed to 0.5 ppm of nitrogen dioxide in air. Suitable controls were maintained. There was no significant difference in the microscopic appearance of lung or liver tissue. Statistical significance can be attached to differences between the experimental and control groups in blood catalase values. The fact that at five weeks the experimental group was higher and at six weeks the control group was higher, however, makes interpretation speculative at this time. Glutamic and aspartic acid excretion increased in the animals exposed to nitrogen dioxide. The aspartic acid increase was significant at the 5% level; the glutamic acid increase was not. Aside from conclusions regarding specific responses, it is the opinion of the authors that this study has demonstrated observable effects on experimental animals caused by an exposure to experienced concentrations of an air pollutant.
-- Authors' summary

1014 A Case of Cirrhosis and Primary Carcinoma of the Liver in Chronic Industrial Arsenical Intoxication. S. S. Jhaveri. Brit. J. Ind. Med. 16, 248-250 (July 1959).

A case of primary liver carcinoma associated with liver cirrhosis in a man who had handled arsenious oxide and sodium arsenite for over 20 years is described with reference to his occupational history, clinical condition, and with details of pathological findings.
-- Author's Abst.

1015 Experimental Cancers in Rats Produced by Chromium Compounds and Their Significance to Industry and Public Health. W. C. Hueper and W. W. Payne. Am. Ind. Hyg. Assn. J. 20, 274-280 (Aug. 1959).

Calcium chromate, sintered calcium chromate and sintered chromium trioxide when introduced in pellet form into the muscle tissue of the thigh and into the pleural cavity of rats

produce cancers, mainly sarcomas, in the majority of animals at the site of implanation within 14 months. They made their first appearance as early as 5 months after implanation. This effect is related to the degree of solubility of these compounds in a watery medium since rats treated under identical conditions with barium chromate, which has a low degree of solubility, did not develop during the same period any tumors. These observations lend support to the concept, that the degree of biologic availability as determined by the solubility of a chromium compound and the amount present controls largely the carcinogenicity of these compounds under the experimental conditions used. The results reported establish the fact that chromium as such is a carcinogenic agent since it is capable of producing carcinomas of the lung and sarcomas of the soft tissues of the mediastinum and thigh. The observations reported make it likely that zinc chromate which is widely used as an anticorrosive paint pigment, also possesses carcinogenic properties because it is slightly more soluble than the carcinogenic strontium chromate. The application of these data will help industry to assess more intelligently potential carcinogenic properties of chromium compounds and to apply proper protective and preventive technologic and sanitary measures. -- Authors conclusions

1016 Accidental Iron Poisoning in Children. American Medical Association, Committee on Toxicology. J. Am. Med. Assn. 170, 676-677 (June 6, 1959).

The approach often recommended to correct most poisoning hazards is to substitute less noxious agents or to restrict use so that the hazards are reduced or eliminated. Iron sulfate and other iron salts, which have produced injury, may ultimately be replaced by safer iron compounds, provided the substitutes are equally effective and not too expensive. Restrictions on use, although theoretically attractive, are not always feasible in practice, especially for a valued and time-tested medicinal agent. A requirement that ferrous sulfate and similar hazardous iron salts be labeled with a caution statement about the hazards of excessive doses, especially to children, seems to best serve the public interest at this time.
-- Committee's conclusions

1017 Biochemical Studies on the Toxicity of Tetraethyl Lead and Other Organo-Lead Compounds. Jill E. Cremer. Brit. J. Ind. Med. 16, 191-199 (July 1959).

The actions of purified tetra-, tri-, and di-ethyl lead on rats and rat brain slices and brain brei have been examined. A method based on a reaction with dithizone and capable of estimating tri- and di-ethyl tin in rat tissues has been developed. After injection into rats tetraethyl lead is converted into triethyl lead and this is responsible for the toxic effects. Diethyl lead is much less toxic and the effects are different. The utilization of lactate and the oxidation of glucose by brain brei and slices respectively are inhibited by triethyl lead. A similar effect is seen in slices taken from rats poisoned with tetra- or tri-ethyl lead. Rat liver microsomes readily convert tetraethyl to triethyl lead and the latter is stable and remains in the animal tissues for several days. The concentration of triethyl lead in the brain is not high in comparison with other tissues but brain tissue appears to be unduly sensitive to its toxic action. Neither tetra- nor tri-ethyl lead reacts with BAL or EDTA. Diethyl lead reacts with BAL but not with EDTA. -- Author's Abst.

1018 Vanadium Poisoning. S. Hickling. New Zealand Med. J. 57, 322, 607-608 (Dec. 1958).

This paper contains a report of a probable case of vanadium poisoning in a man engaged in cleaning the boiler of a small oil burning ship. A great deal of dust was produced in this work, but the man had decided to carry on the task without a respirator because stocks of respirator pads had run out. Within two hours of beginning his work he had symptoms of severe coryza and headache for which he attended the Wellington Industrial Health Clinic. He was taken off work and the symptoms disappeared in a day or two. When first seen his tongue had a dense black coating with a greenish tinge but in a few days the color turned deep green and then yellowish green before disappearing. Samples of soot collected from the boilers were analyzed and the ash was found to contain 20% of vanadium. The fuel oil used in these boilers which is of Middle Eastern origin is quoted in the literature as containing an average of 16% of vanadium. -- Bull. Hyg.

1019 The Determination of Zirconium in Air. E. E. Campbell. Am. Ind. Hyg. Assn. J. 20, 281-283 (Aug. 1959).

The purpose of this study was to apply the Bricker and Waterbury method to the analysis of air samples of zirconium, which in industrial plants is predominantly in an insoluble form from machining or powder metallurgical operations. The Hygienic Guide for zirconium suggests this method as a means of evaluating possible zirconium exposure. The threshold limit of 5 mg/cu.m. makes an ultramicro method unnecessary; however, because atmospheric contamination during some operations is of short duration, levels below the milligram level are of interest. The range of 1 to 10 micrograms of zirconium per sample was chosen for this study, which for a 10-liter air sample means that from 0.1 to 1 mg. of zirconium per cubic meter may be determined.

1020 The Toxicology of Some Aliphatic Aldehydes. E. V. Henson. J. Occ. Med. 1, 457-462 (Aug. 1959).

This third in a series of reviews on the several homologous series of aliphatic chemicals deals with the aldehydes. In the stepwise reduction of acids, which were discussed previously, to alcohols, aldehydes are intermediates. The properties, uses and toxicity of the following are briefly described: acetaldehyde, paraldehyde, acrolein, crotonaldehyde, and glyoxal. In the present review the actions of the aldehydes in relation to one another and the actions of representative members have been summarized. Local irritation by all the aldehydes seems to prevent dangerous exposures, particularly to the more toxic unsaturated compounds, and the absence of clinical reports would indicate that chronic intoxication does not occur.

1021 The Maximum Permissible Concentration of Formaldehyde in the Atmospheric Air. V. P. Melekhina. Gigiena i Sanit. 3, 10-14 (1959). Russian.

The author studied formaldehyde as an atmospheric pollutant. The effect of small doses on health in man was also determined. Investigation of a chemical plant producing formaldehyde showed that the atmospheric air in its vicinity was polluted with formaldehyde up to a distance of 1000 meters. Motorcar exhaust gases also contain formaldehyde. The author determined that the threshold for formaldehyde smell for the majority of people is 0.07 mg cu.m. The threshold for reflex action, as determined by the method of optic chronaxy, is 0.05 mg cu.m., and by the method of adaptometry—0.098 mg/cu.m. Consequently the maximum permissible concentration of formaldehyde in air, considering the coefficient of reserve, may be taken to be not more than 0.035 mg/cu.m. at any time. -- Public Health Eng. Abstr.

1022 Determination of Dichlorodifluoromethane in Fumigation Mixtures with Ethylene Oxide by Measurement of Thermal Conductivity. W. A. Affens, E. O. Haenni and R. A. Fulton. Anal. Chem. 31, 1565-1568 (Sept. 1959).

A practical procedure for field use has been developed for the sampling and determination of dichlorotrifluoromethane and ethylene oxide in fumigation and sterilization atmospheres. The dichlorodifluoromethane is determined by a thermal-conductivity method, and the ethylene oxide is determined as described by Lubatti. A commercially available instrument is used for the thermal conductivity measurements. It can be used for laboratory applications . greater sensitivity by modification of the instrument. -- Editor s abst.

1023 The Value and Use of Exposure Test 5. Determination of Trichloroethyl Alcohol (Urochloralic Acid) As an Exposure Test on Workers with Trichlorethylene. Z. Bardodej and Marie Krivucova. Ceskoslov. hyg. 3, No. 5, 268-272 (1958). Czech.

The authors have investigated the method of Kubis and Liskova (Bratislav. lekarske listy 36, 153, 1956) for determining urochloralic acid (trichloroethanol vapor glucuronide) in the urine as an index of exposure to trichloroethylene vapor in industrial workers. The

method is based on the oxidation of urochloralic acide with chromic acid to trichloroacetic acid, which is determined by a color reaction with alkali and pyridine. The average ratio of urochloralic acid to trichloroacetic acid in the urine of persons breathing trichloroethylene in the maximum permissible concentration of 0.4 mg. per liter was 2:1. With a maximum permissible limit of trichloroacetic acid in the urine of 160 mg. per liter the limit for trichloroethanol would therefore be 320 mg. per liter, or 700 mg. per liter conjugated as urochloralic acid. -- Bull. Hyg.

1024 Biochemical Mechanisms in Chronic Carbon Disulfide Poisoning. A. E. Cohen, et al. Am. Ind. Hyg. Assn. J. 20, 303-323 (Aug. 1959).

The threshold exposure concentration which will injure rabbits maintained on a good diet has been shown to be between 500 and 750 ppm when administered 6 hours per day, 5 days a week. Early evidence that carbon disulfide combines with free amino groups in the body is presented. The earliest toxic sign observed was loss of body weight which was followed in 6 to 14 weeks by loss of muscular control over voluntary movement of the lower back and rear quarters of the animal. Based upon evidence presented, the biochemical mechanism for the injury caused by these exposures to carbon disulfide are as follows: (1) Reaction of carbon disulfide with amino groups of amino acids and protein to form thiocarbamate which cyclizes to thiazolidone. (2) Chelation of polyvalent inorganic ions by the newly formed complexing groups to such an extent that cellular metabolism is disturbed. (3) The interference with metabolism causes a stress response and shift in metabolism which results in loss of body weight and indications that the fat stores of the body are being utilized. (4) Ultimately cell death and loss of associated function produce signs of injury.
-- Cond. from authors' summary

INDUSTRIAL DUSTS

1025 Physico-Chemical Studies on Dusts. 10. A Comparative Study of the Solubility and Adsorptive Properties of Finely Divided Silica and Titania. J. Brown, W. J. Jaap and P. D. Ritchie. J. Appl. Chem. 9, 153-159 (Mar. 1959).

Titania (crystalline or amorphous) has a negligibly small water-solubility over the pH range of approximately 3 to 12; silica (crystalline or amorphous) has a low but quite measurable solubility, with a minimum at pH about 2.5 to 3. Rutile, lightly etched with hydrofluoric acid, shows an enhanced solubility, but quartz, similarly treated, shows a reduced solubility. The rate of solution in aqueous media provides no evidence on rutile of a highly-soluble disturbed surface layer such as exists on quartz. Adsorption of basic dyestuffs by titania broadly resembles that shown by silica, although the extent of adsorption is greater.
-- Public Health Eng. Abstr.

1026 Aerosol Filtration with Fibrous Media. R. B. Evans. Am. Ind. Hyg. Assn. J. 20, 327-331 (Aug. 1959).

The author believes that a realistically usable fibrous media can be developed for every aerosol filtering requirement. He discusses sprayed plastic web, wet accreted pads, and air layed filters. Efficiency and performance characteristics of these filter media are illustrated by graphs. The filters are available commercially.

1027 Dust Separation with Ultrasonic Vibrations. E. Zedet. Genie chim. 81, 33-43 (Feb. 1959). French.

Old techniques for dust separation were unsatisfactory only for fairly large-sized particles. The use of electrostatic precipitation and the aerosol method brought about

considerable improvement, but the use of ultrasonic vibrations have given still better results. Ultrasonic vibrations have a characteristic frequency, acoustical intensity, and travel at a definite speed in a given medium. These three factors can be varied for the type of activity desired. Various formulas to explain the working of this type of dust separation, as well as some of the earlier ones, are given. -- APCA Absts.

1028 Respiratory Disease of Mushroom Workers. Farmer's Lung. L. S. Bringhurst, R. N. Byrne and J. Gershon-Cohen. J. Am. Med. Assn. 171, 15-18 (Sept. 5, 1959).

Clinical observations of 16 patients were collected to exemplify a possible new disease entity. Each was a Puerto Rican migratory worker engaged in the handling of compost used as soil for growing mushrooms in Pennsylvania. The disease has not, as yet, been observed or identified in other persons. Immunity was not conferred by a single episode or successive episodes. The disease recurred with re-exposure. Treatment was nonspecific and supportive. Removal of contact from the compost was necessary for cure. The consistent findings were respiratory signs and symptoms, characteristic roentgenographic appearance of lung fields, eosinophil count elevation, nationality of patient, and contact with the compost. The natural pattern of the disease resembles that of "farmer's lung" and "silo-filler's disease". The etiology remains undetermined. -- Editor s summary

1029 Changes in the Collagen Proteins in the Course of Ageing and in Experimental Silicosis. V. Kobrle and M. Chvapil. Arch. Gewerbepathol. Gewerbehyg. 16, 526-538 (1958). German.

There are two main types of collagens, insoluble and soluble. The soluble collagens are divided into three groups: (1) The alkali-soluble collagens. (2) The citrate- or acid-soluble collagens. (3) The phosphate-soluble collagens, which produce under the electron microscope a very characteristic picture. All these three collagens have at one time or another been thought to be the precursor of the true insoluble collagen, but recent work suggests that the soluble collagens are actually part of the insoluble collagen, which is not a uniform single protein but is composed of a number of different components. When the lungs of rats were examined for the different types of collagens, it was seen that with increasing age the soluble types fell and the proportion of insoluble collagens increased. When rats were treated by intratracheal dusting with silicon dioxide it was seen that within two weeks (and more definitely within one month) changes in the composition of the collagens appeared. There was no rise in insoluble collagen, but there was a rise in alkali-soluble collagen. With progressive disease the concentration of alkali-soluble collagen fell again to normal, but there was a corresponding increase in non-soluble collagen which coincided with the first histological changes in the lungs. -- Bull. Hyg.

1030 Value of Histopathological Information for Diagnosis of Silicosis; Critical Study of Pulmonary Biopsy. J. Vidal and J. J. Guin. Poumon & coeur (Paris) 14, 993-998 (Dec. 1958). French.

The authors discuss two cases of pulmonary pathology, one in an agricultural worker and the other in a worker in a pharmacy, in which the radiological findings and other information indicated a diagnosis of pulmonary tuberculosis. However, the presence of silica and of silicotic lesions were reported following pulmonary biopsy. The authors discuss these cases in terms of their criticism of the pulmonary biopsy as a means of diagnosis of silicosis since such lesions may well be found among people who have not had any radiological or clinical symptoms of silicosis and who have never been exposed to the occupational risk of inhaling silica dusts. They feel that histological findings should not prevail over radiological ones because of the lack of specificity in diagnosis of the former findings. -- APCA Absts.

1031 The Perivascular Spaces in the Lung. P. Gross. Arch. Pathology 66, 605-609 (Nov. 1958).

From studies of many tissue sections of animals' lungs the author suspected that the perivascular spaces seen around the pulmonary vessels were in the main not true lymphatic spaces as has been assumed hitherto. Rats and guinea pigs were given quartz dust by

inhalation and intratracheal injection and were killed at various intervals. The lungs of these animals were compared with those of rats and guinea pigs raised under germ-free conditions. The author was able to distinguish between spaces formed by splitting of peri-adventitial fibers of the vessels and true lymph spaces which had a definite endothelial lining. Perivascular spaces were very common in the animals given quartz and were most likely caused by edema but such spaces were rarely seen in control animals. -- Bull. Hyg.

1032 Silica Metabolism in Guinea Pigs. F. Sauer, D. H. Laughland and W. M. Davidson. Can. J. Biochem. and Physiol. 37, 183-191 (Feb. 1959).

The excretion of silica in urine and feces was determined following the oral and intraperitoneal administration of silica to guinea pigs. The urinary excretion of silica after oral administration generally reached a maximum value that was not exceeded by increasing the dose. The urinary excretion after intraperitoneal administration was considerably greater than after oral administration. The results of these experiments suggested that orally and intraperitoneally administered silica is depolymerized to the soluble form prior to excretion in the urine. -- Bull. Hyg.

1033 The Action Exerted by Certain Pneumoconiotic Factors Upon the Acid Mucopolysaccharide Contents of Pulmonary Macrophages. N. Gh. Lupu, Doina Velican, C. Velican and V. Olinescu. Brit. J. Ind. Med. 16, 244-247 (July 1959).

Experimental inhalations of silicon dioxide and tobacco smoke cause a gradual increase in the number of pulmonary macrophages containing metachromatic material within the nucleus and cytoplasm, and they may assume the appearance of mast cells. Many pulmonary macrophages containing metachromatic material were found in anthracotic human lungs. Histochemical techniques identify this material as acid mucopolysaccharides. After a more prolonged action of pneumoconiotic substances, mucopolysaccharides disappear after hyaluronidase extraction. On the basis of these findings the increased amount of acid mucopolysaccharides in the connective interstices of the lung during the phase preceding the onset of fibrous lesions is explained by the prolonged irritative action of pneumoconiotic substances, which are believed to determine hypersecretion of acid mucopolysaccharides by the pulmonary macrophages. -- Authors' Abst.

1034 Difficulties of Diagnosis of Silicotic Tumoral Masses with Super-Imposed Tuberculosis or Cancer. R. Amsler and R. Bonhomme. Poumon & coeur (Paris) 14, 677-686 (July-Aug. 1958). French.

The authors discuss some of the difficulties involved when the tuberculosis specialist or the expert on pneumoconiosis must decide on an immediate diagnosis and the necessary treatment of a possible silicosis in cases where the condition is complicated by the presence of other pathology. The situation is less complicated if, without endangering the life of the patient, a study of his condition can be made over a period of time. Two case histories are presented in detail. In one case the early diagnosis of silicosis, with a later decision that a bronchopulmonary cancer was present, was confirmed by the autopsy findings of silicosis and cancer at the same lung level. In the second case there had been hesitancy about making a diagnosis because of a suspected neoplasm or possibly the presence of tuberculosis, although the tubercle bacilli could not be demonstrated in samples of the expectorated material. A silico-tuberculosis was found at autopsy. -- APCA Absts.

1035 The Possible Role of an Atypical Acid-Fast Non-Pathogenic Bacilli in the Fatal Development of a Pulmonary Silicosis. G. Despierres, P. Gaby, J. Viallier and P. A. Bonnet. Lyon med. (Lyon) No. 15, 659-663 (Apr. 12, 1959). French.

A detailed case history is given of a patient with a pulmonary lesion from whose sputum acid-fast bacilli were cultured. Further studies during the illness, together with autopsy findings, indicated both a pulmonary lesion and a dense infiltration. The x-ray findings

together with a history of employment as a quarry worker had led to the early diagnosis of silicosis. The bacilli isolated were found to be resistant to all of the antibiotics which had been used in the treatment of the patient. In addition, they were not typical of the Koch or tubercle bacilli other than in being acid-fast; they produced a yellow pigment; and were non-pathogenic for laboratory animals. Many questions are raised as to the relation, if any, of this bacillus—which has been mentioned at other times in the literature—to the fatal silicosis. -- APCA Absts.

1036 Treatment of Miner's Tuberculosis. J. Prignot.
Poumon & coeur (Paris) 14, 953-982 (Nov. 1958). French.

The treatment of a group of 52 cases of tuberculosis in miners is discussed in detail. In 30 of the group there was a confluent and massive pneumoconiosis. In 47 of the men there was a bacilliary pulmonary tuberculosis; in 5 the tuberculosis was merely pleural in type. Medical treatment, surgical treatment with excision of lung areas, and bed rest were used. Considerable detail is given on the effects of various treatments on the bacteriological and radiological findings and on the blood sedimentation rate. Of the 52 cases, 27 were stabilized, 9 were improved, and in 13 the condition became worse. Surgical excisions in 14 cases brought about stabilization in 12 cases, improvement in 1, and in 1 the condition became worse. -- APCA Absts.

1037 Lymph Node Biopsies (Daniels' Method) in Silicosis. L. Norvitt and W. DiBiasi.
Arch. Gewerbepathol. Gewerbehyg. 16, 503-510 (1958). German.

This article refers to the work of Daniels who showed that it is possible to do lymph node biopsies by using the easy access to glands lying in the trigonum omoclaviculare (Brit. J. Dis. Chest 16, 360, 1949). In 21 miners where there was a suspicion of silicosis, biopsy was performed. X-ray changes in the appearance of the lung were seen in all except one. In 18, silicosis had been suspected either with or without simultaneous tuberculosis, but in none of these had tubercle bacilli been found. In one case where the x-ray had not shown any changes in the lung picture, the histological findings were negative also. In one other it was possible to confirm the clinical diagnosis of sarcoidosis. In another patient in whom, clinically, sarcoidosis and silicosis had been suspected, it was possible to show that the disease was pure silicosis. In another case it was possible to confirm the clinical diagnosis of tuberculosis. The conclusion is reached that the lymph node biopsies would form a valuable investigation in diagnosis of lung disease, particularly when the suspicion of silicosis is entertained.
-- Cond. from Bull. Hyg.

PHYSICAL ASPECTS OF THE ENVIRONMENT

1038 Noise and Hearing Loss—Part 3. N. E. Rosenwinkel, K. C. Stewart and L. G. Doerfler.
J. Occ. Med. 1, 396-400 (July 1959).

This is the third of a series of six reviews dealing with noise and its effect upon hearing. Subsequent installments are scheduled to appear at intervals of three months. (See IHD Abst. 307, Mar. 1959 and IHD Abst. 818, Aug. 1959). In this installment the authors discuss the techniques and problems involved in industrial audiometry and specifically, the pure-tone air-conduction audiogram. Also described are the testing room, the tester, the subject, and the conduct of the examination. The problem of selecting the person to conduct the audiometric examinations is deserving of close attention. The importance of the audiogram as a medicolegal document is such that extreme caution should be exercised in selecting a technician. The conduct of audiography requires the services of a person capable of performing an exacting task which may, however, become repetitive and tempt the tester into taking the audiograms in

an unobservant, routine manner. In performing the test the technician should be certain that (1) the correct phone is over the proper ear; (2) the cushions are snugly fitted to the head; (3) the headband is adjusted to the correct head size; (4) eye glasses and jewelry are removed; (5) the pinna is not folded; and (6) the receiver is directly aligned with the external meatus. Probably one of the most important aspects of the test is the presentation of the test tone. The tone should be first presented at a level about 20 db. above the estimated threshold of the subject at the frequency being tested. The presentation should be made in short bursts of one or two seconds or less. Moreover, the presentation should be random and avoid any systematic rhythm to afford the subject any extraneous clue as to when to expect the tone.

1039 Hearing Loss Related to Non-Steady Noise Exposures. N. E. Rosenwinkel and K. C. Stewart. Am. Ind. Hyg. Assn. J. 20, 290-293 (Aug. 1959).

This study was the first investigation into the possible existence of a relationship between noise as measured with an integrating type meter and hearing loss. The noise to which the persons were exposed was widely fluctuating and not sensibly measurable with the conventional types of noise measuring equipment. As a first approximation, the existence of the relationship has been investigated on a linear basis. The relationship describes the distribution of hearing loss in a population and must not be applied as a predictor of hearing loss in individuals. The true nature of the relationship between hearing loss and noise exposure cannot be discerned from these data, however, it appears to be some function of time, rate, and an interaction between the two. -- Authors' summary

1040 Medical Problems of Shift-Work. A. Aanonsen. Ind. Med. & Surg. 28, 422-427 (Sept. 1959).

These investigations were made at two electrometallurgical works and an electrochemical factory, all of them situated in the small industrial community of Odda in western Norway. Two groups of industrial laborers, the one consisting of 345 day-laborers and the second consisting of 380 regular shift-laborers, were followed up and subjected to medical evaluation. The age distributions were about the same in both groups. There was no increased morbidity with regard to disorders of the nervous or alimentary systems or with regard to the heart among regular shift-laborers. This group also showed a lower frequency of absence from work (30%) and medical consultations as compared with the day-laborers. In the author's opinion the explanation of this is that the 380 regular shift-laborers represent a selected material because 350 previous regular shift-laborers have been transferred to day-work. Of these, 128 were removed for medical reasons. Within this group there is a marked increase in the frequency of nervous and alimentary diseases. There was, however, no increase in heart diseases in this group as compared with those day-laborers who had never been subjected to regular shift-work. The study clearly shows that the reason some people were not able to go on with shift-work was lack of sleep. There are two possible reasonable ways to fight sleep disturbances among regular shift-laborers. Such laborers who do not have the ability to change their 24-hour's rhythm should not continue as regular shift-laborers. Even good housing conditions will fail to cure their sleep difficulties. Those who are able to continue as regular shift-laborers will be less apt to develop sleep disturbances if their housing conditions are good. -- Author's summary

RADIOACTIVITY AND X-RADIATION

1041 A Venturi Scrubber Installation for the Removal of Fission Products from Air. H. S. Jordan and C. G. Welty. Am. Ind. Hyg. Assn. J. 20, 332-336 (Aug. 1959).

A local exhaust collection system and a venturi scrubber installation for the cleaning of exhaust air contaminated with acid mists and mixed fission products are described in detail. It was determined that 20 cfm exhausted by a local slot exhaust hood would control the maximum evolution of gases from a 1500 ml. beaker. Features of the exhaust system that were designed to offset the hazard of perchloric acid condensation in the system included welded stainless steel construction, sloping horizontal runs, regulating valves only on vertical sections, and adaptability to cleaning by simple washdown. The feasibility of a venturi scrubber with a caustic solution as the scrubbing medium for low loadings of iodine vapors was indicated by an average removal efficiency of 95%. Air-cleaning efficiencies for acid mists were dependent on the type of acid suspended in the air stream. Removal efficiencies of 90% and 95% were obtained with nitric acid and oxide of nitrogen loadings of 2 grams/cu.m., respectively. Total fission product loadings ranging from 0.01 to 0.4 mc/cu.m. were removed from the contaminated air with an average efficiency of 94%.

-- Cond. from authors summary

1042 Administrative Experience with Occupational Over-Exposure to Radiation. M. Kleinfeld and A. P. Abrahams. Am. Ind. Hyg. Assn. J. 20, 294-298 (Aug. 1959).

Nineteen instances of radiation over-exposure in excess of the limits prescribed by Industrial Code Rule 38 have been reported to the New York State Department of Labor since December 1955. In 8 instances, the reported excessive readings were found to be invalid and may be ascribed, on the whole, to faulty dosimetry technique. There were 11 instances of actual over-exposure; 4 were chronic in nature, 4 were acute external over-exposures, and 3 were acute internal over-exposures. The acute over-exposures resulted from accidents; the chronic over-exposures were associated with routine everyday operations. Ten employees showed positive biological effects such as radiation burns or abnormal retention of radioactive material. Injury to the hands was the effect most frequently observed among the chronically as well as the acutely exposed. Those accounted for 7 of the 10 reported instances. The causal factors most frequently involved in the over-exposures were lack of supervision, lack of awareness of the hazard, and failure to provide or maintain appropriate protective devices. In general, the data indicates that the incidence of radiation over-exposure (1.4%) and injury (0.3%) in New York State is extremely low when compared to other major industrial hazards.

-- Authors' summary

1043 Strontium-90 in Man. (3). J. L. Kulp, A. R. Schulbert and Elizabeth J. Hodges. Science 129, 1249-1255 (May 8, 1959).

In January 1958 the average burden of strontium-90 in the skeletons of adults throughout the world was 0.19 micromicrocuries of strontium-90 per gram of calcium. This burden is independent of age above the age of 20. The concentrations of strontium-90 in bone differ less than the total fall-out, as between the Northern and Southern Hemispheres. This is attributable largely to the movement of food, particularly of powdered milk and wheat from the Northern Hemisphere into the Southern Hemisphere. The average concentration of strontium-90 in the skeleton for all people in the world as of January 1958 was about 0.52 micromicrocuries of strontium-90 per gram of calcium. On the basis of data on the strontium-90 in diet and bone, the world deposition, and the level of strontium-90 in the stratosphere at the end of 1958, curves have been drawn to show the anticipated concentrations of strontium-90 in the diet of individuals in the area of Western culture of 20° to 90°N and in newly deposited bone to the year 2000 A.D.

It is estimated on the basis of these data that the maximum concentration in young children will occur in about 1966. A histogram representing 838 samples indicates the present distribution of strontium-90 in the adult population of the world. It is assumed that this reflects the actual spread of all age groups as a result of dietary variations throughout the world.
-- Cond. from Nuclear Sci. Absts.

1044 Determination of Radioactive Strontium. A. S. Goldin, R. J. Velten and G. W. Frishkorn. Anal. Chem. 31, 1490-1492 (Sept. 1959).

The radioactive isotopes of strontium-89 and strontium-90 are determined in a wide variety of environmental samples. Strontium-90 is determined by beta-counting the daughter activity, yttrium-90, after extraction into 2-thenoyltrifluoroacetone reagent. Total radioactive strontium is determined by beta-counting a strontium carbonate precipitate. The method includes procedures for treating different types of material and removing common interferences. -- Editor's Abst.

1045 Measurements with a Whole Body Counter. K. G. McNeill and R. M. Green. Can. J. Phys. 37, 683-689 (June 1959).

An account is given of work on the measurement of the gamma radioactivity of humans. A steel room has been constructed, in which this gamma activity may be measured to a statistical accuracy of a few per cent in 30 minutes using a 5-inch sodium iodide crystal as a detector. -- Cond. from Nuclear Sci. Absts.

1046 Biological Decomposition of Radioactive Laundry Waste. E. W. Wiederhold. MLM-948. Mound Lab., Miamisburg, Ohio. 18 pp. Available at 75 cents from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D.C.

A series of tests was conducted on a laundry waste containing radioactive materials, using an activated sludge process, to determine whether the organic materials which would interfere with a process of flocculation and adsorption could be removed along with a substantial quantity of the radioactive material. A trickling filter was used to treat the waste over a long period of time. The filter removed nearly all of the activity and most of the organic compounds. However, sufficient residual activity remained in the effluent to require either two-stage operation or final processing by flocculation and adsorption. Recirculation was beneficial. A supplementary bacteria feed of ammonium nitrate was necessary.
-- Nuclear Sci. Absts.

1047 The Effects of Radiation on Populations. Anon. OEG-78. Office of the Chief of Naval Operations. Evaluation Group, Washington, D.C. 85 pp. (July 17, 1958).

The possible effects on present and future generations of the exposure of human populations to penetrating radiations are discussed. This subject is widely associated with the effects of nuclear weapons and has been the subject of much public discussion and opinion, not all of it accurate. Although the more severe local effects of a nuclear detonation, such as radiation death or radiation sickness are comparatively well known, the use of nuclear weapons may also result in widespread and prolonged exposure of whole populations to radiation. The effects of very high radiation levels are not treated because they are considered to be widely known. It is shown that even very low levels of radiation can cause discrete hereditary units called genes to change, or mutate, and that eventually such mutated units will cause a death in a future generation. These genetic effects are unimportant if all those exposed to radiation are killed as a result of the exposure. But if those exposed survive, the less-than-lethal exposure may result in the serious impairment or death of some of their descendants for many generations. An example cited shows that so far the very small increase in background radiation due to fallout from present weapons testing may, very roughly, result in an ultimate total of 60,000 embryonic, infant and childhood deaths in the United States in future generations. -- Cond. from Nuclear Sci. Absts.

1048 A Granular Collector for Sampling Fallout Debris from Nuclear Detonations. E. M. Romney, J. W. Neel, G.M. LeRoy, A. J. Steen and K. H. Larson. Am. Ind. Hyg. Assn. J. 20, 267-273 (Aug. 1959).

A granular collector for sampling fallout debris from nuclear detonations was developed which consists of a shallow, metal tray and a removable mylar plastic liner filled with 1/8 inch diameter polyethylene plastic pellets. Fallout debris impinging upon the exposed collector tray during fallout is physically entrapped within the granular matrix and later separated from the matrix by wet sieving in isopropyl alcohol. The fallout debris may be fractionated into different particle size ranges by dry sieving with standard testing sieves. An operational procedure for recovering the primary fallout debris from the granular matrix is described. The efficiency of the recovery procedure was tested using pre-sized glass beads, soil samples and fallout debris. Virtually all particulate material smaller than the granular matrix could be removed by wet sieving in isopropyl alcohol. Less than 2% of the sample was lost during a dry sieving process of fractionating the particulate material into 13 different particle size ranges. A recovery of more than 95% of the samples processed through the operational procedure was consistently obtained. -- Cond. from authors' summary

1049 Investigating Inhalation Hazard Using Synthetic Radioactive Fallout. W. B. Lane. J. Air Pollution Control Assn. 9, 102-104 (Aug. 1959).

An experimental program has been undertaken at the U. S. Naval Radiological Defense Laboratory in which engineers, chemists, and biologists design exposure chambers, formulate radioactive aerosols, and assess the biological hazard by sacrificing exposed animals and analyzing organs and tissues for internally deposited radionuclides. This paper describes certain chemical and physical aspects of this program.

1050 Radioactive Fallout Measurements in Air and in People. C. W. Mays. AECU-4112. Utah Univ., Salt Lake City. Radiobiology Lab. 18 pp. (1958). Photostat available at $3.30 from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D.C.

Whole-body gamma measurements were made on 38 persons. The amount of potassium in a person is approximately proportional to body weight and tends to be greater in men than in women. The average cesium content measured in people living in Salt Lake City, Utah, is greater than average values reported for people living in other parts of the United States. This difference may be due to the proximity of Salt Lake City to the atomic bomb site in Nevada. Information is also included on air sampling during the Pacific tests (1956) and fallout cesium-137 in Utah residents (1958). -- Nuclear Sci. Abstr.

1051 Evaluation of Fallout Data. A. A. Jarrett. Am. Ind. Hyg. Assn. J. 20, 299-302 (Aug. 1959).

An essential part of the safety program in a laboratory manipulating radioactive materials is the routine determination of air-borne activity if operations are compatible with the production of an inhalation hazard. Laboratory air and air discharged from the laboratory should be monitored for radioactivity if there is any possibility of air-borne contamination at hazardous levels. When contamination of the air in the vicinity of a laboratory is a possibility, air surveys should be made to determine background levels of radioactivity before extensive operations are begun. The purposes of routine air sampling are thus threefold: (1) Protect employees. (2) Public safety. (3) Establish background information with respect to variations of radioactive concentrations in the environment unrelated to laboratory operations. The National Committee on Radiation Protection and Measurement has established levels of maximum permissible concentrations to serve as guides to safe operations and upper levels of exposures. The author: (1) Describes currently used methods to evaluate radioactivity which may be a result of nuclear detonations. (2) Proposes a very simple method utilizing a specially prepared graph paper to characterize the activity from nuclear detonations. (3) Presents a method which can verify radioactivity from nuclear detonations without the extended time delay required for taking decay curves and minimizing the interference of other radioactive species.

1052 AEC Atmospheric Radioactivity Studies. J. Z. Holland. Wash-1016. Div. of Biology and Medicine. Environmental Services Branch, AEC. 37 pp. (Jan. 27, 1959). Available at 50 cents from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C.

Studies of radioactivity in the atmosphere are conducted by the U. S. Atomic Energy Commission primarily for the purpose of evaluating hazards to man arising from uses of atomic energy. In its simplest terms, the problem is to determine the dosages to which people are likely to be exposed as the result of various uses of atomic energy and to compare such dosages with either maximum permissible or natural background levels. The atmospheric monitoring activities of the AEC range from local programs associated with industrial operations to world-wide monitoring projects associated with the testing of nuclear weapons. Research projects involving measurements of atmospheric radioactivity are reviewed. The radionuclides studied in the various projects include strontium-90 and other fission products, carbon-14, tritium, and radon. -- Nuclear Sci. Abstr.

ENVIRONMENTAL MEASUREMENTS

1053 Detection of Trace Constituents by Gas Chromatography. Analysis of Polluted Atmosphere. P. S. Farrington, R. L. Pecsok, R. L. Meeker and T. J. Olson. Anal. Chem. 31, 1512-1516 (Sept. 1959).

Apparatus and techniques are described which are applicable to the detailed analysis of polluted atmospheres, including the detection and determination of components present in the range of a few parts per hundred million. Important features are the sample handling technique and the ion gage detector. Large amounts of water have been removed under conditions shown to be inert toward oxygenated organic compounds. The method is generally applicable to trace constituents. -- Editor's Abst.

1054 Atmospheric Pollution by Solid Particles. D. H. Grindell. Engineering 187, 350-351 (Mar. 13, 1959).

In the study of industrial fogs, the number, total surface area, and chemical composition of air-borne particulates are important, especially for the diameter range 0.2 to 2.0 microns. Apparatus is, therefore, necessary which will respond to particles as small as 0.1 micron in diameter and which will measure either the number or the total surface area of the aerosol. Research is in progress to explore an electrostatic method of measuring total particulate surface area. The technique being considered employs apparatus very similar to a two-stage electrostatic precipitator. An aerosol sample is passed through a high voltage charging section and thence to a measuring section. Here the charged particles are impelled by an electric field to a collecting electrode. The current flowing from the collecting electrode as a result of particle deposition is amplified and recorded and is a measure of particle surface area since the charge carried by each particle is roughly proportional to its area.
-- Public Health Eng. Abstr.

1055 The Acute Toxic Effects of Black Smoke. R. E. Pattle, G. D. Wedd and F. Burgess. Brit. J. Ind. Med. 16, 215-220 (July 1959).

Few experiments have been conducted on the toxicity of solid carbonaceous combustion products. In order to obtain an estimate of the toxicity of black smoke which could be compared with similar estimates for other pollutants, the median dosage to death, has been determined for smoke from burning tetrahydronaphthalene administered to guinea pigs and mice. Values ranging from 147,000 mg. min./cu.m. to 351,000 mg. min./cu.m. were obtained at concentrations between 714 mg./cu.m. and 1,140 mg./cu.m. Animals allowed to associate protected one another to some extent, probably owing to their fur acting as a

filter. In mice the cause of death appears to be blockage of the air passages; deaths after removal from the smoke are unusual. In guinea pigs hemorrhagic lesions are caused, and delayed deaths are commoner. The action of smoke on rats resembles its action on mice. It is pointed out that tetralin smoke is considerably more toxic to animals than is sulfur dioxide in the same concentration. This finding is discussed in relation to atmospheric pollution. -- Author's Abst.

1056 Long Range Cloud Diffusion in the Lower Atmosphere. B. P. Leonard, Jr. J. Air Pollution Control Assn. 9, 77-82 (Aug. 1959).

This is largely a treatise involving complex mathematics. On the basis of the data presented the following conclusions may be drawn: (1) Long range cloud diffusion is anisotropic regardless of weather conditions, due to suppression of large scale turbulence by the ground. (2) Anisotropic diffusion is greatly magnified under stable atmospheric conditions due to increased suppression of large scale turbulence. (3) Cloud concentrations at large distances are roughly inversely proportional to the diffusion distance with a major portion of the diffusion occurring in the horizontal plane. This effect is relatively insensitive to weather conditions. (4) Cloud dimensions and, therefore, concentrations differ significantly with weather conditions. This is due almost entirely to differences in diffusion rates in the first 1 to 3 miles of diffusion distance. The results presented in this paper are based on very limited data. They should, therefore, be considered tentative until more data and analyses are available. -- Cond. from author's conclusions

1057 Ozone Cracking of Rubber in the Los Angeles Area. A. J. Haagen-Smit, M. F. Brunnelle and J. W. Haagen-Smit. Rubber Age 85, 615 (July 1959).

Investigations on the smog conditions in Los Angeles have substantiated claims of rapid deterioration of rubber goods in this area. Results obtained over a 3-year test period are presented, as well as a comparison with oxidant and ozone values measured in the same area. The cumulative rubber test is useful in the correct interpretation of outdoor exposure tests of rubber goods, since it integrates the variable action of ozone due to large fluctuations in its concentration and the reaction rate, which is affected by climatological factors. When temperature and flow rate of the air are kept constant, the test offers an inexpensive and convenient way of area surveys in air pollution studies. -- APCA Absts.

1058 An Air Dilution Olfactometer Suitable for Group Threshold Measurement. G. H. Cheesman and H. M. Kirkby. Quart. J. Exptl. Psychol. 11, 113-123 (May 1959).

In contrast to earlier olfactometer models, in which the apparatus was arranged to deliver the various concentrations of an odorant to the observer at a fixed point, such as a nosepiece or similar device, the apparatus described delivers constant, controlled concentrations of odorous material to a series of smelling points. The prototype apparatus described is provided with 12 testing points, so that each of a group of observers can sniff at each point in turn during a test. Provision for changing the distribution of concentrations among the various smelling points eliminates any possibility of the subjects associating particular conclusions with particular locations. Five full olfactory tests were made with the apparatus; involving about 50 subjects; but the results noted show a disappointing range of variation. Because of the necessity to dismantle the equipment, further tests were not possible. However, the working of the apparatus was sufficiently smooth to encourage confidence in the belief that it can prove a valuable instrument for future work. -- Cond. from APCA Absts.

1059 Notes on Interferences by Oxides of Nitrogen with Estimations of Carbon Monoxide in Air by the NBS Indicating Tubes. H. E. Ayer and B. E. Saltzman. Am. Ind. Hyg. Assn. J. 20, 337-339 (Aug. 1959).

Nitrogen dioxide and nitric oxide interference with carbon monoxide estimations by the NBS indicating tube were investigated. Both oxides were found to interfere seriously, the nitrogen dioxide to a greater extent. Nitrogen dioxide interference can be eliminated and nitric

oxide interference considerably reduced by using a U-tube with solid potassium permanganate in the upstream leg and Ascarite in the downstream leg. The U-tube is flushed with the contaminated air, using the rubber bulb, and then connected ahead of the indicating tube. The field determination of carbon monoxide is then made in the usual way. No interference may be expected from concentrations of nitrogen oxides up to 15% of that of carbon monoxide. If an NBS tube estimation without the U-tube does not give a color lighter than one made with the tube, then nitrogen dioxide can be presumed to be within its threshold limit of 5 ppm. The degree of interference eliminated by the tentative method reported was sufficient for the immediate needs of the authors. Since a more extensive study is not planned at this time, this note is offered for the information of those who use the NBS carbon monoxide tubes.

-- Authors' summary

1060 Improved Cascade Impactor for Measuring Aerosol Particle Sizes in Air Pollutants, Commercial Aerosols and Cigarette Smoke. R. I. Mitchell and J. M. Pilcher. Ind. Eng. Chem. 51, 1039-1042 (Sept. 1959).

Various parameters affect the impaction process in a cascade impactor for determining the particle-size distribution of aerosols and sprays. Studies on the jet-to-slide distance which affects the sharpness of classification, and on wall-to-slide distance which affects the loss of particles on the wall were emphasized particularly. An improved cascade impactor containing round jets and slides was designed and calibrated. Problems encountered in the calibration process were studied and solved. Studies of the wall loss that may be expected for each stage of the impactor were made. This improved impactor and modified versions have been used to determine the particle size distribution of air pollutants, therapeutic and biological aerosols, and cigarette smoke. -- IEC Brief

PREVENTIVE ENGINEERING

1061 Moral Responsibility and Dangerous Chemicals. The Wyers Memorial Lecture 1958. T. S. Scott. Trans. Assn. Ind. Med. Officers 9, 57-65 (July 1959).

With regard to standards of safety the author states that even with modern safe plant and processes, assurance must be made doubly sure and a high margin of safety must be sought to make absolutely certain that the plant and operating precautions are completely safe. Contamination can still occur during maintenance operations and through accidental breakage or failure of equipment. The human element may fail if supervision allows men to relax from the strict standards laid down in operating the plant and handling the material. The minimum dose of a carcinogen required to produce a tumor in man under industrial conditions is not known and it is not always possible to measure the amount of a toxic agent in the atmosphere or in body fluids. In such cases standards far more stringent than are usually required for most acutely toxic chemicals must be imposed. With carcinogens many years may elapse before they are manifest. Even under the strictest conditions in the modern plant it cannot be known with absolute certainty that the risk is completely obviated until a whole generation of workmen has been unaffected. To ensure the adequacy and the effectiveness of any prophylactic program, medical supervision must, therefore, be continued indefinitely in the case of carcinogens and many serious toxic hazards. The industrial medical officer must do more than figure simply as a general practitioner inside the factory. He must be able to utilize and coordinate the skill and experience of scientists and technologists in many different specialties and he must continue to function as a doctor in his own right.

COMMUNITY AIR HYGIENE

1062 Leaf Injury Symptoms in Grape Due to Air Pollution. B. L. Richards, J. T. Middleton and W. B. Hewitt. Agron. J. 50, 559-561 (1958).

Leaf lesions occurring on grape leaves in areas polluted by air-borne oxidants are described. The lesions have a stippled appearance and can be distinguished from other grape disorders. The disease occurred when the plants were fumigated with ozone. Toxic ozone levels occur in only some of the grape-producing areas of California.
-- Public Health Eng. Abstr.

1063 Effect of Salinity on Susceptibility of Sunflower Plants to Smog. J. J. Oertli. Soil Sci. 87, 249-251 (1959).

Sunflower plants were grown in nutrient solutions of different osmotic concentrations and in sands of different moisture stress. Some of the plants were exposed to local smog atmospheres in the fall of 1957 and the spring of 1958; other plants were exposed to fumes of sulfur dioxide, oxides of nitrogen, or to hydrochloric acid gas. From earlier work it was reasonable to assume that the extent of smog damage to plants is related to the degree of opening of the stomata. Conditions of moisture play an important role in the closure and opening of the stomata. In the current experiments it was observed that high moisture stress, whether osmotic or non-osmotic, produced plants which were more resistant to smog injury. A theory is presented by which the entry of smog into plants is impeded by the more closed stomata at high moisture stress, thus increasing the resistance of the plants to injury. -- APCA Abstr.

1064 Veterinary Aspects of Air Pollution Research. E. J. Catcott. J. Am. Vet. Med. Assn. 134, 434-436 (May 15, 1959).

Interest in the effects of air pollution on animals has generally developed as a corollary to concern about its influence on human health. During the Donora air pollution episode in 1948, U. S. Public Health Survey disclosed that appreciable numbers of animals were reported to have become ill and that some died during the period of intense pollution. While dogs were allegedly affected in greater numbers than other species, illnesses and deaths were reported by owners of cats, rabbits, calves, and poultry. Symptoms of illness included those of respiratory distress, retching and emesis, coughing, sneezing, and dyspnea; pneumonia was reported for calves. Studies by the author during 1957 of animal mortality and production records failed to reveal any apparent relation with the occurrence of smog in areas in and near Los Angeles which experienced severe air pollution. The unwillingness of veterinarians and animal breeders to indict smog as a serious influence on animal health may reflect the difficulty of assigning clinical reactions to the subtle influences which produce their effects only after prolonged periods. Gross and microscopic examination of tissue from the respiratory tract of 51 dogs from smog and non-smog areas failed to show any of the pathological changes which had been seen in animals exposed to synthetic smogs. Examination of tissues of the respiratory tract of a group of Leghorn chickens living in a smog area and of another living in a smog-free area were also negative; in both groups the birds remained healthy, and their growth, vigor, and appearance were considered to be normal. -- Cond. from APCA Abstr.

1065 Air Pollution Control is Good Business. W. R. Bradley. J. Air Pollution Control Assn. 9, 115-119 (Aug. 1959).

The author suggests 10 steps in a positive approach to air pollution control based on realistic control measures and public relations practices as follows: (1) Determine by sampling

and study if a pollution problem exists. In this connection work closely and confidently with official pollution control agencies. (2) If there is a problem, recognize it, for pollution cannot be easily concealed. (3) Begin control measures through stack sampling, and general air and water sampling. (4) Begin a public relations program advising the community of such work. (5) Using the data obtained, begin research on methods for control through pilot studies. (6) Apply the results of research to engineering development of control facilities. (7) Install proved and tested control equipment. (8) Keep the plant neighbors informed of progress. (9) Invite the public to inspect the accomplishment and to celebrate the success. (10) Inform companion industries of pollution control techniques that may be useful to them.

1066 Engineering and Maintaining In-Plant Air Pollution Control. O. C. Thompson. J. Air Pollution Control Assn. 9, 94-95, 120 (Aug. 1959).

The organization and programming for air pollution control begins with a clearly understood company policy. Written policy statements seem the exception rather than the rule. The author describes a five-step written policy of Union Carbide Chemicals, specifically covering process wastes and related community relations, as follows: (1) Design Engineering Departments are responsible for incorporating into the design of any new installations the means for disposal of all process wastes with a minimum disturbance to the plant community. (2) Each operating plant will assign to some individual the responsibility for proper disposal of process wastes. (3) Each operating plant will assign engineering and laboratory talent for continuing studies of waste disposal. (4) Each operating plant will take an active part in any local committee groups or branches of agencies or trade associations interested in industrial waste disposal. (5) Each operating plant will assign to some individual the responsibility of representing the company to the public on all matters pertaining to air or water waste disposal. This written policy has proved to be of great value. It puts the responsibility for plant wastes control squarely where it belongs—on the plant management. It makes clear that control of wastes begins with product research and development in the laboratories, and that this control is extended through engineering, and the design and construction of each plant unit.

1067 Stainless Steel Anti-Smog Mufflers—Cut Air Pollution. Industrial Publicity Department, Communications Counselors, Inc. J. Air Pollution Control Assn. 9, 93-94 (Aug. 1959).

The muffler is almost entirely fabricated from chromium-nickel stainless steel in order to resist oxidation and corrosion at the high operating temperatures. It is designed to dispose of the unburned fuels present to the exhaust system of a gasoline engine. The muffler consists of a primary burning tube (pilot tube) through which the bulk of the exhaust gases pass during operations of low exhaust volume. Air is introduced through an adjustable opening into this tube and the resulting mixture is ignited by a long-reach spark plug. As the volume increases, the excess exhaust gases are carried through an area surrounding the pilot tube and receive air from an adjustable rectangular opening in the muffler shell. This portion of the exhaust mixture is burned in the same combustion area as that of the pilot tubes. The exit tube of the muffler is baffled to prevent the flame from protruding at the tail pipe. Laboratory tests, made with a gasoline-powered bus produced a satisfactory over-all removal of the smog-forming hydrocarbons.

1068 Enzyme Poisons of Auto Exhaust Gases. T. Bersin. Vitalstoffe 3, (12) 160-165 (1959). German.

Tetraethyl lead and inorganic lead are known to have an inhibiting effect on enzyme actions. The unconsumed gasoline in auto exhausts contains unsaturated hydrocarbons tending to produce smoke and aerosols of lead compounds. The question is raised whether the absence of an increase in reports of toxic effects from lead compounds, while traffic density continues to increase, may be due to unsuitable diagnostic procedures. Central nervous system damages after exposure to tetraethyl lead have been reported to appear 14 years after the original accident. Other known toxic substances found in exhaust gases are carbon monoxide and 3,4-benzpyrene. Carbon monoxide is known to block iron-containing enzymes and produce a decline in

performance. Among the unsaturated hydrocarbons in unburned gasoline are the olefins which, under specific atmospheric conditions react with the ozone of the air to produce the olefin ozonides, which are said to block enzymatic action because of the deflection of the active group. Technical measures are needed to control air pollution, including better utilization of gasoline to leave less unburned fuel, and the use of catalysts to combat pollution with olefins. -- Cond. from APCA Absts

1069 The Toxicity of Ozone, A Constituent of Smog. H. T. Freebairn. J. Appl. Nutrition 12, 2-13 (1959).

In Los Angeles, concentrations of ozone are present, during repeated attacks of air pollution which, under controlled laboratory experiments, have been shown to affect animals and damage plants. These concentrations are presently at the border line of man's susceptibility and certainly an increased concentration or duration of exposure to ozone in the Los Angeles atmosphere could cause injury to human beings. Ozone is an extremely toxic material to many types of organisms, and, because it is also toxic to man, its use is inadvisable as an aerial disinfectant in hospitals. Ozone can be classified as a specific inhibitor and it possesses a toxic activity which indicates that it is more active than hydrogen cyanide as a poison. Ozone not only destroys the outer cell membranes of living organisms, but also reversibly and irreversibly inhibits mitochondral oxygen uptake. There is a suggestion that the reversible inhibition is enzymatic and that the natural resistance of a cell is related to the size of the metabolic pool of reducing substances capable of countering the oxidizing effects of ozone. -- APCA Absts.

MANAGEMENT ASPECTS

1070 Patterns of Sickness Absence in a Railway Population. C. Gordon, A. R. Emerson and D. S. Pugh. Brit. J. Ind. Med. 16, 230-243 (July 1959).

This investigation was carried out in order to obtain morbidity statistics in a large industrial population with special reference to the effects of aging. The population chosen, the "railway research population", consisted of a sample of Scottish railwaymen, drawn from 5 of the 8 areas in the Scottish Region of British Railways. Only certain occupational grades were studied. Information was obtained over a period of one year by means of a detailed monthly return of (1) sickness absence data and (2) job changes. The nature of sickness absence within the railway research population was then studied. It was shown in all but one measure used that sickness tends to increase with age, the most important factor being the increase of long episodes. Examination of the frequency distribution of the duration of sickness episodes revealed that sickness absence tends to be taken in terms of weeks off rather than days off. Analysis of the daily variation in sickness absence showed that the total absence rate increased from Monday to Friday. There was a well-defined tendency for sickness to start on Mondays, and in longer episodes an additional tendency to start on Fridays. This was interpreted in terms of morale, both positive and negative. The reasons for job changes were analyzed and the grades to which men were transferred were identified. The choice of suitable grades for older workers was discussed. It was concluded that working conditions might be important factors in the type of sickness absence experienced and that comparisons with other populations might be helpful in this context. -- Cond. from authors' abst.

1071 Two Schools of Thought About Executive Development. E. E. Jennings. Personnel J. 37, 370 (Mar. 1959).

This article points out that there are two commonly held theories of executive development. The first, the author has called the life-process theory, and the second, the skilled insight theory. In essence, the former theory holds that executives or executive performance are the

end-result of many years of experience with the executive role and that brief training periods cannot essentially contribute anything to the executive's performance. On the other hand, the skilled insight theory argues that particular skills can be taught to the executive in the course of training and educational programs, so that the executive may greatly improve his performance. The author indicates that the organizational climate varies from one type of industry to another concerning adherence to these schools of thought. He does not indicate which school he favors. -- J. Occ. Med. Absts.

1072 How to Improve Safety Through Organization. R. Reed, Jr. Eng. Progress, Univ. Florida 13, 5-7 (June 1959).

Wholehearted support of a safety program by management is a basic requirement for success. The program, in turn, will give generous returns to management to compensate for the time, effort and expense incurred in its operation. Many of these returns are difficult to evaluate. In computing the reduction in the overhead of the firm derived from a lowered accident rate, it is easy to determine the medical and compensation payments incurred from an injury. But other expenses, such as time lost by foremen and fellow workers, by reason of accidents and the reduction of the productive capacity of the injured workers after their return to the job are more difficult to evaluate since they are hidden in the labor and overhead costs which are assigned to production under customary accounting systems. These hidden or indirect safety costs have been studied extensively and a consensus of this research shows, conservatively, that the indirect cost of accidents is four times as great as the direct costs represented by medical and compensation expense. The cost of industrial accidents in 1955 is estimated by the National Safety Council as $3,500,000,000, equivalent to $50 per worker. The author describes three basic methods for developing a safety organization and illustrates two setups by means of organization charts. If proper efforts are made to remove potential accident causes, and to correct conditions which have caused accidents, the injury rates will be reduced. These reduced rates in turn bring both direct and indirect savings, which, with the improved confidence of the personnel, will much more than pay for the cost and effort expended in operating the program and be reflected in lowered unit cost of the product.

ACCIDENTS AND PREVENTION

1073 Barrelmakers' Work Injuries Surveyed. Anon. Safety Standards 8, 16 (Sept.-Oct. 1959).

Except for furniture, cooperage manufacture had a more favorable work-injury record in 1957 than any other manufacturing operation in the lumber and wood products group of industries, according to a recent survey made by the U. S. Department of Labor's Bureau of Labor Statistics. But the cooperage manufacturing frequency rate of 34.0 disabling injuries and its severity rate of 2,393 man-days per million man-hours worked compared very unfavorably with the all-manufacturing rates of 11.4 and 754 respectively. The heaviest incidence of injuries occurred in the stave mills; commonest variety consisted of bruises and contusions, cuts or lacerations, strains or sprains. Interestingly, the highest frequency and severity rates were suffered by firms employing 20 to 49 employees, lowest by those employing 50 to 99. The highest average number of days lost or charged per disabling injury, however, occurred among the smallest firms, those employing from 1 to 19 employees. These and other findings are published under the title of "Work Injuries and Injury Rates in the Manufacture of Cooperage", BLS Report No. 145, conducted in response to a request of the Associated Cooperage Industries of America, Inc. The results are based on reports from 137 cooperage establishments employing more than 4,500 workmen.

1074 Accidents in a Naval Dockyard. C. P. Collins.
Brit. J. Ind. Med. 16, 208-215 (July 1959).

The high incidence of accidents in H.M. Dockyard, Singapore, during 1954 led to a more detailed recording and analysis in 1955-1956. The departmental accident rates per 1000 workers were recorded, together with the circumstances of all injuries resulting in the loss of more than one shift (two per working day, lasting 4 1/2 hours in the mornings and 3 3/4 hours in the afternoons). In the successive quarters of 1955, the number of accidents of all degrees of severity dropped steadily, but by 1956 they had leveled out at figures ranging from 1/3 to 1/4 of the original numbers. In 1956 the numbers of minor accidents reported were 44% of those for 1955, while cases requiring hospital treatment had fallen to 33.8%. This was balanced to some extent by an increase of trivial cases treated without loss of time by first aid in the workshops, but the total numbers still showed a reduction in the accident rate per 1000 workers of 26.2%. The ethnic groups employed all showed a similar decrease in accident rates, but the reduction was noticeably greater among the Malays than the Chinese or Indians. Analysis by category of causation showed that the lower incidence was largely due to improvement in the categories of handling stores, using hand tools and power-driven machinery, but attention to the causes of eye injuries occasioned a reduction of only 5.2%.

1075 Crane Booms vs. Power Lines. S. S. Elkins.
Natl. Safety News 80, 74, 76, 118-121 (Sept. 1959).

Each year, many deaths and serious injuries and much property damage result from crane boom contacts with power lines. In a 9-year period California reported 160 fatalities and 300 injuries due to crane boom contacts. Statistics show that death results in one out of every three injuries caused by accidental contact with high-voltage lines. The electrical nature of the problem suggests that safety groups in the electrical industry should assume leadership in any safety drive reaching across industry lines. Officials of the crane operators' union have offered cooperation, and help from the construction industry and insurance groups is anticipated. The utility industry's stake in reducing crane contact is a major one. In addition to the personal hazard, cranes cause extensive damage to lines and serious interruptions to service. The author discusses equipment involved, electric shock, basic precautions, location of lines, location of equipment, protective devices, and the selection of operators and ground crew.

1076 Laboratory Ventilation. J. C. Barrett.
Natl. Safety News 80, 26-27, 113-118 (Sept. 1959).

The author considers laboratory hood design, hood location, exhaust ductwork, air supply, and air conservation. Certain velocities for laboratory bench-type hoods are recommended by the American Conference of Governmental Industrial Hygienists. For chemical and moderate toxicity material, average face velocity should be a minimum of 100 fpm through the open door area, with an 80 fpm minimum at any point. For high toxicity and radioactive material this should be raised to an average of 125 to 200 fpm with an absolute minimum of 100 fpm. Some authorities claim certain laboratories (as in schools and universities) do not use high-toxicity materials regularly, and individual exposure may not be for a full working day. However, there is no guarantee that a material used in a hood on any given day for a particular project may not be succeeded by a material of high hazard—flammable or toxic. It is also known that with many materials the problem is not merely one of exposure for long periods; serious illness or death can occur from even one short exposure. With such materials as oxides of nitrogen, a single exposure may often be sufficient to kill an individual or impair his health seriously. The glove box hood is another common type of laboratory hood used for work with radioisotopes, with tuberculosis germs, and in many standard chemical laboratories. Here the chemist is entirely outside the hood, and his only contact with the interior is through the glove ports. Exhaust volumes for this hood are based on maintaining 50 fpm in velocity draft at any opening; usually this means an exhaust of 20 to 30 cfm of air for each glove box.

1077 An Approach to a Rational Method for Recommending Face Velocities for Laboratory Hoods. J. E. Peterson. Am. Ind. Hyg. Assn. J. 20, 259-266 (Aug. 1959).

Variables affecting the performance of laboratory hoods have been combined into an equation for the calculation of specific recommended face velocities of each hood. The equation is strictly empirical, and numerical values are assigned to each of the factors on the basis of judgment coupled with techniques developed for that purpose. In use, the Vapor Control Factor is modified by an Environment Factor and a Hood Characteristic Factor to achieve a face velocity which would be recommended for a "standard hood". Then, a statistic (the variance) is utilized to calculate a mean face velocity which will assure that 95% of the individual velocity measurements at the hood face will fall above a minimum, calculated as 75% of the mean face velocity for the "standard hood". Specifications of the "standard hood" are discussed, as is the technique of assigning numerical values to each of the factors in the equation. Values of the variance are determined by measurement, or are estimated from an included table of variances associated with hood types. -- Author's summary

1078 Protection of Flammable Liquids. Anon. Safety Maintenance 118, 42-43 (Sept. 1959).

Flammable liquid hazards present a greater fire potential to more industrial plants than any other fire hazards. The magnitude of this potential has steadily increased with the introduction of more extensive automated operations. Although the author is considering protection of the hazards of flammable liquids, technically the liquids will not burn; it is the vapors of these liquids that do burn or, in certain mixtures with air, explode. The rate of vaporization of a liquid depends upon its vapor pressure with the rate increasing with temperature rise. Flammable liquids at elevated temperatures present greater fire potential and designers of fire protection must recognize this fact. To prevent losses due to the use of flammable liquids in industrial plants, the problems must be carefully and continuously studied. First, the hazard or fire potential of flammable liquids must be recognized by those responsible for fire safety of industrial plants. Secondly, the hazard must be adequately protected by proper design of the operational equipment and the fire protection facilities. Eight ways to minimize the hazards of flammable liquids are given in the form of a table.

MISCELLANEOUS

1079 Tank Car Wash Water. G. Gutzeit. Ind. Wastes 4, 17-20 (Mar.-Apr. 1959).

At the Masury, Ohio manufacturing and maintenance plant of the General American Transportation Corporation, a treatment plant for wastes from washing tank cars went into operation in July 1957. This article describes the facilities and method of operation for these complex wastes. The cleaning operation for the 8,000 to 16,000 gallon railroad tank cars is periodically required before a change in loading, inspection, or repairs can be performed. A basic process for the treatment of these residuals was developed several years ago by the Research and Development Department of the General American Transportation Corporation. Basically, it involves segregation of the cars into the following categories, according to the last commodity carried: (1) Insoluble inert solids, such as asphalt, clay, and kaolin. (2) Gases and volatile liquids. (3) Insoluble organic liquids, such as petroleum products, vegetable oils, non-volatile solvents, and acids. (4) Soluble liquids, neutral and alkaline salts, and alkalies. (5) Taste and odor producing substances, such as phenols, creosols, etc., and non-metallic toxic compounds. Insoluble solids are dumped and incinerated if combustible. Gases and volatile liquids are dissipated into the atmosphere by steaming, unless the products are irritating or toxic. Phenolic materials and other aromatic compounds have to be treated in special installations, involving adsorption on bituminous coal or lignite (the solids being then removed by froth flotation); followed by aeration, lagooning for equalization, biological oxidation or chemical oxidation with chlorine, chlorine dioxide or ozone. Wash waters and stream condensate from tanks having been used for shipping insoluble organic liquids and soluble liquids are segregated, by using movable effluent launders and separated into two groups which are treated separately by methods which are described in detail.

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1760

OCCUPATIONAL HEALTH HAZARDS

Derived from Industrial Health Reports

October 1960 through December 1960

Release No. 27 — For Official Use Only

I. Chemical Health Hazards and Their Control

A. Inhalation Hazards Due to Vapors, Fumes, Mists, Gases and Dusts

1. Asbestos Dust: Further samples have been taken to determine the extent of exposure to asbestos dust by pipecoverers and insulators working aboard ship. Results of the samples taken are as follows:

Operation	Dust Count mppcf
Installation of asbestos cloth	5.9
Installation and sawing insulation block	20.0
Installation of insulation block	3.9
Sawing insulation block	27.0
Installing block insulation	11.7
Mixing magnesia cement	5.6
Sweep up after coating asbestos on boiler	92.5
Rip out of pipe insulation	6.8

In general, it is concluded that while cutting and installing insulation block and when ripping out old insulation, the dust counts usually exceed the safe concentration, assuming all the dust to be asbestos. When installing asbestos cloth and prefabricated insulation, the dust counts generally are within acceptable limits. It has been recommended that pipecoverers and insulators performing dusty jobs be required to wear dust respirators. In some cases, it may be feasible to wet down the insulating material before the work is begun, to reduce dust formation.

4. Fiber Glass Pad for Asbestos: The Value Engineering [illegible] has been looking for a substitute for amestie (asbestos material) in order to reduce the present high cost of insulation practices and to reduce the health hazards of asbestos work. The E.I. Thompson Fibreglass Company of Los Angeles, in conjunction with the Owens-Corning Company, has developed a fibreglass pad which withstands the temperature requirement and also reduces the final cost of the job. According to the manufacturers, fibreglass is made of finely pulverized ingredients, including sand, lime and metallic oxides. A mixture of silicates results after processing with no free silica present. They state that glass fibers are inert, non-toxic, non-allergic, and cause no lung hazard. The new fibreglass contains long smooth fibers which are claimed to be less irritating to the skin. Tentative heat tests have been conducted with fibreglass insulation to 1100 degrees F before any change in physical characteristics. Some fibreglass pads will be installed on a destroyer in the near future for further evaluation. (3)