

Dr. C. S. Bishop - Newark



Industrial Hygiene Digest

INDUSTRIAL HEALTH NEWS

LITERATURE ABSTRACTS

MEDICAL

ENGINEERING

CHEMICAL

TOXICOLOGICAL

LEGAL

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INDUSTRIAL HYGIENE FOUNDATION

MELLON INSTITUTE

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INDUSTRIAL HYGIENE FEATURES

The attainment of optimum health is discussed in Abst. No. 812.

Abst. No. 817 reports on solar retinitis.

Laser photocoagulation of the eye is investigated in Abst. No. 818.

Abst. No. 825 is concerned about ticks on birds migrating from Europe and Asia to Africa.

Abst. No. 828 discusses the continued threat of small pox.

See Abst. No. 833 for information on health hazards of selected rocket propellants.

The acute oral toxicity of reduced iron is described in Abst. No. 838.

Abst. No. 852 gives data on the pneumoconiosis study of western Pennsylvania bituminous coal miners.

An environmental dust study of anthracite mines in eastern Pennsylvania is presented in Abst. No. 853.

Consult Abst. No. 860 for aeromedical aspects of a commercial jet operation.

See Abst. No. 865 for the ozone toxicity hazard in cabins of high altitude aircraft.

The responsibility of local health agencies in the control of ionizing radiation is outlined in Abst. No. 873.

Controlling air contaminants in new industrial processes is the topic of Abst. No. 877.

Information concerning atmospheric contamination in the space cabin is given in Abst. No. 880.

See Abst. No. 883 for a comparative study of executive health examinations.

Data on launderette waste treatment are given in Abst. No. 892.

FOUNDATION FACTS

THRESHOLD LIMIT VALUES for 1963, adopted by the American Conference of Governmental Industrial Hygienists at their 25th Annual Meeting in Cincinnati, Ohio on May 6 & 7, 1963 appear in this issue of the Digest. A supplemental status report on TLV's for Electromagnetic Radiation prepared by Industrial Hygiene Foundation for the benefit of its member companies is also included herein. Additional copies of ACGIH Threshold Limit Values and the IHF Supplement are available upon request.

ENGINEERING SERIES BULLETIN NO. 5 — INTERNATIONAL AUDIOMETRIC ZERO, is being mailed to all members of IHF with this issue of the Digest. The purpose of this Bulletin is to provide member companies with timely and accurate advice concerning a matter currently under deliberation in the American Standards Association Committee S3. The advantages and disadvantages of replacement of the present American audiometric reference level by the International level are set forth. A limited supply of this Bulletin is available, and additional copies will be sent to members free of charge as long as the supply holds out. A statement from the minutes of an AIHA Noise Committee meeting at Mellon Institute on September 6 pertaining to its position on this matter is considered of interest and is included in this issue of the Digest with the kind permission of the AIHA.

ADDITIONS TO IHF TECHNICAL COMMITTEES:

Medical

Dr. D. C. Braun, U.S. Steel Corp.
Dr. R. L. Gibson, Gulf Oil Corp.
Dr. R. J. Halen, J & L Steel Corp.
Dr. George Roush, Ethyl Corp.

Legal

Mr. P. J. Winschel, Reed, Smith, Shaw & McClay

Chemical-Toxicological

Dr. J. A. Zapp, Jr., E. I. du Pont de Nemours & Co.

01 132 1869

28th ANNUAL MEETING — OCTOBER 23-24, 1963

Programs and registration cards have been mailed to all members. This is your meeting and an excellent program has been arranged. Plan now to be with us and let us have your preregistration card as soon as possible.

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EDITORIAL

A STATEMENT OF POLICY FROM AIHA

The American Standards Association S3 Committee has prepared a draft of a new standard for audiometers and is currently polling membership of the Committee with final deadline for voting set for October 12, 1963. The standard reference threshold levels recommended by the International Standards Organization are included in this document. This matter was considered at a meeting of the AIHA Noise Committee on September 6 and the following conclusions were reached.

The proposed Standard assumes the following:

1. The ISO standard reference threshold levels represent a more technically sound reference than the ASA-1951 levels.
2. Refinement of the reference will permit improved clinical diagnosis.
3. A change in the reference will have to be made eventually.
4. All deliberating bodies agree almost unanimously that the ISO reference levels be adopted.
5. There are certain practical objections but these are not considered important.
6. Now is the time for action before more complicating factors develop.

At the September 6 meeting, it was noted that:

1. It is not apparent that the ISO standard reference threshold levels are more scientifically sound than the present reference levels:
 - a. The criteria on which the levels were established are not clearly defined.
 - b. Recent published and extensive unpublished data available to the committee were not considered in determining the ISO values. These data suggest that a revision of the ISO standard may be required.
2. It is doubtful that the adoption of the recommended levels will result in a significant improvement in clinical diagnosis.
3. There is some doubt that a new reference threshold is needed at this time.
4. Despite published references to the contrary, all interested professional and technical groups have not expressed an opinion.
5. The practical objections are considerable.*

On the basis of the above considerations, the AIHA Noise Committee recommends that the AIHA member of the ASA S3 Committee cast a negative vote with an expression of willingness to evaluate new information as it becomes available.

* Discussion of proposed changes in Standards for Hearing Testing Instruments, James H. Botsford, American Industrial Hygiene Association Journal 24, 334-344 (July-August 1963).

01 132 1871

DR. DANIEL C. BRAUN ACCEPTS CHAIRMANSHIP
OF I-H-F MEDICAL COMMITTEE



Industrial Hygiene Foundation is pleased to announce that Daniel C. Braun, M.D., has accepted the Chairmanship of its Medical Committee. He served as its Secretary from 1950-57.

Dr. Braun received his M.D. degree from the University of Pittsburgh School of Medicine in 1937, interned at Mercy Hospital, Pittsburgh, and has completed a number of postgraduate courses in industrial medicine, hygiene and toxicology at the University of Pittsburgh, Long Island College of Medicine and Columbia University.

Dr. Braun was Medical Director of IHF from 1950-57. Prior to that he had been Medical Director for Pittsburgh Coal Co., serving subsequently as a consultant in occupational medicine for Pittsburgh Coal, Westinghouse Electric Corp., and other industrial firms in the Pittsburgh area. After leaving the Foundation, he became Plant Medical Director, Homestead District Works of U. S. Steel Corp., and is now Assistant Medical Director, divisions and associated subsidiaries of U. S. Steel.

Dr. Braun is a former director of the Industrial Medical Association and Past-President of the IMA of the Pittsburgh-Cleveland Area. He is certified in occupational medicine by the American Board of Preventive Medicine and is a Fellow of the Am. Coll. of Chest Physicians, Am. Academy of Occ. Med., Am. Public Health Assoc., and Pittsburgh Academy of Medicine. He is also a lecturer in occupational health at the Graduate School of Public Health, University of Pittsburgh.

01 132 1872

DR. LESTER V. CRALLEY ACCEPTS CHAIRMANSHIP
OF I-H-F ENGINEERING COMMITTEE



Industrial Hygiene Foundation is pleased to announce that Lester V. Cralley, Ph.D. has accepted the Chairmanship of its Engineering Committee. He has served as a member of this Committee for a number of years. Dr. Cralley is Chief Industrial Hygienist for the Aluminum Company of America in Pittsburgh, a position he has held since 1945.

Dr. Cralley received his B.S. degree in chemistry from McKendree College in 1933, and his Ph.D. degree in industrial hygiene and toxicology from Iowa State University in 1942. During the years 1941-45 he served in the United States Public Health Service, Division of Industrial Hygiene with a rank of Captain.

Dr. Cralley is a member of the American Industrial Hygiene Association, as well as past president and treasurer. He is also a member of the following organizations: American Foundrymen's Society Air Pollution Committee; American Chemical Society, American Public Health Association, American Society for Testing Materials - D22 Committee; Air Pollution Control Association; and Research Society of America.

01 132 1873

THRESHOLD LIMIT VALUES 1963^{1/}

Adopted at the 25th Annual Meeting of the
American Conference of Governmental Industrial Hygienists,
Cincinnati, Ohio, May 6-7, 1963

These values 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 workday. 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. Because it has been recognized that the threshold limits of certain acutely-acting substances may not provide a safety factor comparable to that of chronically-acting substances for which a time-weighted average applies, a "C" designation or "ceiling" has been affixed to such values indicating that the Threshold Limit Value should not be exceeded. The bases for the "C" listing is given in appendix C.

Special consideration should be given to the application of these values in assessing the health hazards which may be associated with exposure to mixtures of two or more substances. A brief discussion of basic considerations involved in developing Threshold Limit Values for mixtures, and methods for their development, amplified by specific examples are given in appendix B.

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

These limits are intended for use in the field of industrial hygiene and should be interpreted and applied only by persons trained in this field. They are not intended for use, or for modification for use, (1) as a relative index of toxicity, by making a ratio of two limits, or (2) in the evaluation or control of community air pollution or air pollution nuisances, or (3) in estimating the toxic potential of continuous uninterrupted exposures.

These values are reviewed annually by the Committee on Threshold Limits for 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

(In Alphabetical Order)

Substance	ppm*	mg/m ³ **	Substance	ppm*	mg/m ³ **
Acetaldehyde	200	360	Aldrin (1,2,3,4,10,10-hexachloro-1,4,4a,5,8,8a-hexahydro-1,4,5,8-dimethano-naphthalene)—Skin	—	0.25
Acetic acid	10	25	† Allyl alcohol—Skin	2	5
Acetic anhydride	5	20	Allyl chloride	1	3
Acetone	1,000	2,400	C Allyl glycidyl ether (AGE)	10	45
Acetonitrile	40	70	Allyl propyl disulfide	2	12
Acetylene tetrabromide	1	14	† Ammonia	50	35
† Acrolein	0.1	0.25			
Acrylonitrile — Skin	20	45			

Note: The word "Skin" following a substance indicates that the substance can penetrate the skin to contribute to the exposure and threshold limit value should be reduced accordingly.

1/ Reprinted with permission from the American Conference of Governmental Industrial Hygienists.

† 1963 Revision.

* Parts of vapor or gas per million parts of air by volume at 25°C and 760 mm. Hg pressure.

** Approximate milligrams of particulate per cubic meter of air.

A Numbers, See Appendix A

01 132 1874

Substance	ppm	Mg/M
Ammonium sulfate (Ammat)	—	15
Amyl acetate	100	525
Amyl alcohol (isoamyl alcohol)	100	360
Aniline—Skin	5	19
Antimony	—	0.5
ANTU (alpha naphthyl thiourea)	—	0.3
Arsenic	—	0.5
Arsine	0.05	0.2
Barium (soluble compounds)	—	0.5
C Benzene benzol—Skin	25	80
Benzidine	—	A ¹
Benzyl chloride	1	5
Beryllium	—	0.002
Boron oxide	—	15
C Boron trifluoride	1	3
Bromine	0.1	0.7
Butadiene (1,3-butadiene)	1,000	2,200
2-Butanone (methyl ethyl ketone)	200	590
2-Butoxy ethanol (Butyl Cellosolve)	50	240
Butyl acetate (n-butyl acetate)	200	950
Butyl alcohol	100	300
tert. Butyl Alcohol	100	300
C Butylamine	5	15
n-Butyl glycidyl ether (BGE)	50	270
Butyl mercaptan	10	35
o-tert. Butyltoluene	10	60
Caesium oxide fume	—	0.1
Calcium arsenate	—	—
Carbon dioxide	5,000	9,000
Carbon disulfide—Skin	20	60
Carbon monoxide	100	110
Carbon tetrachloride—Skin	10	65
Chlordane 1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene	—	0.5
Chlorinated camphene 60%	—	0.5
Chlorinated diphenyl oxide	—	0.5
Chlorine	1	3
Chlorine dioxide	0.1	0.3
C Chlorine trifluoride	0.1	0.4
C Chloroacetaldehyde	1	3
Chlorobenzene	—	—
monochlorobenzene	75	350
Chlorobromomethane	200	1,050
Chlorodiphenyl (42% Chlorine)—Skin	—	1
Chlorodiphenyl (54% Chlorine)—Skin	—	0.5
C Chloroform (trichloromethane)	50	240
1-Chloro-1-nitropropane	20	100
Chloropicrin	0.1	0.7
Chloroprene (2-chloro-1,3-butadiene)	25	90
Chromic acid and chromates (as CrO ₃)	—	0.1
Cobalt	—	0.5
Crag (R) herbicide (sodium 2-[2,4-dichlorophenoxy] ethanol hydrogen sulfate)	—	15
Cresol (all isomers)—Skin	5	22
Cyanide (as CN)—Skin	—	5
Cyclohexane	400	1,400
Cyclohexanol	50	200
Cyclohexanone	50	200
Cyclohexene	400	1,350
2,4-D (2,4-dichlorophenoxy-acetic acid)	—	10
DDT (2,2-bis (p-chlorophenyl)-1,1,1-trichloroethane)—Skin	—	1
Decaborane—Skin	0.05	0.3
Diacetone alcohol (4-hydroxy-4-methyl-2-pentanone)	50	240
Diborane	0.1	0.1
1,2-Dibromoethane (Ethylene dibromide)	25	190
n-Dichlorobenzene	50	300
p-Dichlorobenzene	75	450
Dichlorodifluoromethane	1,000	4,950
1,1-Dichloroethane	100	400

Substance	ppm	Mg/M
1,2-Dichloroethane	—	—
ethylene dichloride	50	300
1,2-Dichloroethylene	200	790
C Dichloroethyl ether	15	90
Dichloromono-fluoromethane	1,000	4,200
C 1,1-Dichloro-1-nitroethane	10	50
Dichlorotetrafluoroethane	1,000	7,000
Dieldrin 1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,5,7,8,8a-octahydro-1,4,5,8-dimethanonaphthalene—Skin	—	0.25
Diethylamine	25	75
Difluorodibromomethane	100	860
+ C Diglycidyl ether (DGE)	25	2.8
Diisobutyl ketone	50	290
Dimethyl acetamide—Skin	10	35
Dimethylaniline N-dimethylaniline—Skin	5	25
Dimethylformamide	20	50
1,1-Dimethylhydrazine—Skin	0.5	1
Dimethylsulfate—Skin	1	5
Dinitrobenzene—Skin	—	1
Dinitrotoluene—Skin	—	1.5
Dinitro-o-cresol—Skin	—	0.2
Dioxane (diethylene dioxide)	100	360
Dipropylene glycol methyl ether	100	500
EPN (O-ethyl O-p-nitrophenyl thionobenzene phosphonate)—Skin	—	0.5
Ethyl acetate	400	1,400
Ethyl acrylate—Skin	25	100
Ethyl alcohol (ethanol)	1,000	1,900
Ethylamine	25	45
C Ethylbenzene	200	870
Ethyl bromide	200	890
Ethyl chloride	1,000	2,600
Ethyl ether	400	1,200
Ethyl formate	100	300
+ C Ethyl mercaptan	20	52
Ethyl silicate	100	850
Ethylene chlorohydrin—Skin	5	16
Ethylenediamine	10	30
Ethylene glycol dimethyl (Combined EGDN + NG)—Skin	0.2	1.2
Ethyleneimine—Skin	5	9
Ethylene oxide	50	90
2-Ethoxyethanol (Cellosolve)	200	740
2-Ethoxyethylacetate (Cellosolve Acetate)	—	540
Ferbam (ferroc dimethyl dithiocarbamate)	—	15
Ferrovanadium dust	—	—
Fluoride as F	—	2.5
Fluorine	—	0.2
Fluorotrichloromethane	1,000	5,600
C Formaldehyde	5	6
Furfural	5	20
Furfuryl alcohol	50	200
Gasoline	500	2,000
Glycidol (2,3-Epoxy-1-propanol)	50	150
Heptane (n-heptane)	500	2,000
Hexane (n-hexane)	500	800
Hexanone (methyl butyl ketone)	100	410
sec-Hexyl acetate	50	295
Hexone (methyl isobutyl ketone)	100	410
C Hydrazine—Skin	—	1.3
Hydrogen bromide	3	10
C Hydrogen chloride	5	7
Hydrogen cyanide—Skin	10	11
Hydrogen fluoride	3	2
Hydrogen peroxide 90%	1	1.4
Hydrogen selenide	0.05	0.2
C Hydrogen sulfide	20	30
Hydroquinone	—	2
C Iodine	0.1	—
Iron oxide fume	—	15
Isophorone	25	140
Isopropylamine	5	12
Isopropyl glycidyl ether (IGE)	50	240

Substance	ppm*	Mg/m ³ **	Substance	ppm*	Mg/m ³ **
Ketene	0.5	1.9	α-Phenyl glycidyl ether PGE	50	110
Lead	—	2	Phenyldiazine—Skin	5	22
Lead arsenate	—	0.15	Phosdrin 2-carbomethoxy-1-methyl vinyl dimethyl phosphate	—	—
Lindane hexachlorocyclohexane, gamma isomer	—	0.5	Phosgene carbonyl chloride	—	—
Lithium hydride	—	0.025	Phosphine	0.3	—
Magnesium oxide fume	—	.5	Phosphoric acid	—	—
Malathion (n,n-dimethyl dithiophosphate of diethyl mercaptosuccinate)—Skin	—	15	Phosphorus yellow	—	—
Manganese	—	5	Phosphorus pentachloride	—	—
Mercury—Skin	—	0.1	Phosphorus pentasulfide	—	—
Mercury organic compounds—Skin	—	0.01	Phosphorus trichloride	0.5	—
Mesityl oxide	25	100	Picric acid—Skin	—	—
Methoxychlor (2,2-di-p-methoxyphenyl-1, 1, 1-trichloroethane)	—	15	Platinum Soluble Salts	—	0.01
Methyl acetate	200	610	Propyl acetate	200	840
Methyl acetylene	1,000	1,650	Propyl alcohol	—	—
Methyl acrylate—Skin	10	35	Isopropyl alcohol	400	380
Methylal (dimethoxymethane)	1,000	3,100	Propyl ether	—	—
Methyl alcohol (methanol)	200	260	Isopropyl ether	500	2,100
Methyl bromide—Skin	20	80	n-Propyl nitrate	25	—
Methyl cellosolve (2-methoxyethanol)—Skin	25	80	Propylene dichloride	—	—
Methyl cellosolve acetate ethylene glycol monomethyl ether acetate	—	—	1,2-dichloropropane	25	150
Methyl chloride	100	210	Propylene mine—Skin	25	50
Methyl chloroform (1, 1, 1-trichloroethane)	350	1,900	Propylene oxide	100	240
Methylcyclohexane	500	2,000	Pyrethrum	—	—
Methylcyclohexanol	100	470	Pyridine	5	15
Methylcyclohexanone	100	460	Quinone	0.1	—
Methyl formate	100	250	Rotenone (commercial)	—	—
Methyl isobutyl carbinal (methyl amyl alcohol)	25	100	Selenium compounds as Se	—	—
Methyl mercaptan	20	40	Sodium fluoroacetate 1080—Skin	—	0.05
Methyl styrene	100	480	Sodium hydroxide	—	—
Methylene chloride (dichloromethane)	500	1,750	Stibine	0.1	—
Monomethyl aniline—Skin	2	9	Stoddard solvent	500	2,900
Molybdenum (soluble compounds)	—	5	Strychnine	—	0.15
(insoluble compounds)	—	15	Styrene monomer (phenylethylene)	100	420
Naphthalene (coal tar)	200	800	Sulfur dioxide	5	13
Naphthalene (petroleum)	500	2,000	Sulfur hexafluoride	1,000	6,300
2-Naphthylamine	—	A ²	Sulfuric acid	—	—
Nickel carbonyl	0.001	0.007	Sulfur monochloride	1	6
Nicotine—Skin	—	0.5	Sulfur pentafluoride	0.025	0.25
Nitric acid	10	25	Sulfuryl fluoride	5	20
p-Nitroaniline—Skin	1	6	2,4,5-T (2,4,5-Trichlorophenoxyacetic acid)	—	10
Nitrobenzene—Skin	1	5	TEOP (tetraethyl dithiopyrophosphate)—Skin	—	0.2
Nitroethane	100	310	Teflon (R) decomposition products	—	A ⁴
Nitrogen dioxide	5	9	TEPP (tetraethyl pyrophosphate)—Skin	—	0.05
Nitroglycerin (combined EGDN + NG)—Skin	0.2	2	Tellurium	—	0.1
Nitromethane	100	250	1, 1, 2, 2-Tetrachloroethane—Skin	5	35
1-Nitropropane	25	90	Tetrahydrofuran	200	590
2-Nitropropane	25	90	Tetranitromethane	1	8
N-Nitrosodimethylamine (Dimethylnitrosamine)—Skin	A ³	—	Tetryl (2, 4, 6-trinitrophenylmethyl nitramine)—Skin	—	1.5
Nitrotoluene—Skin	5	30	Thallium (soluble compounds)—Skin	—	0.1
Octane	500	2,350	Thiram (tetramethyl thiuram disulfide)	—	5
Osmium tetroxide	—	0.002	Titanium dioxide	—	15
Ozone	0.1	0.2	p-Toluidine (toluol)	200	750
Parathion (O, O, diethyl-O-p-nitrophenyl thiophosphate)—Skin	—	0.1	o-Toluidine—Skin	5	22
Pentaborane	0.005	0.01	C Toluene 2,4-diisocyanate	0.02	0.14
Pentachloronaphthalene—Skin	—	0.5	Trichloroethylene	100	520
Pentachlorophenol—Skin	—	0.5	Trichloronaphthalene—Skin	—	5
Pentanone (methyl propyl ketone)	200	700	1,2,3-Trichloropropane	50	300
Pentane	1,000	2,950	1,1,2-Trichloro 1,2,2-trifluoroethane	1,000	7,600
Perchloroethylene (tetrachloroethylene)	100	670	Triethylamine	25	100
Perchloromethyl mercaptan	0.1	0.8	Trifluoromonomomomomethane	1,000	6,100
Perchloryl fluoride	3	13.5	Trinitrotoluene—Skin	—	1.5
Phenol—Skin	5	19	Triorthocresyl phosphate	—	0.1
			Triphenyl phosphate	—	3
			Turpentine	100	560
			Uranium (soluble compounds)	—	0.05
			(insoluble compounds)	—	0.25

Substance	ppm*	Mg/M ³ **
Vanadium	—	0.5
C.V.O. (dust)	—	0.1
V.O. (fume)	—	0.1
C Vinyl chloride (chloroethylene)	500	1,300
Vinyl toluene	100	480
Warfarin 3-(α -acetylbenzyl)-4-hydroxycoumarin	—	0.1
Yttrium	—	5
C Xylene (xylol)	200	870
Xylidene—Skin	5	25
Zinc oxide fume	—	5
Zirconium compounds (as Zr)	—	5

Radioactivity: For permissible concentrations of radio-isotopes in air, see U. S. Department of Commerce, National Bureau of Standards, Handbook 59, "Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure," June 5, 1959. Also, see U. S. Department of Commerce, National Bureau of Standards, Handbook 59, "Permissible Dose from External Sources of Ionizing Radiation," September 28, 1954 and addendum of April 15, 1958.

Substances	ppm*	Mg/M ³ **
Heptachlor (1,4,5,6,7,8,8a-heptachloro-3 α ,4,7,7a-tetrahydro-4,7-methanoindene)	—	0.5
† Methylamine	25	31
† Methyl Methacrylate	100	410
† C Methylene bis phenylisocyanate	0.02	0.2
† Mineral Wool (Fiberglas)	—	2
† Naphthalene	10	50
Oil (mineral)	—	5
† β -Propiolactone	—	5
† Silver	—	0.05
† Tantalum	—	5
† 1,1,1,2-Tetrachloro-2,2-difluoroethane	1000	8340
† 1,1,2,2-Tetrachloro-1,2-difluoroethane	500	4170
† Tetraethyl lead	—	0.075
† Tin	—	2
(inorganic compounds)	—	2
(organic compounds as Sn)	—	0.1
—Skin	—	0.1

MINERAL DUSTS

Substance	m.p.p.c.f.†
SILICA	
Crystalline	
Quartz, Threshold Limit calculated from the formula	250 % SiO ₂ = 5
Cristobalite	—
Amorphous, including natural diatomaceous earth	20
SILICATES (less than 1% crystalline silica)	
Asbestos	5
Mica	20
Soapstone	20
Talc	20
Portland Cement	50
Miscellaneous (less than 1% crystalline silica)	50
Conversion factors	
mppcf $\times$ 35.3 = million particles per cubic meter	
= particles per c.c.	

† Millions of particles per cubic foot of air, based on impinger samples counted by light-held technique.

‡ The percentage of crystalline silica in the formula is the amount determined from air-borne samples, except in those instances in which other methods have been shown to be applicable.

TENTATIVE VALUES

Substance	ppm*	Mg/M ³ **
C tert Butyl chromate (as CrO ₃)—Skin	—	0.1
† Calcium oxide	—	5
Camphor	—	2
† Copper Fume	—	0.1
Dusts & Mists	—	1.0
DDVP (O, O-Dimethyl-2,2-dichloro-vinyl phosphate)	—	1
† Demeton (R) (Systox)	—	0.1
Endrin (1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octa hydro 1,4-endo-5,8-dimethano-naphthalene)—Skin	—	0.1
Epichlorohydrin	5	19
Ethanolamine	3	6
† Graphite	—	15 mppcf
† Hafnium	—	0.5

Appendix A

- A¹ Benzidine. Because of high incidence of bladder tumors in man, any exposure, including skin, is extremely hazardous.
- A² β -Naphthylamine. Because of the extremely high incidence of bladder tumors in workers handling this compound, and the inability to control exposures, β -naphthylamine has been prohibited from manufacture, use and other activities that involve human contact by the State of Pennsylvania.
- A³ N-Nitrosodimethylamine. Because of extremely high toxicity and presumed carcinogenic potential of this compound, contact by any route should not be permitted.
- A⁴ Teflon = decomposition products. At least one identified component of Teflon decomposition products is extremely toxic, but in the absence of more complete toxicity information and suitable analytic methods, a definite threshold limit value is not recommended at this time; but air concentrations should be minimal.
- A⁵ β -Propiolactone. Because of high acute toxicity and demonstrated skin tumor production in animals, contact by any route should be avoided.

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Appendix B

THRESHOLD LIMIT VALUES FOR MIXTURES

When two or more hazardous substances are present their combined effect rather than that of either individually should be given primary consideration. In the absence of information to the contrary, the effects of the different hazards should be considered as additive. That is, if the sum of the following fractions

$$\frac{C_1}{T_1} + \frac{C_2}{T_2} + \dots + \frac{C_n}{T_n}$$

exceeds unity, then the threshold limit of the mixture should be considered as being exceeded. C indicates the observed atmospheric concentration and T the corresponding threshold limit. See Example 1Aa.

Exceptions to the above rule may be made when there is good reason to believe that the chief effects of the different harmful substances are not in fact additive, but independent as when purely local effects on different organs of the body are produced by the various components of the mixture. In such cases the threshold limit ordinarily is exceeded only when at least one member of the series C_1/T_1 or C_2/T_2 , etc. itself has a value exceeding unity. See Example 1Ab.

Antagonistic action or potentiation may occur with some combinations of atmospheric contaminants. Such cases at present must be determined individually. Potentiating or antagonistic agents are not necessarily harmful by themselves. Potentiating effects of exposure to such agents by routes other than that of inhalation is also possible, e.g., imbibed alcohol and inhaled narcotic trichlorethylene. Potentiation is characteristically exhibited at high concentrations, less probably at low.

When a given operation or process characteristically emits a number of harmful dusts, fumes, vapors, or gases, it will frequently be only feasible to attempt to evaluate the hazard by measurement of a single substance. In such cases the threshold limit used for this substance should be reduced by a suitable factor, the magnitude of which will depend on the number, toxicity and relative quantity of the other contaminants ordinarily present.

Examples of processes which are typically associated with two or more harmful atmospheric contaminants are welding, automobile repair, blasting, painting, lacquering, certain foundry operations, diesel exhausts, etc. Example 2.

EXAMPLES

1Aa General case, where source of contaminants is a constant

a ADDITIVE EFFECTS

$$\frac{C}{T} = \frac{C_1}{T_1} + \frac{C_2}{T_2} + \dots + \frac{C_n}{T_n}$$

Air contains 10 ppm of hydrogen sulfide, 10 ppm of carbon monoxide, and 10 ppm of sulfur dioxide. The TLV's are:

$$\frac{10}{5} + \frac{10}{10} + \frac{10}{50} = 2.2 > 1$$

Threshold limit is exceeded.

b INDEPENDENT EFFECTS

Air contains 0.15 mg/m of lead dust and 0.20 mg/m of sulfur dioxide. The TLV's are:

$$\frac{0.15}{0.15} + \frac{0.20}{0.75} = 1.27 > 1$$

Threshold limit is not exceeded.

1B. Special case when source of contaminants is a mixture and atmospheric composition is assumed similar to that of original material. (A vapor blend, where each component is the same at the observed temperature.)

a ADDITIVE EFFECTS (approximate solution)

1. A mixture of equal parts of trichloroethylene (TLV 100) and 2-methyl propanol (TLV 350)

$$\frac{C}{100} = \frac{C}{350} \quad \frac{C}{T} \quad \text{Solution applicable to 3500 solvent vapor at 100°F where 100 is an arbitrary constant}$$

$$C = C_1 = \frac{1}{2} C$$

$$\frac{C}{100} = \frac{C}{350} = \frac{2C}{T}$$

$$\frac{7C}{700} = \frac{2C}{700} = \frac{2C}{T}$$

$$T_m = 700 \times \frac{2}{9} = 155 \text{ ppm}$$

1Bb General Exact Solution for Mixtures of N Components With Additive Effects and Different Vapor Pressures

$$(1) \frac{C_1}{T_1} + \frac{C_2}{T_2} + \dots + \frac{C_n}{T_n} = 1$$

$$(2) C_1 + C_2 + \dots + C_n = T$$

$$(2.1) \frac{C_1}{T_1} + \frac{C_2}{T_2} + \dots + \frac{C_n}{T_n} = 1$$

By the Law of Partial Pressures,

$$(3) C_i = aF_i$$

And by Raoult's Law,

$$(4) p_i = F_i p_i^*$$

Combine (3) and (4) to obtain

$$(5) C_i = aF_i p_i^*$$

Combining (1), (2.1), and (5), we obtain

$$(6) \frac{F_1 p_1^*}{T_1} + \frac{F_2 p_2^*}{T_2} + \dots + \frac{F_n p_n^*}{T_n} = \frac{1}{a}$$

and solving for T

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$$(6.1) T = \frac{F_1 p_1^* - F_2 p_2^* - \dots - F_n p_n^*}{F_1 p_1^* + F_2 p_2^* + \dots + F_n p_n^*}$$

$$(6.2) T = \frac{\sum_{i=1}^n F_i p_i^*}{\sum_{i=1}^n F_i p_i^*}$$

T = Threshold limit value in ppm
 C = Vapor concentration in ppm
 p = Vapor pressure of component in solution
 p* = Vapor pressure of pure component
 F = Mol fraction of component in solution
 a = A constant of proportionality
 Subscripts 1, 2, ... n relate the above quantities to components 1, 2, ... n, respectively
 Subscript i refers to an arbitrary component from 1 to n
 Absence of subscript relates the quantity to the mixture.

Solution to be applied when there is a reservoir of the solvent mixture whose composition does not change appreciably by evaporation.

Exact Arithmetic Solution of Specific Mixture

	Mol wt	Density	T	p* at 25°C	Mol fraction in half-and-half solution by volume
Trichloroethylene (1)	131.4	1.46 g/ml	100	73mm Hg	0.527
Methylchloroform (2)	133.42	1.33 g/ml	350	125mm Hg	0.473

$$F_1 p_1^* = (0.527) (73) = 38.2$$

$$F_2 p_2^* = (0.473) (125) = 59.2$$

$$T = \frac{38.2 + 59.2}{\frac{38.2}{100} + \frac{59.2}{350}} = \frac{(97.4) (350)}{133.8 + 59.2} = \frac{(97.4) (350)}{193.0} = 177 \text{ ppm}$$

(Note difference in T.L.V. when account is taken of vapor pressure and mol fraction in comparison with above example where such account is not taken).

2. A mixture of one part of 1:1 parathion T.V. 0.5 and two parts of 2:1 EPN T.V. 0.5:

$$\frac{C_1}{0.1} = \frac{C_2}{0.5} = \frac{C_m}{T_m} \quad C_1 = 2C$$

$$C_m = 3C$$

$$\frac{C_1}{0.1} = \frac{2C}{0.5} = \frac{3C}{T_m}$$

$$\frac{7C}{0.5} = \frac{3C}{T_m}$$

$$T_m = \frac{1.5}{7} = 0.21 \text{ mg/m}^3$$

1C INDEPENDENT EFFECTS

1. From naphtha (TLV, 500) containing 10 mole per cent benzene (TLV, 25) the narcotic effects can be considered as approximately the same as that of benzene-free naphtha.

The blood effects can be considered as due to the benzene alone.

For intermittent exposure, a TLV of 500 ppm may be used as long as the average concentration does not exceed $25 \times 100 = 2500$ ppm, the TLV based on the benzene content.

2. Diesel engine exhaust contains several irritants, one of which is nitrogen dioxide. A limit of 2 ppm NO₂ has been found to correlate fairly well with the beginning of subjective (irritation) effects from such gases, although no subjective effects are experienced from NO₂ alone at 5 ppm.

Appendix C

BASES FOR ASSIGNING LIMITING "C" VALUES*

T.L.V. RANGE ppm* or mg/m ³	Permitted Fluctuation Factor of T.L.V. for 5, 10 or 30 min.	Examples
0 to 1	3	Boron trifluoride (1 ppm) at 3 ppm if repeatedly encountered for periods of 5, 10, or 30 minutes, may lead to pneumonitis; a "C" listing recommended.
1 to 10	2	
10 to 100	1.5	Ethyl benzene (200 ppm) at 250 ppm if repeatedly encountered for periods of 5 or 10 minutes may prove intolerably irritating to the eyes; a "C" listing recommended.
100 to 1000	1.25	

* According to this limitation, the presently listed TLVs will or will not be candidates for a "C" ceiling listing (1963) TLVs not coming within this limitation will bear a "C" before the substance name. Judgment is based on whether the excursions in concentration under the time limits stated may result in a) intolerable irritation b) chronic or irreversible tissue change, or c) narcosis of sufficient degree to increase accident proneness or materially reduce work efficiency.

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A SUPPLEMENTARY STATUS REPORT ON THE
THRESHOLD LIMIT VALUES FOR CONTROL OF HAZARD FROM
CERTAIN FORMS OF ELECTROMAGNETIC RADIATION

(EDITOR'S NOTE:) Prepared by Industrial Hygiene Foundation from the sources listed. Not related to American Conference of Governmental Industrial Hygienists TLV's.

Microwave: A field power density of 0.01 W/cm^2 has been widely used⁽¹⁻⁵⁾ as a TLV for microwave exposure. It has been criticized in that there is no provision for duration of exposure and is thus interpreted to mean "for any period of time". Since most biological structures seem to require exposures of many seconds or minutes to produce measurable thermal effect it has been proposed that a new standard incorporating a time factor be set. American Standards Association C-95 Committee indicates that such a standard is in preparation and will appear shortly.⁽⁴⁾

Infrared and Visible Light: A threshold limit of 0.01 cal./cm^2 at the retina for any period of time has been proposed,⁽⁶⁻⁸⁾ based solely on thermal effect. Thresholds have not yet been established for pulsed lasers having discharge times of less than one microsecond.^(7, 8) Lasers have a potential capability of producing non-thermal effects (ionization in tissue and blast effects) when pulse times are reduced to nano second (i.e., $1 \text{ sec.} \times 10^{-9}$) levels.^(3, 7, 8)

Ultraviolet: A threshold limit value has been set at $0.5 \mu\text{w./cm}^2$ for exposure (of eyes) for 7 hours or less or $0.1 \mu\text{w./cm}^2$ for 24 hours. These limits were set for germicidal lamp installations in 1943.^(9, 10)

External Ionizing Radiation⁽¹¹⁻¹³⁾: The limits for external ionizing radiation indicated below are those specifically required by AEC⁽¹³⁾ and vary slightly but significantly from those set by the Federal Radiation Council⁽¹²⁾ as noted on page 38 of the latter report. (These values do not include natural background radiation or exposure from medical or dental x-ray procedures.) Threshold Limit Values are intended for the use of trained and experienced industrial hygienists. The differences between TLV's in this case illustrate the importance of obtaining competent technical consultation in the design of facilities and evaluation of exposure problems.

	Max. 13 wk. dose (rem)	Max. yearly dose (rem)	Max. accumulated dose (rem)
Controlled (restricted) areas			
Whole body, head and trunk, active blood forming organs, gonads, or lens of eye	$1 \frac{1}{4}^{\dagger}$	5	$5(n-18)^{**}$
Skin of whole body ($\cong$ R dose)	$\sim 1/2$	30	—
Hands and forearms, feet and ankles	$1 \frac{3}{4}$	75	—
Environments			
Any part of body	—	0.5	—

[†] Not over 3 rem in any quarter of one year.

^{**} Where n is age in years and is greater than 18.

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13. Title 10, Code of Federal Regulations, Part 20, "Protection Against Radiation" dated June 1, 1962 (§20.101 and 2).

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Industrial Hygiene Foundation
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INDUSTRIAL HYGIENE DIGEST
Literature and News

NEWS ITEMS

795 Association of Official Agricultural Chemists to Meet.

The Association of Official Agricultural Chemists will hold its 77th annual meeting, October 14 to 17 at the Shoreham Hotel, Washington, D.C. The scientists will discuss and approve analytical methods for foods, drugs, cosmetics, feeds, fertilizers, pesticides, and other commodities studied by the Association. Dr. Paul Kirk, criminologist of the University of California, will address the assembled meeting October 15, and Dr. E. L. Butz of Purdue will speak at the annual banquet on October 14. A day-long symposium on instrumentation has been planned for October 17. There will be exhibits of lab equipment and supplies. Address inquiries to Luther G. Ensminger, AOAC, Box 540, Benjamin Franklin Station, Washington 44, D.C.

-- Chem. Eng. News 41, 102 (July 29, 1963)

796 Next Examinations in Aviation Medicine.

The next examinations by the American Board of Preventive Medicine for Certification in Aviation Medicine have been announced by John C. Hume, M.D., Secretary-Treasurer. The examinations will be held at the Americana Hotel, Bal Harbour, Miami Beach, Florida, on May 8, 9, and 10, 1964. This is immediately preceding and in conjunction with the 35th Annual Meeting of the Aerospace Medical Association, May 11, 12, 13, and 14. Final dates for filing applications is November 30, 1963. Requests for information and all applications must be sent to The American Board of Preventive Medicine, Incorporated, Dr. John C. Hume, 615 North Wolfe St., Baltimore 5, Maryland.

-- Aerospace Med. 34, 664 (July 1963)

797 Bio-Environmental Engineering—New Career Field Specialty.

In the future, engineer personnel of the USAF Medical Service will be included in a broad "career field specialty" designated "Bio-Environmental Engineering" rather than as "Sanitary and Industrial Hygiene Engineers". This new designation and broadened scope of professional practice and utilization within the Air Force takes into account the wide spectrum of bio-medical and environmental problems associated with U.S. Air Force technology, and operational requirements. The need for engineers with training in fundamentals of physiology and the life sciences is being reflected in increased training and special procurement programs, according to Major General R. L. Bohannon, Deputy Surgeon General, USAF, who said, "We are not only concerned with health protection, per se, but also with using the talents of our medical service engineers in the area of medical electronics, hospital construction, and specialized design operations."

-- Aerospace Med. 34, 666 (July 1963)

798 Hygienic Guide Series.

The following additional Hygienic Guide Series are now available: Manganese and its Inorganic Compounds, Acrolein (Acrylaldehyde, Propenal), Ethylene Glycol Monoethyl Ether (2-Ethoxyethanol), and Aluminum and Aluminum Oxide. They are given in the May-June AIHA Journal (pp. 284-291) and can be obtained from the American Industrial Hygiene Association, 14125 Forestview, Detroit 27, Michigan, at 25 cents each.

-- Am. Ind. Hyg. Assn. J. 24, 284-291 (May-June 1963)

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799 Booklet Available.

A booklet, "Eyes in Industry: A Guide to Better Industrial Vision Testing", published by the National Society for the Prevention of Blindness, is available from the Society, 16 East 40th Street, New York, N.Y. 10016, at 50 cents a copy.

Arch. Environmental Health 7, 120 (July 1963)

OCCUPATIONAL DISEASE STATISTICS

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

	Conn. <u>June</u>	Pa. <u>July-Aug.</u>	Tenn. <u>July</u>	<u>Total</u>
Asphyxia, argon and nitrogen gases			1	1
Brucellosis			1	1
Carbon disulfide poisoning			1	1
Chronic acid poisoning	5			5
Dermatitis	11*	19	2	32
Emphysema		1		1
Exposure to lead fumes		1		1
Fumes (unidentified)		1		1
Insecticide poisoning		1		1
Lead poisoning		3	1	4
Pneumoconiosis		1		1
Pneumoconiosis (suspected)		1		1
Respiratory irritation		4		4
Silicosis		1		1
Silicosis (suspected)		3		3
Silicotuberculosis	1			1
Toluene diisocyanate poisoning	1			1
Tuberculosis		1		1
Totals	18	37	6	61

* Causes are listed as follows:

Connecticut: Occupational dermatitis due to plants, poison ivy, 1; occupational dermatitis due to solvents, 1; occupational dermatitis due to drugs (including wound dressings and medications, 1; occupational dermatitis due to other chemicals: nickel and nickel compounds, 1; synthetic resins or resin (plastic) compounds, 3; unspecified, 2; occupational dermatitis—other: friction, 1; infection, 1.

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COMING EVENTS

- 801 Oct. 1-4 Animal Care Panel, Los Angeles, Calif.
 Oct. 1-4 American Council of Independent Laboratories, Annual Meeting, Lincoln, Neb.
 Oct. 6-10 Water Pollution Control Federation, 30th Annual Meeting, Seattle, Wash.
 Oct. 7-10 13th Annual Instrument Symposium and Research Equipment Exhibit, National Institutes of Health, Bethesda, Md.
 Oct. 8-10 7th Conference on Analytical Chemistry in Nuclear Technology, Gatlinburg, Tenn.
 Oct. 8-11 American Roentgen Ray Society, Montreal, Quebec, Canada
 Oct. 8-12 Congress of Neurological Surgeons, Denver, Colo.
 Oct. 10-11 National Plant Food Institute, Northeastern Fertilizer Conference, Reading, Mass., Pennsylvania
 Oct. 14-16 Association of Official Agricultural Chemists, 77th Annual Meeting, Washington, D.C.
 Oct. 14-18 Society for Applied Spectroscopy, San Diego, Calif.
 Oct. 15-17 American Society of Lubrication Engineers, 10th Joint Lubrication Conference of ASLE and ASME, Rochester, N.Y.
 Oct. 15-18 American Dietetic Association, 46th Annual Meeting, Philadelphia, Pa.
 Oct. 16-18 Association of Life Insurance Medical Directors of America, New York, N.Y.
 Oct. 19-23 Chemical Institute of Canada, 13th Canadian Chemical Engineering Conference, Montreal, Quebec, Canada
 Oct. 20-23 Canadian Manufacturers of Chemical Specialties Association, 6th Annual Meeting and Conference, Toronto, Ontario, Canada
 Oct. 23-24 Industrial Hygiene Foundation, 28th Annual Meeting, Mellon Institute, Pittsburgh
 Oct. 25-27 Association of Clinical Scientists, Annual Meeting, Washington, D.C.
 Oct. 25-29 American Heart Association, Los Angeles, Calif.
 Oct. 27-29 California Fertilizer Association, 40th Annual Convention, San Francisco, Calif.
 Oct. 27-30 National Agricultural Chemicals Association, 30th Annual Meeting, Hot Springs, Virginia
 Oct. 28-30 American Society for Microbiology, 3rd Interscience Conference on Antimicrobial Agents and Chemotherapy, Washington, D.C.
 Oct. 28-31 National Safety Congress and Exposition, Chicago, Ill.
 Oct. 28-Nov. 1 American College of Surgeons, San Francisco, Calif.
 Oct. 29-31 International Symposium on Plasma Phenomena and Measurements, Institute of Electrical and Electronics Engineers, San Diego, Calif.
 Oct. 30-Nov. 1 Parenteral Drug Association, Annual Convention, New York, N.Y.

LEGAL DEVELOPMENTS

802 Safety Code Chart on Industrial Trucks.

A chart shows in graphic form a comparison of the provisions of the applicable state laws and codes with the provisions of the American Standard Safety Code for Powered Industrial Trucks, ASA B56.1-1959. The chart is one of a series which, when complete, will provide comparisons of the provisions of state laws and codes with comparable provisions of American Standard Safety Codes in major areas subject to occupational safety and occupational hygiene regulations. Single copies are available, without charge, while the supply lasts, from the U.S. Department of Labor, Bureau of Labor Standards, Washington 25, D.C.

-- Safety Maint. 126, 53 (Sept. 1963)

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803 Air Pollution Control Bill Approved.

An air pollution control bill has been approved by the House by a vote of 372 to 111. H. R. 6518, known as the Clean Air Act, gives the Secretary of Health, Education, and Welfare more power than the 1955 Air Pollution Control Act which it is designed to replace. Secretary of HEW would establish a national research program of air pollution prevention and control and would make grants to help state and local pollution control authorities. In addition, he would have authority to call conferences on air pollution problems, make recommendations for abating air pollution, and, when other remedies had failed, file suit to force abatement of air pollution. Opponents of the bill, who feared that it gave the Federal Government too much enforcement power, tried to get the bill sent back to committee but were defeated by a vote of 41 to 19.

-- Chem. Eng. News 41, 21 (Aug. 5, 1963)

804 Ohio Weighs Tax Exemptions for Air Pollution Controls.

Lawmakers wrangled over whether industry should be granted broad tax concessions for air pollution control facilities. The Senate passed and returned to the House for concurrence a bill to grant real estate, personal property, corporation franchise and sales tax exemptions for air pollution control installations, on both existing and future equipment. As originally approved by the House, the bill provided only a sales tax exemption. The measure touched off a lively dispute, with supporters arguing it will help Ohio industry reduce pollution and yet remain competitive. Opponents contend it rewards industrialists for doing what they are required by law to do in the first place. Fate of the bill was uncertain.

-- Air Eng. 5, 8 (Aug. 1963)

805 Florida Eyes Air Pollution Controls.

A new air pollution control law was favorably reported out by the Senate public health committee. The measure would make it compulsory for an air pollution commission to file charges against any industry rejecting a request by the state board of health to discontinue practices that pollute the air. The bill would be enforced by an air pollution commission, executive director and other staff personnel.

-- Air Eng. 5, 8 (Aug. 1963)

806 Interior Wants More Money for Pesticide Research.

Secretary of the Interior, Stewart L. Udall, called on Congress recently to lift the present \$2.6 million ceiling on appropriations for research on pesticides and their effects on fish and wild life. A bill (H.R. 4487) now before the House Interior Committee would give Interior more authority to conduct pesticide research. Secretary Udall bases his request for more money on the research report for 1961-1962 just released by the Fish and Wildlife Service. "The report calls attention to the glaring inadequacies in knowledge about wildlife pesticide relationships", he says.

-- Chem. Eng. News 41, 19 (Aug. 12, 1963)

BOOKS, PAMPHLETS AND NOTICES

- 807 Occupational Disease in California, 1961.** State of California, Department of Public Health, Bureau of Occupational Health. 30 pp. (Date not given). **FOR SALE BY:** State of California, Department of Public Health, Bureau of Occupational Health, 2151 Berkeley Way, Berkeley 4, California. **PRICE:** Not given.

This review summarizes 18,495 doctors' reports of occupational disease from among over 5 million persons covered by the California workmen's compensation law in 1961. The 1961 data summarized here do not differ markedly from previous years and are primarily for use of the local health departments and other official agencies in California concerned with the health of

workers. Among all industry groups, agriculture had the highest rate with 4.2 reports of occupational disease per 1,000 workers; followed by construction, 0.4; and manufacturing, 0.3. Within the manufacturing division, rates fluctuated from 12.2 reports per 1,000 workers in rubber and miscellaneous plastic products to 0.6 reports per 1,000 workers in petroleum products. Most occupational diseases fall into the traditional categories of skin conditions, respiratory conditions, effects of environmental conditions and systemic poisonings. The hazards most frequently implicated in these diseases are poison oak, food products, agricultural chemicals and chemicals generally used as solvents. In California, 29,749 men and 15,701 women of working age (15-64) died during 1960. Only a small proportion of these deaths are finally classified as due to occupational disease. Every death certificate filed during 1961 with mention of poison oak was reviewed and counted. Since this was a departure from the previous method of counting such deaths, the fatality table for 1961 is not comparable to previous years. -- Author's summary.

- 808 Safety in Industry. Mechanical and Physical Hazards. No. 3, Bull. 356. Static Electricity. U. S. Department of Labor, Bureau of Labor Standards. 20 pp. (1963). FOR SALE BY: Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. PRICE: 15 cents.

Today, static electricity is not considered a phenomenon which excites man's curiosity. It is considered by most people to be a nuisance which causes shocks, unruly hair, clinging clothes, or other annoyances. To people who are concerned with industrial safety, it is more than an annoyance, it is a hazard which, in many areas, can be dangerous. This bulletin discusses static electrical phenomena not as an exhaustive treatise but as a short survey of possible causes and controls. The explanations used have been simplified and are included to develop a practical basis for understanding and discussion. The generation of static electricity cannot be prevented but its accumulation can be controlled. The uncontrolled discharge of a static accumulation which results in a spark energetic enough to be a source of ignition is the primary hazard of static electricity. This may be an acute problem if there is the possibility of such an occurrence in a flammable atmosphere. Operations, including paint spraying, tank cleaning, the transfer of petroleum products, grain handling, printing, or other processes in which flammable vapors may be present, must include static control as a factor. When and where static electrical hazards exist are not difficult to determine. The evaluation of the extent of the hazard and the proper control methods require more specialized knowledge and study.

- 809 Safety in Industry. Organization and Administration. No. 4, Bull. 355. Using Injury Statistics. U. S. Department of Labor, Bureau of Labor Standards. 18 pp. (1963). FOR SALE BY: Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. PRICE: 15 cents.

The safety man should not under-estimate the significance of the statistical data on the injury experience of the company. "The Past is Prologue" could well be the heading on every chart and table of injury statistics because past experience, properly applied, is the guide to future safety activities. The dictionary defines statistics as the science which deals with the collection, classification, and use of numerical facts or data bearing on a subject or matter. Injury statistics reflect not only the results of the safety program, but also the effectiveness of the safety organization. This bulletin, one of the Safety in Industry series dealing with organization and administration, discusses the latitude and limitations of injury statistics and suggest how such statistics can be utilized as a means for establishing an injury prevention program. Some people infer from the word "statistics" a cold and impersonal array of useless figures as dull and dry as dust. Such inference can be avoided by thinking of them in terms of experience. Injury statistics have a significant role in accident prevention. They are indispensable for the intellectual and methodical conduct of business, and mass statistics are a useful tool because they represent the collective experience of many individuals. The records of such occurrences make possible a scientific approach to accident prevention. Because past experience, properly applied, is the guide to future safety activities, this bulletin points the way to the use of such data to accomplish the desired results.

INDUSTRIAL MEDICAL PRACTICE

- 810 Mental Disorders in Socially Defined Populations. Isabel McCarfrey, Elaine Cumming and Claire Rudolph. Am. J. Public Health 53, 1025-1030 (July 1963).

The authors' hypothesis that groups of people applying for assistance from social service agencies have a high degree of association with mental disorders is supported. This association is found not only with organic disorder and alcoholism among men but also with the functional disorders. The highest degree of association for the functional disorders is found among men whose problems are associated with role failure. Role failures in women probably are inadequately represented in this report because of the types of agencies studied. Other types of agencies are suggested for further study. The findings tend to confirm the proposition that one visible social sign of mental illness is failure to meet role obligations and expectations. It therefore seems reasonable to believe that we shall be led closer to untreated as well as treated mental disorders as we develop more precise definitions of personal failure and social disruption.

-- Authors' summary

- 811 Democracy and Rehabilitation of the Mentally Ill. W. N. Deane. Arch. Gen. Psychiat. 9, 1 (July 1963).

Descriptive evidence from a rehabilitation project is presented to support the thesis that rehabilitation of the mentally ill, in hospital settings, can be democratic and avoid techniques and philosophies associated with the "organization man", "company unionism", "brainwashing", and "militaristic indoctrination", as well as misguided overindulgent humanitarianism. Data on group interview, rational classification of patients for group purposes, utilization of reward and punishment in order to stress privileges and responsibilities, high expectations for patients, based on the opportunity for gradually more complex decision-making, and stressing of the individual need to the exclusion of efficiency, where necessary, are presented in support of this thesis.

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

- 812 Attainment of Optimum Health. J. M. Mather. Can. Med. Assn. J. 89, 175-181 (July 27, 1963).

The history of the worker in public health is reviewed, his present activities are assessed, and predictions are made concerning his future role. It is emphasized that the public health specialist is but one member of the total health team in the community. His interdependence with other disciplines must be accepted if optimal health care is to be provided. Although prepared specifically for public health workers, this article has direct relevance to the future of the medical profession as a whole. In view of the present intense interest in the future pattern of health care in Canada, the viewpoint of a physician with a dual background in public health and medical school administration and teaching is considered to be particularly pertinent.

-- Author's abst.

- 813 Ergonomics—The Study of Man at Work, with Special Reference to the Psychological Factors in the Practice of Industrial Hygiene. R. A. McFarland. Am. Ind. Hyg. Assn. J. 24, 209-221 (May-June 1963).

Many major problems in equipment and workspace design have resulted from the failure to give sufficient consideration to human capabilities and limitations. The effectiveness of any man-machine system depends upon the integration of the biological characteristics of the operator with the mechanical design of the equipment and working areas. The initial phase of a program in human engineering, or ergonomics, should always consist of an advance analysis of the equipment including a survey of the nature of the task, the work surroundings, the location of controls and instruments, and the way the operator performs his duties. The basic data needed in human

engineering include those which describe the range of human body size at rest and in motion, biomechanical abilities including range, strength, speed and accuracy of motion, sensory abilities and human reactions to the physical variables of the environment. Only by the application of these kinds of data to the design of the workspace, controls, instruments and environment, can the worker be assured of maximum comfort, efficiency and safety in the performance of his task. In conclusion, it is important to note that the industrial hygienist is in an unusually favorable position to assist in the development and application of human engineering in industry by virtue of his training, background, and special interests.

-- Author's summary

- 814 A Recording Ergometer. P. G. Petty. Lancet 1, 976 (May 4, 1963).

A new electromechanical recording ergometer is described. The patient's handgrip is exerted against an adjustable spring via a pair of handles. The movement of the handles is converted into an electrical signal which is applied to an ECG machine to provide a permanent record. The instrument is simple and cheap to construct. -- J. Am. Med. Assn. References and Reviews

- 815 Management of Fractures of the Hand. P. R. Lipscomb. Am. Surgeon 29, 277 (April 1963).

The management of fractures of the small bones of the hand is reviewed. Often these fractures are treated as minor injuries resulting in severe disability. Perfect reduction with particular attention to correct alignment and rotation is necessary to restore normal function. When small dorsal fragments are present, a single Kirschner wire passed through the joint is the best means of immobilization. Bandaging must give even pressure, permit no motion at the site of injury, and be non-constricting and comfortable. For severe or multiple fractures of the hand, edema and thereby, stiffness may be prevented by the use of voluminous dressings applied with the hand and wrist in the position of function (grasp of a moderately firm ball of fluffed dressings) until the acute reaction of the injury subsides. This usually takes about 4 days. After that time, all joints that are not necessarily immobilized are kept moving freely. The patient must be seen at regular intervals by the physician. His progress must be evaluated and the restoration of function encouraged until recovery is complete. -- J. Am. Med. Assn. References and Reviews

- 816 Free Matted Fascia Lata Patches in Repair of Large or Difficult Hernias: A Sixteen Year Experience. J. E. Hamilton. Ann. Surg. 157, 925 (June 1963).

Since 1946, free fascia lata patches were used to repair 24 of the largest and most difficult hernias. There were no recurrences or operative deaths. Three repairs were done within the previous 18 months; the remaining 21 are 3 to 15 years old. The integrity of the repair was unaffected in 5 cases developing minimal to moderate wound infection. The persistence of sound fascia is attested to both by biopsy and by the fact that 3 patients were reoperated on through the fascial repair with subsequent sound healing. -- J. Am. Med. Assn. References and Reviews

- 817 Solar Retinitis. S. Y. Shirley. Can. Med. Assn. J. 89, 134-135 (July 20, 1963).

Retinal burns can be produced by direct gazing at the sun. This lesion is caused by the thermal effects of the visible and near infrared rays focused on the pigment structure behind the retina. It is rarely seen, as the normal eye will tolerate only fleeting glances at the sun, but is fairly common during a solar eclipse. In the present case a 21-year-old girl was sun bathing June 1, 1963. She stated that several times during the afternoon she forced herself to look directly into the sun for a number of seconds. On the same evening she noticed that her vision was blurred and on attempting to read she noticed that parts of the words seemed to be missing. She was seen June 4, and her vision was 20/50 in the right eye and 20/60 in the left. Ophthalmoscopic examination showed that the media were clear, the optic discs were normal, and both maculae were edematous with a cherry red depressed spot in their centers. The appearance of the retina was similar to that of a central serous retinopathy. Her visual fields showed a small central scotoma to 1/1000 white test-object each eye. A diagnosis of solar retinitis was made. The patient was admitted to a hospital and placed on dexamethasone 0.75 mg. 4 times daily, and bed rest. Over

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a period of 2 weeks the macular edema subsided but the red depressed areas remained, suggesting an early formation of macular holes. At present, her vision is 20/30, right eye, and 20/40, left eye. In viewing a solar eclipse a No. 4 density filter (or shade No. 10) is recommended; as a rough test this filter will abolish the readability of print on a 60-watt incandescent frosted electric light bulb.

- 818 Laser Photocoagulation of the Eye. M. M. Zaret, et al.
Arch. Ophthalmol. 63, 97 (1963).

The pulsed ruby laser (optical maser) was used to produce ocular lesions in rabbits. An energy density of 0.1 joule/sq. cm. in a 0.5-msec. pulse at a wavelength of 694.3 millimicrons was attained. Immediate and delayed effects were observed. At the site of the intense focal image, a small retinal burn was immediately apparent. Gradually, it enlarged as the heat was conducted to the surrounding tissue. The ultimate size of the coagulated area was dependent on the intensity of the laser beam and the degree of retinal pigmentation. By using neutral density filters to attenuate the incident energy, lesions varying in diameter from 1 to 0.2 mm. were produced. Histologic examination of the lesions showed typical photocoagulation injury.

-- J. Occ. Med. Absts.

- 819 The Detection of Hyaluronic Acid in Pleural Fluids of Cases with Diffuse Pleural Mesotheliomas. J. S. Harrington, J. C. Wagner and Marianne Smith.
Brit. J. Exptl. Pathol. 44, 81-83 (Feb. 1963).

Hyaluronic acid was isolated in concentrations ranging from 0.012-0.79% from the pleural fluids of 6 histochemically-proven cases of diffuse pleural mesothelioma. In four cases, the concentration increased with the progress of the disease, and in one of these it dropped rapidly before death. It was presumed that this was due to gel formation by the polysaccharide. The detection of hyaluronic acid in the pleural fluid is a useful aid to the diagnosis of diffuse pleural mesotheliomas.

-- Bull. Hyg.

- 820 Epidemiology of Nonbacterial Pneumonia Among Naval Recruits. L. F. Miller, et al.
J. Am. Med. Assn. 185, 92-99 (July 13, 1963).

Studies of an epidemic of acute respiratory disease and pneumonia in September through November, 1961, indicated a high degree of association of Type 4 adenovirus with both diseases. Incidence of the disease was positively correlated with the number of Naval recruits entering training. Routine injection of non-respiratory-disease vaccines accentuated the incidence, whereas penicillin prophylaxis did not. The pneumonia rate was highest among recruits from the northern United States, but was not related to previous urban or rural residence. Clinically and epidemiologically, the pneumonia was similar to that reported previously as having affected military recruits in the U.S. and the United Kingdom.

-- Authors' abstr.

- 821 The Relationship of Reported Coronary Heart Disease Mortality to Physical Activity of Work. H. A. Kahn. Am. J. Public Health 53, 1058-1067 (July 1963).

Findings that relate physical activity of work to incidence of coronary heart disease (CHD) have been disputed. This study addresses itself to this problem by examining letter carriers and postal clerks. The findings tend to support the relation between physical activity and heart disease. The clerk/carrier ratio was found in this study to be about 1.4 to 1.9 times as high a risk for clerks as compared to carriers. This appears to approximate fairly closely findings for early CHD mortality in bus drivers (1.5 age-adjusted) compared to the more active bus conductors (0.8 age-adjusted). The present study suggests in addition that current physical activity may be more closely associated with this differential than is the individual's life-time "average" for physical activity on the job.

- 822 Effect of Buffered Lobeline Sulfate on Cigarette Smoking. J. Merry and G. Preston.
Practitioner 190, 628 (1963).

Tablets containing lobeline sulfate 2 mg., magnesium carbonate 125 mg., and tribasic calcium phosphate 150 mg. were tested in a clinical trial with 90 volunteer subjects, all hospital staff members. The subjects were interviewed weekly for 4 weeks. During week 1, all attempted to stop smoking unaided; for week 2, the subjects received a placebo. Those who had not stopped smoking after the second week (63 subjects) were divided into two matched groups, one continuing on the placebo (32 subjects) and the other receiving buffered lobeline sulfate tablets (31 subjects). The subjects were told all the tablets contained the experimental substance. The number of cigarettes smoked each day was recorded by each subject. When the two groups were analyzed, comparing the consumption of cigarettes at the end of 2 and of 4 weeks, the number of cigarettes smoked was 10.6 and 9.3 for the "lobeline group" versus 10.6 and 8.4 for the "placebo group". It was concluded that while many subjects succeeded in reducing their consumption of cigarettes during the study period, this result could not be attributed to the lobeline. -- Can. Med. Assn. J. Absts.

- 823 Mycotic Infections of Animals Transmissible to Man. H. C. Rowsell.
Am. J. Med. Sci. 245, 333-344 (March 1963).

The literature is reviewed on mycotic infections common to animals and man. Precise knowledge of the role of the animal in transmission of the mycoses is not available except for the dermatophytes. The patterns of transmission are difficult to analyze because of the ubiquity of most pathogenic fungi and the possibility of long incubation periods. "As bacterial and viral diseases are conquered, the fungal diseases resistant to most chemotherapeutic agents will pose a greater problem." An evaluation is made of the incidence of the specific mycoses in animals and the potential for transmission of each mycosis from animals to man. The mycoses are discussed under the headings of superficial mycotic infections (dermatophytes) and deep mycotic infections (systemic). The mycoses discussed as superficial infections are dermatomycosis, piedra, maduro-mycotic mycetomas, phycromycosis, and aspergillosis. The deep mycoses discussed are histoplasmosis, blastomycosis, coccidioidomycosis, cryptococcosis, and moniliasis. There are 153 references to the subject. -- Public Health Eng. Absts.

- 824 Occupational Infectious Diseases with Special References to Zoonosis in Agricultural Work.
 A. Brandt. Z. ges. Hyg. u. ihre Grenzgebiete 9, 23-35 (Jan. 1963). German.

This paper from the German Democratic Republic contains much analyzed statistical information on the incidence of infectious diseases caused by occupation. In the first part of this paper, there is a description and a detailed table of the number of infections suffered by persons engaged in the care of the sick in 1960 and 1961 which are grouped as: (1) medical, (2) nursing and allied occupations, and (3) technical and administrative. The three most frequent infections observed were in the order: infectious hepatitis, tuberculosis, and dysentery. Practicing physicians and nursing personnel were chiefly affected. The second part of the paper is devoted to a detailed analysis of notified zoonosis which occurred in people in a large number of different occupations concerned with the care or handling of animals. The number of these reported infections showed a considerable increase in 1961, compared with 1960, except in the case of ornithosis, and in 1961 the actual figures were: trichophytosis (428 cases), ornithosis (290), brucellosis (133), erysipeloid (122) and bovine tuberculosis (116). This increased reported incidence is stated to be the result of increasing efforts by country physicians to diagnose zoonoses and better care in the field of industrial hygiene. -- Bull. Hyg.

- 825 Ticks (Ixodidae) on Birds Migrating from Europe and Asia to Africa, 1959-1961.
 H. Hoogstraal, et al. Bull. World Health Organization 28, 235-262 (1963).

The need for imaginative thinking and research in the epidemiology of diseases transmitted by arthropods is made manifest by new views of the longevity and host ranges of arthropod-borne viruses, as well as by other biological and medical phenomena. Among these is the inter-continental transport of ticks by migrating birds. During the fall migration periods of 1959, 1960, and 1961, 32,086 birds (comprising 72 forms) were examined for ticks in Egypt while en route from Asia and eastern Europe to tropical Africa. Of these, 40 forms, represented by 31,434

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birds, were tick-infested. The bird hosts, numbering 1,040 (3.31% of the tick-infested bird forms examined), bore 1,761 ticks, or 1.69 ticks per host. Common tick species taken from the birds are enumerated. Ticks are known to be reservoirs and vectors of pathogens causing a number of human and animal diseases in Europe and Asia. Several of the bird hosts have also been incriminated as reservoirs in their summer ranges. Over 20 strains of pathogenic viruses were isolated from these birds and their ticks in Egypt in the 1961 fall migration period. The most difficult problems in investigations such as this in many parts of the world are taxonomic ones: the correct identification of bird hosts, of immature stages of ticks, and of viruses.

-- Cond. from Public Health Eng. Abstr.

- 826 Survey of Brucellosis in Alaska. B. E. Huntley, R. N. Philip and J. E. Mavrunich. J. Infectious Diseases 112, 100-106 (Jan.-Feb. 1963).

A strain of Brucella pathogenic for man has been isolated from the caribou, Rangifer tarandus. Serological evidence indicates that brucellosis is prevalent among the native population of Alaska that are dependent upon caribou for food. Although its precise taxonomic position is not yet established, the cultural and antigenic characteristics of the isolated organism suggest a closer relationship to Brucella melitensis than to either B. suis or B. abortus.

-- Public Health Eng. Abstr.

- 827 Incidence of Brucella Infection Among Slaughterhouse Workers. H. A. Valkenburg, et al. Ned. Tijdschr. Geneesk. 107, 439 (March 9, 1963).

The incidence of infection with Brucella species was investigated with the aid of the rapid agglutination test and the complement fixation test in 1,042 workers in 15 slaughterhouses and in 232 adults who served as controls. The tests revealed a significantly higher incidence among the slaughterhouse workers than among the controls. The highest incidence of Brucella infections was found among butchers and workers engaged in the processing of offal (16%), the lowest among administrative and technical personnel (about 2%). The incidence in this latter group was about the same as that found in controls, whereas among veterinarians, meat inspectors, and laboratory personnel the incidence of Brucella infection was 10%. These percentages show that there is a correlation between the incidence of Brucella infection and the extent of contact with slaughtered animals.

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

- 828 The Continuing Threat of Small Pox. A. S. Benenson. Arch. Environmental Health 1, 96-100 (July 1963).

Importation of small pox into small pox-free areas in this era of jet travel is prevented only by effective defense using jennierian vaccination. This is usually applied by individual physicians who then certify to its effectiveness on internationally accepted documents. Because of allergic sensitivity of previously vaccinated individuals to vaccinal protein, most improperly vaccinated individuals develop allergic reactions indistinguishable from those seen in the fully immune. Vaccination failures can largely be eliminated by the use of potent, preferably freeze-dried vaccine, followed by examination, 7 to 9 days later, when successful vaccination shows inflammation surrounding the central lesion. Immediate revaccination of all those showing no actual inflammation results in effective immunity of the maximal number of individuals.

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

- 829 Diseases of Insects of Medical Importance in Europe. J. Weiser. Bull. World Health Organization 28, 121-127 (1963).

The biological control of insects carrying human diseases was first attempted many years ago, but the results were disappointing owing to the insufficiency of information on the ecology and pathology of such insects at the time. In recent years, however, increased knowledge of insect pathology and ecology and the development of insecticide-resistance have led to a revival of interest in this method of vector control. Most of the recent published work on this subject relates to findings in North America; comparatively little information has hitherto been available in respect to Europe. This paper, which is based on a survey of the literature and on the author's

own experience, presents the results of research on diseases of insects of medical importance in Europe. Infection with viruses, rickettsiae, bacteria, fungi, protozoa and nematodes are discussed and suggested lines for future European research on biological control are put forward.

-- Public Health Eng. Abstrs.

SKIN DISEASES AND BURNS

- 830 Regional Studies in Skin Cancer, First Report: North Western Queensland.
H. Silverstone. Med. J. Australia 1, 312 (March 2, 1963).

Examinations and inquiries were made of 284 men and 210 women over the age of 20 years. There were 53.9% of the men, and 39% of the women who were found to have keratoses. The prevalence rates for skin cancer (basal cell and squamous cell carcinoma) were 11.3% for men and 9.5% for women. Of the 242 patients with lesions of one kind or another only 30 (35.5%) had ever received treatment for their skin lesions. In particular, of the 52 patients judged to have skin cancer, 33 (63.5%) had never received treatment. Keratoses were nearly twice as common among persons who suffered from sunburn as among those whose skin tanned readily. The relative risks of skin cancer in the groups appeared to be of the order of 2:1. Men showed a sharply increasing tendency to keratoses according to the degree of exposure to sunlight received in their daily occupations. Skin cancer was found much more frequently among patients with keratoses than among those without keratoses. About one-third of the keratoses and nine-tenths of the skin cancers occurred on the face and neck; the remainder were on the hands and arms.

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

CHEMICAL HAZARDS

- 831 Industrial Hygiene in Retrospect and Prospect—Toxicological Aspects. H. F. Smyth, Jr.
Am. Ind. Hyg. Assn. J. 24, 222-226 (May-June 1963).

Much progress has been made in the protection of health and safety through the study of toxicological properties of materials used in home and industry. It is time that the objectives and methods of these studies be re-examined in the light of broadened concepts for the future. Our techniques and goals must be more precise and better defined to meet the changes of progress and time.

-- Author's abst.

- 832 Experimental Cancer of the Lung. L. M. Shabad.
Federation Proc. 22, Part II, T331 (March-April 1963). (see IHD Abst. No. 128 Feb. 1963).

Experimental attempts to induce cancer of the lungs in animals are reviewed and results presented of successful attempts to induce lung cancer in rats. The technique involved introducing 9,10-dimethyl-1,2-benzanthracene once per month intratracheally, as a mixture in India ink powder (2 mg. carcinogen and 0.2 mg. India ink). Initial proliferations occurred 2 1/2 months at the site of deposition (as indicated by the India ink); by 5 months, definite squamous cell pulmonary carcinoma was seen. Of 24 rats variously treated, adenomatous proliferations were seen in 9, pulmonary adenocarcinoma in 1, focal proliferations of metaplastic epithelium in 13, and squamous cell cancer of the lung in 21. Metastases were seen in 3 of the squamous cell cancer cases. Positive results have also been obtained with 3,4-benzpyrene. The India ink is believed to function as an adsorption medium, retaining the carcinogen in contact with lung tissue for a period sufficient to permit a reaction to occur.

-- J. Occ. Med. Abstrs.

- 533 Health Hazards of Selected Rocket Propellants. J. E. Boysen.
Arch. Environmental Health 7, 71-75 (July 1963).

Many of the present-day propellants and oxidizers present unusual problems because of their high order of toxicity and the huge quantities used. The current concept of concentration also creates additional problems because design and procedural decisions must be made before the development of adequate toxicological and clinical data. The approach of some of these problems is discussed. Brief resumés of the following compounds are included: chlorine trifluoride, hydrazine, 1,1,1-trimethylhydrazine, hydrogen peroxide, n-propyl nitrite, alkyl boranes, nitrogen dioxide, and peracetic fluoride.

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

- 534 A Toxicopathologic Study in Animals After Brief Single Exposures to Hydrogen Fluoride.
M. J. Rosenholtz, et al. Am. Ind. Hyg. Assn. J. 24, 253-261 (May-June 1963).

It is likely that hydrogen fluoride (HF) vapor will be one of the products found in the exhaust fumes of some of the advanced missiles. The possibility that men might be exposed to high concentrations of this vapor for short periods of time has therefore increased. Similar exposure to HF vapor may also occur in industries manufacturing, using, or storing this acid gas. These increased possibilities of exposure have created the need for additional toxicological information to aid in evaluating the hazards and estimating safe concentrations of HF in single, short exposures of men. In this investigation the LC50 values for single exposures to HF were found to be 4970, 2690, 2040, and 1310 ppm for rats exposed respectively for periods of 5, 15, 30 and 60 minutes. Rats, dogs, and rabbits were exposed also to concentrations of 6% to 50% of the LC50 values for rats. Signs of intoxication and pathology are described. Renal and hepatic lesions were noted. Human sensory levels may be more sensitive than animal studies in establishing tolerable levels for brief human exposures.

- 535 The Efficacy of Ozonization of Water from the North Donets-Donbass Canal for Drinking Purposes.
B. L. Vakhier. Gigiena i Sanit. No. 3, 9-14 (1963).

On the basis of facts and experimental data, an attempt is made to demonstrate the advisability of using ozone for drinking water treatment and to determine the parameters of ozonization for the purpose of designing new ozonization stations. In canal and other surface sources with water of low turbidity, ozonization will apparently become the main, if not the only, means of water treatment without the employment of a large number of generally used expensive and deficient reagents. As a result of ozonization, the quality of drinking water, judging by its bacteriological and organoleptic indices, will not be inferior to that of pure natural water. The cost of water ozonization as compared with the cost of commonly used reagents will be 5 to 26% cheaper.

-- Public Health Eng. Absts.

- 536 Nitrogen Dioxide Poisoning. I. Occupational Significance and Evaluation of Toxicologic Data and Experimental Methodology. R. H. Kooiker, L. M. Schuman and Yick-Kwong Chan.
Arch. Environmental Health 7, 13-16 (July 1963).

New or recently recognized occupational hazards, such as silo filler's disease, increase the number of situations in which consideration should be given to nitrogen dioxide exposure. Adequate information on acute poisoning with nitrogen dioxide is important. Experimental data are also of value in relation to the unexplored concept of nitrogen dioxide as an etiologic factor in chronic respiratory disease. The literature reveals inadequate data concerning the hazard of such poisoning. Experimental studies are numerous, but the data are conflicting, and comparison of results is difficult. Few reports include sufficient information to permit evaluation of the validity of the reported findings.

-- Authors' summary

- 537 Nitrogen Dioxide Poisoning. II. A New Approach to Experimental Exposure Studies: Methodology Using A Static System, with Statistical Evaluation of Factor Variability. R. H. Kooiker, L. M. Schuman and Yick-Kwong Chan. Arch. Environmental Health 7, 16-32 (July 1963).

In a new approach to experimental exposure studies, a static type chamber of relatively small size is used. The chamber has features for rapid and safe introduction and removal of

animals, standardization of animal activity, and accurate maintenance of test substance concentration. This static exposure chamber is suitable and adaptable for toxicologic studies in general. A modified chemical method is used to determine the concentration of nitrogen dioxide in permanently trapped atmospheric samples. Infrared analysis could not be satisfactorily adapted for continuous monitoring of nitrogen dioxide. Flowing samples of the test atmosphere are continuously monitored for carbon dioxide and oxygen concentrations to study the possible influence of these gases on the toxicity of nitrogen dioxide. Data obtained from animal exposure experiments performed with this methodology are subjected to statistical analysis. A unique use of standard statistical methods for evaluation of toxicologic data provides evidence for the conclusion that this experimental methodology permits replication of the required experimental conditions. The accuracy and precision of this reproducibility is such that definitive investigations of nitrogen dioxide poisoning are possible. This is the first in a series of reports on investigations of nitrogen dioxide poisoning especially oriented toward increasing the knowledge concerning all aspects of silo filler's disease. There are 77 references to the subject. -- Authors' summary

- 838 The Acute Oral Toxicity of Reduced Iron. E. M. Boyd and M. N. Shanas.
Can. Med. Assn. J. 89, 171-175 (July 27, 1963).

Evidence obtained in this project suggests that Reduced Iron, N. F. IX, a form of powdered elemental iron, could stand therapeutic reinvestigation as a drug with probably very low toxicity. This evidence was obtained from a study of the acute toxicity of reduced iron given orally to albino rats. The LD50 $\pm$ S. E. estimated under these conditions was found to be 98.6 ± 26.7 g. of iron per kg. body weight, or over a hundred-fold that of iron given as ferrous sulfate under the same conditions. Death from these huge doses of iron occurred at a mean $\pm$ standard deviation of 62 ± 35 hours, and the interval to death was inversely related to dose. The immediate cause of death was respiratory failure. Clinical signs preceding death were anorexia, oligodipsia, oliguria, alkalosis, diarrhea, loss of body weight, hypothermia, and alternating irritability and depression. At autopsy there was loss of weight in most organs, accompanied by dehydration when death occurred early, and edema when death was delayed. Vascular congestion of the gastrointestinal tract, liver, kidneys, heart, lungs, brain, spleen, adrenals and thymus gland was the dominant histopathologic sign. Toxic signs began to disappear in survivors toward the end of one week, and had completely disappeared at 2 to 4 weeks. The toxicity syndrome was somewhat similar to that seen in delayed deaths produced by much smaller toxic doses of ferrous sulfate. There are 15 references in the bibliography. -- Authors' summary

- 839 Manganism in Industry of Electric Batteries. F. Lutier.
Presse med. 71, 601 (March 16, 1963).

Manganism was detected in 9 men working in 2 factories of electric batteries. The men mixed manganese and were exposed to the pulverulent dust for periods varying from 6 to 48 months. Clinically, the patients' toxic condition was similar to that usually observed in manganese miners, but was not as severe. However, the disease was not recognized at its early stage, and diagnosis was made when objective signs (disturbances in equilibrium, gait, speech, etc.) were already present. Six of the patients received edathamil calcium disodium, a chelating agent, in a daily dose of 2 g. given in 2 intravenous infusions during a period of 5 days. These treatment courses were repeated according to the patient's condition. The treatment resulted in the improvement or at least stabilization of the toxic symptoms, but none of the patients were able to resume steady work. The toxic manifestations of manganism in the 3 untreated subjects deteriorated within 10 years and lead to severe infirmity. The importance of early diagnosis of manganism and of measures to prevent inhaling such dust in industry is emphasized.

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

- 840 The Determination of Microgram Quantities of Tin in Foods. Mary H. Thompson and G. McClellan. J. Assn. Offic. Agr. Chemists 45, 979-982 (Nov. 1962).

An accurate, sensitive colorimetric method for the determination of microgram quantities of tin has been adapted for use with food products. The method consists essentially of a cobalt carbamate extraction and selective reduction to eliminate interfering metals, followed by color

development with phenylfluorone. An average recovery of 100% of tin was effected. Standard deviation of the means of 1.4 micrograms and an average deviation of 1.2 micrograms per aliquot for color development containing approximately 20 micrograms of tin was obtained in 10 samples ranging from 2.1 to 0.1 micrograms of tin per gram of sample.

-- Public Health Eng. Abstr.

- 841 Renal Function Subsequent to Childhood Plumbism. L. B. Tepper.
Arch. Environmental Health 21, 76-85 (July 1963).

Evidence from Queensland has suggested that delayed chronic and often fatal renal disease has developed in approximately one-third of persons with a history of childhood plumbism. It was the purpose of the investigation described here to determine the extent to which renal sequelae follow childhood plumbism in Massachusetts. An attempt was made to evaluate the current renal status of 165 persons with a history of well-documented lead intoxication in childhood more than 20 years ago (1924-1941). One hundred thirty-nine cases (84%) were traced. Detailed renal screening tests were concluded in 42 persons. No convincing evidence of chronic renal disease subsequent to lead intoxication was established. Factors contributing to the dissimilarity between the Queensland and Massachusetts findings are discussed.

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

- 842 Effects of Single and Repeated Exposures of Humans and Rats to Vinyl Chloride.
D. Lester, L. A. Greenberg and W. R. Adams.
Am. Ind. Hyg. Assn. J. 24, 265-275 (May-June 1963).

Rats exposed 8 hours daily to vinyl chloride at concentrations of 2% for 3 months and 5% for 19 days exhibited changes in liver and spleen weight and in red and white cell counts. Except in the case of liver, tissue alterations did not accompany these changes. The alterations in liver morphology were within the normal range and were not pathologic in character. Because of other facets of the animals' response, such as rate of growth, serum transaminase and hemoglobin, were unchanged, it is suggested that the present threshold limit value of 0.05% need not be lowered.

-- Authors' abstr.

- 843 The Action of Benzol in Inducing Leukemia. G. Saita and E. C. Vigliani.
Med. lavoro 53, 581-586 (Oct. 1962). Italian.

There were 4 cases of hemocytoblastic leukemia among 36 patients with blood disorders caused by benzene who were investigated from 1942 to 1961 in the Clinica del Lavoro. The 4 cases are described: 2 patients died soon after diagnosis in 1942 and 1945; 2 recently diagnosed and treated with steroids and antimetabolites, e.g., prednisone and 6-mercaptopurine, had periods of remission, possibly due to the prevalence of microhemocytoblastic elements, grossly abnormal cells being rare. Myeloid and lymphatic leukemia were not found. One of these recent patients was a man who had worked in the same place as the patient who died in 1945. Several workers there had hypoplastic types of anemia, but this man was not examined until 1949 when his blood was normal. In 1949, benzene was replaced by toluene, xylene, benzene and acetates. His blood remained normal until 12 years after his exposure to benzene ceased. (The benzene concentration had been 10 times the MAC). In February 1961 he developed leukemia and died 14 months later. Findings in the other cases are mentioned: 2 patients had decreased red cells, 5 had decreased red and white cells, 4 had decreased red cells and platelets, 20 had a decrease of all blood elements and 1 patient had a leukemoid reaction. Discussing features of the disease in these patients, the authors state that benzene-induced leukemias frequently begin with a leucopenic phase, preceded by manifestations of hypoplasia or aplasia. Benzene probably acts as the initiating mutagenic agent and successive mutations give rise to the development of leukemia. -- Bull. Hyg.

- 844 How Insects Resist Insecticides. J. N. Smith.
New Scientist (London) 16, 144-147 (Oct. 1962).

"All terrestrial animals have a set of detoxication mechanisms which can act on a variety of compounds foreign to the body. It is this inherited facility that enables insect populations to

develop resistance to massive and repeated attack by an insecticide. They can chemically alter its molecule to an innocuous substance. Greater understanding of the process is likely, in the long run, to serve man better than the search for fresh insecticides." The general theory of resistance to insecticides is developed, examples of various types of resistance are detailed, and techniques for resistance control are described. -- Public Health Eng. Absts.

- 845 Principles in Assessment of Insecticides by Experimental Huts. A. Smith.
Nature 195, 171-173 (April 13, 1963).

The object of this article is to outline some general principles on insecticide assessment which have emerged during the course of the investigations; these arise from trials made in 20 experimental huts with different insecticides against *Anopheles gambiae* over the past 3 years. From these principles it has been possible to predict, within fairly wide limits, the overall mortality achieved from comparatively easily obtained results—such as could be acquired from local houses fitted with window traps. -- Public Health Eng. Absts.

- 846 The Antimetabolite, Imidazole as a Pesticide. R. J. Pence.
J. Econ. Entomol. 56, 1-7 (Feb. 1963).

Imidazole, an antimetabolite of histamine and nicotinic acid, has been found to be a safe and effective pesticide. The biological effects of imidazole have been evaluated on a metabolic basis and as a contact insecticide. Reversal of imidazole with histamine, histamine derivatives, and nicotinic acid has been demonstrated within a biological system. Imidazole, when synergized with boric acid, may be employed at low levels to proof fabrics satisfactorily against insect attack. When synergized with 2-amino-pyridine and combined with base oil, imidazole quickly controlled a number of insect and related arthropod species. The effectiveness of imidazole was significantly increased by adding two surfactants to base oil. A hydrophilic surfactant has been found to increase the physiological activity of imidazole without improving the physical properties of the oil carrier, while perchloroethylene has been found to directly increase lipid solubility. -- Public Health Eng. Absts.

- 847 Human Respiratory and Ocular Irritation Studies Utilizing o-Chlorobenzylidene Malononitrile Aerosols. Effect of Particle Size. E. J. Owens and C. L. Punte.
Am. Ind. Hyg. Assn. J. 24, 262-264 (May-June 1963).

Studies have been made with humans to determine the influence of one and sixty micron aerosols of o-chlorobenzylidene malononitrile on respiratory and ocular irritating effects. Small particles rapidly produce respiratory and ocular irritation. Only 3 of 17 individuals could tolerate small particles for as long as 60 seconds. Large particles predominately produce ocular irritation. Of 18 subjects exposed, 15 were able to tolerate the cloud for at least 60 seconds. Large particles increase recovery time from ocular irritation. -- Authors' abstr.

- 848 Toxicological Studies of DDVP for Disinsection of Aircraft. W. A. Rasmussen, et al.
Aerospace Med. 34, 593-600 (July 1963).

It has been proposed to use (O, O-dimethyl-2, 2-dichlorovinyl phosphate DDVP) for the disinsection of aircraft on international flights where there is a hazard of transporting and introducing insect vectors of human disease. The insecticide would be used as a vapor at a concentration of 0.15 to 0.25 microgram/l. for a period of 0.5 hours during flight. The greatest number of flights involving a need for disinsection on any airline schedule now in effect is 39 flights in 14 days. It is only by accident that any given member of a crew could be assigned to complete maximal schedule, and if he were, present flight regulations would then require that he be off-duty for the remainder of the month. When volunteers were exposed to DDVP at concentrations varying from 0.14 to 0.33 micrograms/l. in a duplication of the maximal schedule of exposure (39 doses in 14 days), no change related to exposure was detected in plasma cholinesterase or in measurements of a number of physiological functions. It was evident that if any change were to be detected, measurements would have to be made in connection with exposures to DDVP that were more frequent or more intense, or both. When the intensity of exposure was kept the same but the

frequency increased to twice the maximum required by any airline schedule, there was a depression of plasma cholinesterase activity, but it was so small that it reached a low grade of statistical significance during only 3 of 11 weeks of testing. No other abnormality could be related to exposure to DDVP. The following functions or factors were investigated: complex reaction time, airway resistance, near and distant visual acuity, visual accommodation, stereoscopic vision, phorias, prism vergence, flicker fusion, pupal size, peripheral and central vision, color vision, and physical and neurological status. -- Cond. from authors' summary

- 849 Pentachlorophenol Intoxication. P. L. Eptea, et al.
Arch. maladies profess. 24, 310-312 (Jan.-March 1963). French.

In 1952, the senior author and his colleagues reported the first French observations on poisoning by chlorophenols (Bull. Hyg. 23, 556 (1953)). This paper reports 3 more cases in forest workers concerned with stripping wood with sodium pentachlorophenate. The first case was typical and the patient recovered. The second patient died, but the features were not pathognomonic. The third patient suffered from an eczematiform dermatitis which cleared when he ceased work, but which recurred when he worked again with the pentachlorophenate, but was eventually cured. -- Bull. Hyg.

INDUSTRIAL DUSTS

- 850 On the Calibration of Cascade Impactors. T. T. Mercer.
Ann. Occ. Hyg. (London) 6, 1 (1963).

Review of the theory of the impaction process along with the derivation of several equations for evaluation of impactors is presented and applied to the results from several investigations. Two methods of calibrating cascade impactors are compared. The "root inertial parameter" compares more closely with the theoretical values and is probably more meaningful than the mass median diameter. Although no method is entirely satisfactory, the use of the effective cut-off diameters in the interpretation of data from unknown aerosols is preferable to the use of the mass median diameter. -- J. Occ. Med. Absts.

- 851 Measuring Dust Concentration in the Industrial Plants of Czechoslovakia. P. Pachner.
Ann. Occ. Hyg. (London) 6, 39 (1963).

Standardization was attempted of evaluation of pneumoconiosis-producing dust in industrial plants in Czechoslovakia. Three counting methods (circular konimeter, slit konimeter, and impinger) and two gravimetric methods (a tube with glass-wool and a Soxhlet thimble) were compared. Konimetric methods are not suitable for the measurement of dust concentrations by plant personnel. Gravimetric methods should be used as standard method for measuring dust by supervisory bodies, because they are more reproducible and can be used to compare dust over a long period of time. A standard method is needed. -- Cond. from J. Occ. Med. Absts.

- 852 Pneumoconiosis Study of Western Pennsylvania Bituminous-Coal Miners. W. W. McBride, E. Pendergrass and J. Lieben. J. Occ. Med. 5, 376-388 (Aug. 1963).

The results of radiographic examinations, vital capacity studies, and the collection of personal and employment histories of 9,997 western Pennsylvania bituminous coal miners are presented. The findings are compared with those of a previous central Pennsylvania study. Roentgenographic findings were positive in 11% of the working volunteer who presented themselves for examination in western Pennsylvania. Twenty-five per cent of the roentgenograms of working miners were positive in the central Pennsylvania study. Several possible explanations for the difference in findings are presented. -- Authors' summary

- 853 Environmental Dust Study of Anthracite Coal Mines of Eastern Pennsylvania. E. J. Baier and R. Diakun. *J. Occ. Med.* 5, 390-403 (Aug. 1963).

The results of an environmental study of 24 anthracite mines in Pennsylvania are presented. Dust levels in the breathing zone of miners for various operations and locations within the mines are tabulated. Size frequency of the dust agrees with previous studies and indicates that the dust is within respirable limits. Weighted dust exposure is reported in addition to random sampling as a means of classifying hazardous operations within an occupation. The extent to which control measures are employed and their effectiveness in allaying dustiness are included. There are 23 references to the subject.

-- Authors' summary

- 854 Infective Pneumoconiosis. Variable Coal with Constant Tuberculosis. E. J. King, S. Sivalingam and W. Treveila. *Arch. Environmental Health* 2, 33-46 (July 1963).

The pneumoconiosis of coal miners may be of simple or complex sort. Simple pneumoconiosis is not severely disabling and produces no clinical symptoms other than shortness of breath. On the x-ray film, shadows of reticulation are seen, and large sections of the lungs of persons who died or were killed by accident show nothing more than a simple focal accumulation of dust in the lungs. When the amount of dust is small, focal accumulations are few, and no pathology is seen (Grade 1 of simple pneumoconiosis); when there is more dust, foci are more numerous, and emphysema may be found (Grade 2); when the foci of dust are very numerous, the lung appears intensely black, and focal emphysema may be extensive (Grade 3). On a background of simple pneumoconiosis of Grade 2 or 3 (but not of Grade 1) a much more severe condition of progressive massive fibrosis superimposes itself in a proportion of coal workers. This has all the hallmarks of something in addition to, and separate from, the simple pneumoconiosis on which it arises. Clinically, the disease is progressive and finally fatal. X-ray films show large, dense shadows, which may be sausage-shaped, golfball-shaped, and even as big and round as a cricket ball. On autopsy, jet-black rubbery lesions are found in the lungs which correspond to the x-ray shadows. They may be necrotic at the core. Progressive massive fibrosis (PMF) in coal miners always occurs on a background of Grade 2 or Grade 3 simple pneumoconiosis and very seldom on a background of Grade 1. This implies that a high concentration of dust is necessary before PMF can occur.

-- Cond. from authors' summary

- 855 A Year of Supplementary Examinations of Apprentice Miners in the Combined Coal Mines in Limburg (The Netherlands). V. H. Rutgers. *Ned. Tijdschr. Geneesk.* 107, 387-397 (March 2, 1963). Dutch.

In the mining industry a considerable percentage of the working days lost as a result of illness is due to respiratory disease. Since 1959, all apprentice miners have been examined for respiratory predisposition before they go down into the mine for the first time. A working hypothesis developed in Groningen by Orie and his associates was followed: asthmatic constitution or asthmatic disease is assumed if at least 2 or 3 characteristics out of a certain complex of symptoms are found to be present. Nine hundred apprentices were examined during the first year. Of these, 246 or 27.3% probably had an increased predisposition. If the apprentices were classified into groups according to the number of positive characteristics, it was found that the more positive characteristics a group had, the higher the percentage was of absentees as a result of respiratory disorders. There was a significant difference between the number of working days lost by the "asthmatic constitution" group and by the group with no marked predisposition to respiratory disorder. In the latter group, the apprentices with only the personal history positive showed a same loss of working days as the "asthmatic" group. This supplementary examination, which is followed up at regular intervals in cases of respiratory predisposition, will make it possible to transfer certain persons in time to a more suitable (dust-free) environment. In this way, it is hoped to prevent serious pulmonary disorder caused by harmful exposure during working hours.

-- Bull. Hyg.

- 856 Medical Aspects of the Esparto Industry. J. G. Dantin.
Med. y seguridad trabajo 10, 13-21 (Oct.-Dec. 1962). Spanish.*

The area concerned with the cultivation of esparto grass is in the southeast of Spain. The people are very poor and conditions primitive. Harvesting takes place in February-March and again in September. An extensive description is given of the various procedures involved. The actual harvesting, retting and beating of the grass are done mostly by women, while the combing, which entails pulling the sheaves through a series of metal spikes placed on wooden poles and involves considerable effort, is done by men. The grass is made into rope, the rope-making wheel being worked manually by quite young boys. The medical aspects can be divided into two groups: (1) The actual signs and symptoms; (2) pathogenesis. As regards the latter and manifestations are very suggestive of and similar to those in farmer's lung. The combers are especially exposed to the inhalation of vegetable dusts and in them chronic bronchitis, benign pneumoconiosis, more or less intense cor pulmonale, and tuberculosis may occur. Pneumoconiosis was found in 30% of the combers. It is of slow evolution, the final cardiac complications being due to the extent of the disease. The author used spirometry and apnea time as tests of respiratory function and states that x-ray examinations have only a complementary value, the changes seen being similar to those in millers. Prepatellar bursitis is not uncommon in the pickers. Clinically 2 patients had emphysema, 2 pulmonary tuberculosis, and a number evidence of some cardiac condition.

-- Cond. from Bull. Hyg.

- 857 Air Treatment and Dust Control in Investment Foundries. P. G. Rothery and R. G. Ringer.
Foundry Trade J. 113, 15-25 (July 5, 1962); *ibid.* 73-77 (July 19, 1962).
(Foundry Trade Journal, 17 John Adams Street, Adelphi, London WC2, England*).

This paper, which was presented at the British Investment Casters' Technical Association's fourth annual meeting, describes the various methods available for dealing with air treatment in investment foundries. The first part of the paper shows the calculations involved in providing controlled heating, ventilation, cooling, and drying and the importance of dust extraction and describes some of the calculations necessary. In the second part there is described the various types of equipment available to the industry for handling air for heating, air conditioning, and drying, and air polluted with industrial dust and fumes. Finally, it is shown how the various technical processes described are applied to the actual working of an investment foundry.

-- Public Health Eng. Abstrs.

- 858 Pleural Calcifications Following Dust Exposure. C. Stephanopoulos.
Acta Tuberc. Pneumol. Scand. 42, 228-232 (1962). (Acta Tuberculosea et Pneumologica Scandinavica, Ejnar Munksgaard, Noerregade 6, Copenhagen K, Denmark*).

Pleural calcification in two patients is described. One was employed at a brick kiln for 13 years and then for 17 years as a marble worker. The other had worked in a shell factory, breaking casts from shells after removal from the furnace. Neither had a history of chest disease before the discovery of the calcification, although the second developed tuberculosis 43 years after the exposure and 17 years after the discovery of the changes. The absence of a past history of chest disease suggests to the author the possibility of these calcifications having an occupational origin. The literature on the subject is reviewed. Smith (Bull. Hyg. 27, 1036 (1952)) is quoted as finding 3 cases in 1,278 brick-kiln workers. Calcifications are localized in the parietal pleura, and the hypotheses for deposition of calcium which have been suggested by various authors are discussed.

-- Bull. Hyg.

* Address not in current List of Periodicals.

PHYSICAL ASPECTS OF THE ENVIRONMENT

- 859 Environment in Relation to Behavior of Spiders. P. N. Witt.
Arch. Environmental Health 7, 4-12 (July 1963).

The orb web of certain species of spiders is the record of a rigid behavior pattern. Variations in the pattern can be observed which are brought about by changes in the environment. The rhythmic 24-hour variation of light and temperature is found to be the most favorable condition for frequent web-building. Food deprivation over 2 and more weeks affects body weight more than thread production and web-building, indicating a probable transformation of body constituents into silk protein in emergency situations. Evidence for the importance of spiders' perception of gravity, surface structure, and vibration in its web is presented. An effort is made to deduce from this the clues which the animal obtains from its environment.

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

- 860 Aeromedical Aspects of a Commercial Jet Operation. G. J. Kidera.
Aerospace Med. 34, 601-605 (Jul. 1963).

Ozone monitoring by continuous sensors on 38 flights at various current jet altitudes indicates that no hazard exists. Radioactivity in present day jet operation does not exceed the AEC maximum permissible limit. Jet crew absenteeism is less than piston crew absenteeism. Because of the possibility of clear air turbulence, passengers are advised to keep the seat belts on whenever seated. There is no adverse effect on airborne electronic equipment by cardiac Pacemakers. Certain equipment can, in close proximity, affect the output of the Pacemaker. However, the requirement of proximity cannot be met. Passengers utilizing Pacemakers can be flown safely in present day commercial aircraft.

-- Author's resumé

- 861 Adrenal Cortical Response in Motion Sickness. E. V. Dahl, et al.
Arch. Environmental Health 7, 86-91 (July 1963).

Healthy male volunteers, who became motion sick on a rotating tilt chair or during maneuvers in aircraft exhibited a rapid rise in the concentration of free 17-hydroxycorticosteroids in their serum. A similar rise took place in most individuals who did not vomit when they were subjected to the same motion. Half of these men admitted nausea. In a smaller number of men, who did not vomit, the serum 17-hydroxycorticosteroid content during and after the period of motion did not rise above levels which existed before the onset of motion. Only one of 11 men in whom there was no hormonal elevation admitted slight nausea.

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

- 862 Ventilatory Dynamics Under Hyperbaric States. W. B. Wood and L. H. Leve.
Arch. Environmental Health 7, 47-59 (July 1963).

Ventilatory dynamics maximum breathing capacity (MBC), timed vital capacity (TVC), maximum expiratory flow (MEF) were performed on 9 United States Navy deep sea divers and 2 submarine and diving medical officers. The performance utilizing first air, 10% helium-oxygen (80%-20%), as the respiratory medium at various levels of hyperbaric pressure up to 15 atmospheres absolute (atm. abs.) was compared with performance at 1 atm. abs. An additional observation was made on the same subjects utilizing a 95% helium-5% oxygen mixture at 15 atm. abs. The over-all effect was that of a marked decrease in all parameters measured and the development of an obstructive pattern similar to that of the emphysematous patient. The probable mechanism of the observed alterations through increased work of breathing is discussed. The relationship of these findings to previous observations on decreased respiratory minute volume (RMV) and hypercapnia in underwater swimmers is discussed. There are 19 references to the subject.

-- Author's summary

- 863 The Relationship of Age and Rate of Acquisition of Flying Time Versus the Summation of Bilateral Hearing Loss Amongst Canadian Civilian Licensed Pilots. J. A. Sullivan, W. E. Hong and W. A. Prowse. *Aerospace Med.* 34, 655-661 (July 1963).

Shortly after the establishment of the Division of Civil Aviation Medicine of the Department of National Health and Welfare of the Government of Canada, the authors were requested to submit an informative brief setting forth the requirements for Otolaryngological Examination for all personnel licensed by the Department of Transport to fly in Canada. As audiometric investigations of hearing were not a requisite of the medical examination required to be conducted annually by the Department of Transport of all licensed pilots in order to be permitted to fly, it was necessary to acquire all such data through cooperation of civilian licensed pilots volunteering to an extensive audiometric examination. The furthering of the accuracy of the graphical representation of the entities of pilot age, rate of acquisition of flying time, or total flying time, and other pertinent factors not yet determined with respect to the hearing acuity expressed as an algebraic summation of the hearing loss present in each ear could soon be realized by continuation of the present audiometric survey, either as a research program or as an actual requirement of the medical examination of all pilots licensed to fly by the Department of Transport in Canada.

- 864 Some Effects on Human Subjects of Ultra-High Frequency Radiation. A. H. Frey. *Ann. J. Medical Electronics* 2, 28-31 (Jan.-March, 1963). (*American Journal of Medical Electronics*, R. H. Donnelley Corporation, 466 Lexington Avenue, New York, N. Y. 10017 *).

Data were presented which indicate that ultra-high frequency radiation can induce effects at average power densities below the currently accepted hazard limit of 10 mw./sq. cm. It was found that the perception of sound can be induced in human subjects, and the possibility of an effect on the heart was indicated. Limitations in the data were pointed out, but there is no question as to the existence of the effects. -- Public Health Eng. Absts.

- 865 Ozone Toxicity Hazard in Cabins of High Altitude Aircraft—A Review and Current Program. L. S. Gaffe and H. D. Estes. *Aerospace Med.* 34, 633-643 (July 1963).

Ozone is present in significant quantities in the atmosphere starting above the tropopause and in toxic concentrations in the stratosphere reaching a peak at about 70,000-90,000 feet. The ambient ozone concentration varies with geographic latitude, season of the year and meteorologic factors. The exact cabin concentrations of ozone in various types of current jet aircraft at different altitudes are presently being studied by the Federal Aviation Agency and will be plotted in relationship to these factors to determine whether or not an environmental health problem actually exists particularly for aircrews because of their frequency of exposure. If, as a result of these and subsequent studies, it is determined that the cabin ozone content exceeds 0.2-0.3 ppm for significant periods of time it will be recommended that some means of destroying or reducing the ozone content below this level be utilized. High ambient ozone concentrations of 5-10 ppm are found at altitudes of 65,000-80,000 feet through which the supersonic transport will cruise. The air used for cabin pressurization passes through the compressors very quickly, too quickly to destroy all the ozone present by adiabatic heating. Unacceptable concentrations of ozone will be present in the cabin environment of the supersonic air transport (SST) unless the use of devices such as a catalytic filter or some engineering technique for delaying or increasing the dwell time of the ambient air intake through the compressors sufficiently long enough to take advantage of adiabatic heating to destroy or reduce the ozone content below 0.2-0.3 ppm is employed. It is recommended that additional research be performed in the area of time/temperature relationships of air compressors of turbo-jet, turbo-ramjet and other proposed types of SST to develop adequate techniques of ozone destruction. There are 65 references to the subject.

-- Authors' summary

- 866 The Use of Laser Beams and Their Potential Occupational Hazard. L. Solon. *Ind. Hyg. Rev.* 5, 19-26 (May 1962).

Beams of light from LASER (Light Amplification by Stimulated Emission of Radiation) represent a new source of radiant energy in the visible and in the infrared region of the spectrum.

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This light is coherent (roughly, in phase) and is highly monochromatic. It is most readily produced at present by exciting the chromium atoms in an artificial ruby with one or more xenon flash tubes, although other compounds have been used also. Because of the nature of the light, it is highly collimated and large energy densities can be obtained in narrow beams. Many uses have been suggested for these sources—space communication, high temperature welding, electron accelerators, and biomedical and surgical tools. There are hazards in handling such sources of energy: e.g., eye damage has been demonstrated in exposed experimental animals. Specular reflective surfaces in the path of the beam create the possibility of inadvertent exposure of the eye to the reflected beam.

-- Public Health Eng. Absts.

RADIOACTIVITY AND X-RADIATION

- 867 Late Effects of Roentgen Therapy Given in Infancy. B. O'Malley, G. J. D'Angio and G. F. Vawter. *Am. J. Roentgenol., Radium Therapy Nuclear Med.* 89, 1067-1074 (May 1963).

Late complications associated with roentgen therapy of children are discussed and an illustrative case is reported. The patient was irradiated as an infant and developed, over a period of 20 years, lesions exemplifying three of the major categories of late radiation effects. Growth disturbance was sustained by the vertebral spine, functional impairment by the kidneys, and tumor induction by the skin.

-- Nuclear Sci. Absts.

- 868 Radiation Exposure from Luminous Watch Dials. W. Seelentag and H. Schmier. *Radiol. Health Data* 4, 209-213 (April 1963). (Radiological Health Data, U.S. Public Health Service, Washington 25, D.C. *).

In the first (German) Regulations for Radiation Protection, paragraph 11, contains definitions of harmful or dangerous activity concentrations for radiation from luminous dials for individuals. Recent measurements of wrist watches show a definite trend toward a reduction in such activity. In the case of German-made watches, most have radium amounting to less than 0.06 and usually only about 0.02 microgram. Radiation dose to wearers of such watches amounts to only a small percentage of the natural background radiation. The local dose to the skin of the forearm ranges around a few per cent of the maximum permissible occupational dose. Exceptions, however, are found among watches of non-German manufacture, especially so-called sport watches, which may give a whole body radiation exposure in the order of magnitude of natural background radiation, and local forearm dose up to the maximum permissible occupational dose or even higher. Such watches should not be worn all day, and should at least not be worn at night. Somatic manifestations, such as effects on the blood picture, or local erythema, or pigmentation of the forearm, do not occur even in the latter cases; when they do occur, it is due to causes other than ionizing radiation. The average genetic dose from these time pieces to the population appears to be relatively insignificant, according to current estimations; it amounts to only about 1% of natural background radiation exposure. Nevertheless, it should be a basic rule that every artificial radiation exposure is undesirable unless it is justified, as in the use of ionizing radiation in medicine.

-- Public Health Eng. Absts.

- 869 Retention and Excretion of Cesium-137 by Man. M. P. Taylor, J. Vennart and D. M. Taylor. *Phys. in Med. Biol.* 7, 157 (Oct. 1962).

Five men had accidental Cs-137 intakes of less than the I.C.R.P. maximum permissible amount as a result of leakage from radiographic sources. The half-period of body retention of this radionuclide varied between 80 and 130 days. The average daily urinary excretion was 0.5% of the body burden. It is suggested that this excretion ratio may be of value if it is ever necessary to screen large numbers of people quickly after an accident involving Cs-137.

-- J. Occ. Med. Absts.

* Address not in current List of Periodicals.

- 870 Gamma-Ray Spectrometric Determination of Low Concentrations of Radioactive Cesium in Sea Water by a Nickel Ferrocyanide Method. G. J. Mohanrao and L. R. Folsom. Analyst 58, 105-106 (Feb. 1963).

A simple, fairly rapid and reliable method is presented for determining radioactive cesium in sea water, based on a known method of concentration. Radioactive cesium, together with microgram amounts of stable cesium naturally present in sea water, is co-precipitated with nickel ferrocyanide from a 50- to 200-liter sample. After the precipitate has settled and the supernatant liquid has been syphoned off, the nickel ferrocyanide is transferred to a pint container and counted in a gamma-ray spectrometer equipped with a 5-inch by 4-inch NaI(Tl) crystal and a 256-channel pulse-height analyzer. Studies with a cesium-134 tracer helped to determine the most favorable conditions of pH, temperature and concentration of reagent. The procedure has been used aboard ship and in the laboratory since 1960 for oceanographic survey of radioactive cesium in sea water in concentrations ranging between 0.03 and 0.4 pC per liter.

-- Public Health Eng. Absts.

- 871 Radioactivity of Biological Materials from Brazilian Areas Rich in Thorium Compounds. E. Penna-Franca and O. G. DeFreitas. Nature 197, 1062-1063 (March 16, 1963).

Radium-228 was measured in environmental and biological samples collected near the towns of Guarapary and Meaibe, and an unpopulated area near Iron Hill. Vegetation samples in these locations contained radium-228 at the level of 0.001 microcurie/g. calcium and 0.01-0.06 microcurie/g. calcium respectively. Radium-228 concentrations in some biological specimens and gamma count rates of a variety of samples are also reported. -- Public Health Eng. Absts.

- 872 Survey of X-ray Facilities in Los Angeles. C. L. Senn, et al. Radiol. Health Data 4, 215-220 (April 1963). (Radiological Health Data, U.S. Public Health Service, Washington 25, D.C. ").

A survey of x-ray facilities was undertaken by the Los Angeles City Health Department as a part of its responsibility to regulate and control machines and devices that generate ionizing radiations that may adversely affect the health of exposed persons. The survey covered medical, dental, and industrial facilities, and included fluoroscopic and photofluoroscopic units. Approximately 2,700 radiation facilities were inspected to obtain information regarding exposure of patients and operators of the equipment. The factors considered in evaluation of the facilities were: size of the primary beam delivered to the patient, filtration, direction of the primary beam, operator protection (shielding or separation from the beam and workload), occupancy of adjacent areas, and assessment of total exposure to individuals or areas. Charts and data are presented indicating the percentage of facilities that met or exceeded established criteria for safety and efficiency. Recommendations leading to correction of inadequacies and education of equipment operators are presented.

-- Public Health Eng. Absts.

- 873 The Responsibility of Local Health Agencies in the Control of Ionizing Radiation. Anon. Report of the Committee on Local Control of Ionizing Radiation of the Conference of Municipal Public Health Engineers. Am. J. Public Health 53, 1136-1144 (July 1963).

Control of ionizing radiation is necessary for health protection. The principles of control are similar to other environmental health measures. As an environmental concern, radiation protection should be integrated with other environmental programs of health agencies. Future use of ionizing radiation will undoubtedly increase manifold as new applications are discovered. Thus local health agencies have a responsibility to prepare to cope with problems in this field, as in any other environmental condition that has a vital influence on health. Health officers and environmental health administrators will be negligent in their duties if they fail to recognize their responsibilities in this field. The U.S. Public Health Service has a responsibility for leadership in the coordination and support of research concerning the health effects of exposures to ionizing radiation. This agency also has a responsibility to stimulate and conduct training for health workers in this field.

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Along with state and local health agencies, other interested federal agencies (for example, the AEC and the Federal Radiation Council), educational and research institutions, and users, the U.S. Public Health Service has a responsibility in setting standards for health protection. As state health departments develop an increasing program involvement in radiation protection, states should plan their activities to involve positively local health agencies. The states should also stimulate and encourage local participation in this vital new program area.

-- Authors' summary

- 874 Control of Tritium Health Hazards at the Savannah River Plant. W. C. Reinig and E. L. Albenesius. *Am. Ind. Hyg. Assn. J.* 24, 276-283 (May-June 1963).

The control of hazards resulting from tritium production at the Savannah River Plant are described. Controls in use include radiological engineering techniques followed by training of operating personnel, use of protective clothing, control of surface and air contamination, bioassay, and environmental monitoring. Details indicating the effectiveness of these control measures are given.

-- Authors' abst.

- 875 Thyroid Carcinoma in Man after Exposure to Ionizing Radiation. A Summary of the Findings in Hiroshima and Nagasaki. E. L. Socolow. *New Engl. J. Med.* 268, 406-410 (Feb. 21, 1963).

The prevalence of thyroid carcinoma after exposure to radiation from atomic weapons was studied in matched groups of exposed and non-exposed patients participating in the long-term investigations of the Atomic Bomb Casualty Commission, Hiroshima and Nagasaki, Japan. Biopsies were obtained in approximately 50% of patients with thyroid nodules, without knowledge of the patient's radiation history. Thyroid carcinoma was demonstrated to be significantly more prevalent among patients who were heavily exposed to ionizing radiation at the time of the atomic bombings in 1945.

-- Bull. Hyg.

ENVIRONMENTAL MEASUREMENTS

- 876 Effects on Animals of Exposure to Auto Exhaust. S. D. Murphy, et al. *Arch. Environmental Health* 7, 60-70 (July 1963).

Rats, mice, and guinea pigs were exposed for 4 to 6 hours to experimentally produced, irradiated and non-irradiated exhaust atmospheres, in concentrations ranging from approximate community pollution levels to 8 to 10 times ambient concentrations. During exposure to irradiated exhaust guinea pigs had increased pulmonary flow resistance and decreased respiratory rates. The respiratory function returned to normal when the animals were returned to clean air. Voluntary running activity of mice was decreased during exhaust exposure. Non-irradiated exhaust was less effective than irradiated atmospheres which contained less photochemical reaction products. Mortality from severe pulmonary stress (alpha-naphthylthiourea (ANTU) edema) was higher for mice placed in exhaust atmospheres. Rats formed more carboxyhemoglobin (proportionate to CO concentration) when exposed to irradiated as compared to non-irradiated exhaust atmospheres.

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

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PREVENTIVE ENGINEERING

- 877 Controlling Air Contaminants in New Industrial Processes. A. D. Brancat.
Ind. Hyg. Rev. 5, 27-37 (May 1962).

New and changed industrial processes create airborne contaminants requiring ventilation and other control measures. Although more toxic materials are used or created in new or welding processes, the extent of hazard is governed by many other factors and the new technique may not be appreciably more hazardous than ordinary welding operations. Fluorides from submerged arc welding, ozone from inert gas-shielded metal arc welding, flux core electrodes and lead welding present new problems, which can be controlled by proper application of local exhaust and general ventilation and respirators. The plasma jet adds a noise problem. Epoxy resins are increasing in use in a wide variety of applications, creating problems of dermatitis and ventilation for spraying operations. Welding and burning of plastic-coated metals require close control because of thermal decomposition products. Pressure (without compressed air) spray painting does not eliminate the need for control ventilation in this operation. Radiant heat and high temperatures are serious problems in many industries. "Cool out booths" where workers can recover between heat exposure have been effective, and heat shields are used to control radiant heat. Abrasive blasting still presents problems. The substitution of metal grit for sand has introduced a lead problem from small amounts of this impurity. In general, however, new problems are amenable to solution by judicious application of well-known principles.

-- Public Health Eng. Absts.

- 878 The American Sanitary Engineering Intersociety Board (ASEIB). E. Boyce.
Am. J. Public Health 53, 1127-1131 (July 1963).

The American Sanitary Engineering Intersociety Board has undertaken several studies in keeping with the broad objectives of the board as given in the Articles of Incorporation. These objectives, briefly stated are: (1) To improve the practice, elevate the standards and advance the cause of sanitary engineering. (2) To grant and issue to engineers duly licensed by law to practice engineering, certificates of special knowledge of sanitary engineering or in any field thereof, and to revoke certificates so granted or issued. (3) To receive and act upon applications for such certificates—to determine by examination, investigation or otherwise, the fitness of applicants for, and the holders of such certificates. (4) To furnish to the public, or to interested organizations, lists of engineers having special knowledge in sanitary engineering, as evidenced by certificates granted by the corporation. (5) To keep and maintain a register of holders of certificates granted by the corporation, such roster to be known as the American Academy of Sanitary Engineers.

- 879 Operator Protection in Wastewater Treatment Plants. G. E. Browning and J. J. Gannon.
J. Water Pollution Control Fed. 35, 186-190 (Feb. 1963).

A survey was made in 200 wastewater systems in northern California to determine the health and safety conditions affecting operators. Observations were made of features relating to physical safety, prevention of operator sickness and body infection, prevention of burns, explosions, asphyxiation, and poisoning, and the handling of chlorine. -- Public Health Eng. Absts.

COMMUNITY AIR HYGIENE

- 880 Atmospheric Contamination in the Space Cabin. R. A. Saunders.
Rept. NRL Prog. 7-11 (Jan. 1963). (Naval Research Laboratory, Office of Technical Services,
Department of Commerce, Washington 25, D.C. *).

Organic contaminants dispersed in the atmospheres of Mercury spacecraft are adsorbed by activated charcoal in the environmental control system. The contaminants are later recovered from the charcoal in the form of a complex mixture by a process of vacuum desorption. The small volume of the space cabin and the low concentration of the various contaminants result in the recovery of very small quantities of contaminant mixture. The identification of the components in this mixture and the determination of their concentration in the original atmosphere require the use of microtechniques. The contaminant mixture is separated into its components by means of an analytical gas chromatograph. The individual components are recovered from the effluent stream of the chromatograph with a novel fraction collecting system and their identity is established by means of infrared and mass spectral techniques. A summary is given of 27 organic contaminants recovered from several spacecraft atmospheres.

-- Aerospace Med.

- 881 Laminar Air Flow for Contamination Control. R. C. Marsh. J. Am. Assn. Contamination Control 11, 7-11 (May 1963). (Journal of the American Association for Contamination Control, West Coast Publishing Inc., 1605 N. Cahuenga Blvd., Los Angeles 28, Calif.*).

The author's conclusions, based on work that has been done at the Sandia Corporation over the past 2 years are: with laminar air flow, control over airborne contamination can be achieved both simply and economically to a point where airborne contamination is insignificant. Operational contamination levels of at least two orders of magnitude lower than that obtainable in conventional clean rooms can be maintained by the laminar flow design. This control can be achieved independently of the activity within given areas. The overall cost of achieving and maintaining airborne contamination control by laminar air flow means will be substantially cheaper than the cost of conventional means.

-- Public Health Eng. Absts.

- 882 Power Plant Using High Sulfur Coal Takes Steps to Reduce Air Pollution. D. T. McPhee.
Ind. Water and Wastes 8, 9-11 (Jan.-Feb. 1963).

The Montrose steam electric station of the Kansas City Power and Light Company is located in the center of a high sulfur coal deposit easily accessible by strip mining. Dust collectors and a 250 foot chimney eliminated much of the problem of fly ash removal and sulfur dioxide dispersion, however, for 240 hours each year objectionable pollution of the atmosphere was evident. In keeping with company policy of being a good neighbor, the company is installing two 330 ton 95% electrostatic precipitators and a 450 foot stack in spite of the plant location in a remote rural area.

-- Public Health Eng. Absts.

MANAGEMENT ASPECTS

- 883 Comparative Study of Executive Health Examinations. H. A. Vonachen and W. J. Roche, Jr.
J. Occ. Med. 5, 389-395 (Aug. 1963).

There are as yet too few data available on executive health examinations to permit the development of broad generalizations. Many more intragroup and intergroup studies will have to

* Address not in current List of Periodicals.

be made, and further consideration must be given to age-group differences and occupational differences, as well as the effect of health education on executive health maintenance programs. Aside from the pure statistical analysis of data gathered from health examinations such as described in this paper, much remains to be done to develop among business executives a sound orientation toward health maintenance. Too often business and industrial executives, who pay large sums in taxes to defray the cost of many public health services and donate millions of dollars to health causes, neglect their own well-being. The medical director and his staff must strive to make the executive realize his responsibility to attain and maintain good health patterns and habits, and that the more successful and enterprising the executive is, the greater gap his disability or death will leave. In the years of his dealing with the health problems of business executives, the industrial physician has observed certain factors which constitute particular dangers to this group—e.g., undefined working hours; irregular work flow; and the fact that such work is not measured in time served, but in goals achieved. The tension associated with executives' jobs extends through much of their working day. In this era of quality control of manufactured goods, as well as materials and resources, similar guides to health control must be established and maintained by executives. -- Cond. from Authors' comment

- 884 The Challenge of Comprehensive Health Care. W. P. Dearing.
Am. J. Public Health 52, 2071 (Dec. 1962).

Comprehensive health care is a goal for the American people. It is not a precise entity, but varies according to available resources. The author uses the term in the sense of the maximum possible preventive, diagnostic, therapeutic, and rehabilitative services provided by qualified personnel under competent medical direction appropriate to the needs of the individual. This country faces the spectacle of great advances in medical knowledge and techniques and a demand on the part of the public for the benefits of expanding knowledge, but wholly inadequate action to provide high-quality comprehensive health care in an efficient manner. Comprehensive health care carries a special challenge for the consumers to become knowledgeable and discriminating, for labor to extend services through group practice, and for management to work with labor, the health profession, and the insurers to improve efficiency and quality of medical care. Every segment of our society has a stake in all aspects of comprehensive health care. It is fortunate to be able to afford high-quality care. Everything possible should be done to aid rather than impede progress toward the goal of comprehensive health care. -- J. Occ. Med. Abstrs.

ACCIDENTS AND PREVENTION

- 885 Health and Safety in the Handling of the Newer Plastics and Resins. Part I. E. D. Palmes.
Ind. Hyg. Rev. 5, 39-42 (May 1962).

With most plastics the toxicity varies inversely with the chain length; the monomers and prepolymers are highly reactive while most finished plastics are comparatively inert. Most health problems arise from the unreacted original materials or from chemical breakdown. Teflon, epoxies, and the polyurethanes are examples. Besides the polymers themselves, plastics contain plasticizers, fillers, stabilizers, dyes, and pigments. The possibility of such materials leaching out from the plastic must be considered, especially when the finished plastic comes into contact with food. -- Public Health Eng. Abstrs.

- 886 Health and Safety in the Handling of the Newer Plastics and Resins. Part II. L. Orris.
Ind. Hyg. Rev. 5, 43-48 (May 1962).

Dermatitis has been produced under certain conditions when each new plastic has been introduced. The epoxy resins, the newest of the resins, have produced high rates of dermatitis that are especially serious because the desirable properties of these resins have brought them into very wide use. The original epoxy resin itself is usually a severe irritant and a strong

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sensitizer. The amines added as hardeners are themselves potent irritants and sensitizers. The operations used in producing and processing plastics, which are described, give ample opportunity for exposure, and careful control measures are required. Examples of dermatitis among consumers exposed to these materials in garments, stockings, hearing aids, and hats are given. Measures for the control of hazards among plastic producers should include education, ventilation, personal protective equipment, and plant cleanliness. -- Public Health Eng. Absts.

- 887 Investigating Air Accidents. P. G. Tweedie.
New Scientist (London) 17, 83-85 (Jan. 10, 1963).

The qualifications and organization of air-accident investigating personnel are described. Investigative procedures include steps taken from the beginning of an accident to the formation of an opinion of a likely cause. The modern aircraft is now a very large and complicated but easily disintegrated structure, propelled at extremely high speeds at great altitude and controlled by advanced hydraulic and electrical systems. Communication between it and the ground is at a minimum. Consequently, many of the methods devised and used by investigators over the years to facilitate determining accident causation can no longer be applied. Effective accident investigation must depend increasingly upon an analysis of flight information obtained from automatic recorders carried on the aircraft itself. Such recorders, protected against fire and the forces of impact, are designed to be recovered with the recordings intact. -- Aerospace Med.

MISCELLANEOUS

- 888 Thermal Pollution of Surface Supplies. G. E. Arnold.
J. Am. Water Works Assn. 54, 1332-1346 (Nov. 1962).

Approximately 80% of all water withdrawn by industry from lakes and streams in Pennsylvania is used for cooling. This results in discharge of large quantities of heat to streams and lakes. Because of meager information on thermal pollution, a committee was appointed to study the problem. Municipal governments, recreational organizations, public health agencies, and industry were represented. Regulations to control the discharge of heated wastewater to streams were prepared. It was proposed that discharge to a stream shall be limited to an amount that could not raise the entire streamflow above 93°F, assuming complete mixing at the point of discharge. Details of the proposed regulations are given, together with recommendations for their administration. -- Public Health Eng. Absts.

- 889 Investigation of a Small Watercourse Accidentally Polluted by Phenol Compounds.
H. Krombach and J. Barthel. Intern. J. Air and Water Poll. 7, 39-46 (Jan. 1963).

This study of the evolution of a mass discharge of industrial waste waters, rich in phenol compounds and in sulfates, into a small watercourse has shown that the biochemical disintegration of phenols under natural conditions is accomplished very quickly following substantially the same laws of disintegration as organic matter carried by domestic waste waters. In this instance, the toxicity of phenol compounds to the aquatic flora and fauna, at concentrations usually assumed to be lethal, was intensified by a marked lack of oxygen. -- Public Health Eng. Absts.

- 890 Treatment of Trade Wastes Containing Formaldehyde. Anon.
Effluent Water Treat. J. 3, 88-89 (Feb. 1963). (Effluent & Water Treatment Journal, Thunderbird Enterprises Ltd., 140 Cromwell Road, London SW7, England*).

A waste treatment plant is described for a factory that produces urea and melamine-formaldehyde resins with wastes that contain formaldehyde and methanol. Industrial waste water is pumped to a million gallon storage lagoon. The treatment schedule is pre-aeration, settling,

dilution with cooling water, activated sludge (including domestic sewage), trickling filter, settling tank, chlorination, treated effluent pond, and final dilution with condenser cooling water. Waste sludge is lagooned. A flow diagram is furnished. Oxygen absorption value of diluted waste before activated sludge treatment is 300-400 mg./l. The diluted effluent from the system is not toxic to fish and is capable of biological purification.

-- Public Health Eng. Abstrs.

- 891 ABS and Its Effect on Public Water Supplies. T. E. Dalton, J. D. O'Leary and S. J. Ciuba. Water Works Eng. 110, 107, 131 (Feb. 1963). (Water Works Engineering, R. H. Donnell Corporation, 400 Lexington Ave., New York, N.Y. 10017*).

A survey of major surface waters in New Jersey, extending from August 30 to September 12, 1962, and involving the collection of 53 samples at random sites, indicated that more than half of the samples had alkylbenzene sulfonate (ABS) concentrations of 0.1 ppm or less. Only 1 of the samples had concentrations of 0.5 ppm or greater. One river in the southern part of the state showed an ABS content of 1.0 ppm, the highest reported concentration.

-- Public Health Eng. Abstrs.

- 892 Launderette Waste Treatment System. J. M. Flynn. Water & Sewage Works 110, 83-84 (Feb. 1963).

Ground waters in Suffolk County, New York, receive annual waste flows of over 150 million gallons containing 500,000 pounds of detergents from 120 launderettes. The county health department now requires treatment to reduce concentration of detergents and other substances in these flows. A number of treatment units have been tried. These include: pH reduction and air flotation with removal of floating sludge; passing of flow thru a blanket of alum floc and activated carbon with bleeding off of sludge; and pretreatment with activated carbon followed by application to a vacuum diatomite filter. The latter procedure when preceded by a clarifier has given promising results. Problems of operation by reluctant owners are difficult to resolve.

-- Public Health Eng. Abstrs.

* Address not in current List of Periodicals.