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NOVEMBER, 197
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INDUSTRIAL HEALTH FOUNDATION
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FOUNDATION FACTS

37th ANNUAL MEETING - OCTOBER 10-11, 1972 - WILLIAM PENN HOTEL, PITTSBURGH, PENNSYLVANIA

STAFF ACTIVITIES: Many individuals outside of industry (labo management) and government need to be prepared to apply, to teach, and to counse their day-to-day professional activities, those in the public who have questions about or who have a nee know the provisions of the Occupational Safety and Health Act of 1970 (OS&HA), especially with regard andards of control of the industrial environment for reasons of employee safety and health protect In this regard, *Dr. deTreville* gave three talks during the month: 1) On November 5, he spoke to school chemistry teachers and students at Hampton High School (north of Pittsburgh) in a Chemical Safety sium sponsored by the Pittsburgh section of the American Chemical Society on "The Application and Comm on of Toxicological Research Findings in our Industrial Society"; 2) On November 11, he spoke of the t of OS&HA on Community Health" in a panel on employee health and safety during the Industry-Govern "Dialogue for Action" Joint Policy Committee Conference of the National Association of Manufactur AM) in Washington, D.C.; 3) On November 13, he presented a paper on "Bioeffects of Certain Re le Fibrous Dusts" at a meeting of the Tri-State Region of the American College of Physicians and the sylvania Society of Internal Medicine at Montefiore Hospital, Pittsburgh.

In his talks to high school chemistry teachers, hospital sional staffs, private practitioners of medicine and diagnosticians (internists, radiologists, patholo etc.), *Dr. deTreville* has encouraged his listeners to seek assistance through their own technical l ans, who in turn may wish to request assistance from IHF in Technical Information Research. A rela small but growing number of large public libraries have subscribed to IHF's monthly Industrial H Digest since pre-World War II days, but the majority will not become aware of the existence of thi ful reference unless prospective users communicate that a need exists.

In helping to further closer liaison between occupational y a health, along lines discussed at the Foundation's 36th Annual Meeting, *Mrs. Carey*, who attended 197 National Safety Congress, October 25-28, and who agreed to serve, was elected to the Executive Co tee f the Chemical Section of the National Safety Council. *Mrs. Carey*, who was also recently app ed t the Educational and Scholarship Committee of the Pennsylvania Library Association, has establis liaison with head librarians of a public library and a high school library in the area of Pittsburgh in to valuate their needs in the area of human ecology and to assist them in gaining entree to the inter ry lan system in areas of environmental and occupational health.

Dr. Gross attended a meeting of the American Conference of ermental Industrial Hygienists Threshold Limits Committee, of which he is a member, on November 18 in Cin nati.

VISITORS: Among distinguished visitors to IHF headquarters duri the month were several from other countries. The morning of November 3 *Dr. Antonio Vinas Fontanals*, chief, and *Dr. Manual Baselga Monte*, Technical Supervisor, representing the Technical Provincial Cabinet of the Spanish Ministry of Labor were received. The same afternoon, *Dr. H. Stoll*, who is in charge of the Medical and Health Center for Sony Corporation, Tokyo, Japan, and *Dr. Nobuhiro Maruoki* of the American Health Foundation, New York, visited the Foundation. *Dr. William Chapman* of Australia and *Dr. Thorstein Guthe* of Norway; guests of *Drs. Miles O. Colwell* and *William H. Dawson* of the Aluminum Company of America, visited IHF headquarters and Mellon Institute of Carnegie-Mellon University, subsequently joining a luncheon for the Pittsburgh Society of Occupational

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Physicians at the Harmarville Rehabilitation Center to receive a briefing on long-range planning to improve both rehabilitation services and disability evaluation on industry's employees.

TLV's: Included with this issue are the Threshold Limit Values of Airborne Contaminants, Threshold Limit Values of Physical Agents and Notice of Intended Changes adopted by the American Conference of Governmental Industrial Hygienists for 1971. These values are reprinted each year for the convenience of Foundation members, with the permission of the American Conference of Governmental Industrial Hygienists.

IHF TRAINING COURSE FOR PLANT AND DEPARTMENTAL MANAGERS: A training course on *Employer's Responsibilities and Employees' Rights Under the Act* will be conducted by IHF staff personnel on December 7-8 at Foundation headquarters. This is the first in a series of courses planned in which emphasis will be on training and equipping with teaching aids persons who will subsequently serve as instructors in-plant in their individual organizations. Announcements have been mailed to members and registrations are now being received on a "first come, first served" basis as the number of registrants will be limited.

IHF COMING EVENTS - CIRCLE THE DATES ON YOUR CALENDAR NOW

January 19-20, 1972	*Heat Stress Workshop* will be jointly sponsored by the Department of Occupational Health, Graduate School of Public Health, University of Pittsburgh.
March 7-8, 1972	*8th Engineering Discussional* William Penn Hotel, Pittsburgh, Pa.

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IHF WELCOMES EDITORIAL MATTER FROM ALL MEMBER COMPANIES PERTAINING TO INDUSTRIAL HYGIENE PROGRAMS, PROBLEMS AND DEVELOPMENTS

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IN MEMORIAM

THEODORE C. WATERS,
IHF Trustee

The staff of the Industrial Health Foundat eceived the announcement of the death of Mr. Theodore Waters on Friday, er 15, with a deep feeling of personal loss.

Mr. Waters was a forerunner of today's leg phasis on occupational health. A native of Baltimore, he attended Boy tin School and graduated from the Augusta Military Academy near Stauntor ginia in 1917. The next year he studied at the Harvard Law School, and ears later graduated from the University of Maryland Law School at which ne joined what is now the firm of Miles and Stockbridge in Baltimore. Mr ers began to specialize in defending corporations against suits involving s for occupational deseases and soon became an authority in this field. He ed several states draft regulations on the use of harmful substances in trial plants.

During his busy years as legal counsel, M ers have untiringly of his time and wisdom to IHF on matters of legal con o its member companies. From 1962-1964, he was Chairman of the IHF Lega mittee, Member of the Executive Committee, and Chairman of the Policy Planning Committee. Working originally with Alfred C. Hirth, Owens-Illinois s C.., Anthony J. Lanza, M.D., Institute of Industrial Medicine, New York Unive y, and more recently with Andrew Kalmykow, Counsel, American Insurance Ass tion present IHF Legal Committee Chairman, Mr. Waters has lent guidance IHF n every stage of its growth and development. He served as a Trustee . HF's Board from 1941-1964 and has been Trustee Emeritus since 1964.

Mr. Water's contribution to our specialty f has been great and his devotion to IHF's needs and problems have had imm urable value. We shall miss his wit, his warmth and his erudition, but his per onal example will remain with us as a model of character and loyalty to the high ideals contained in IHF's mission.

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EDITORIAL

SECOND [illegible] STRESS WORKSHOP SCHEDULED FOR JANUARY 19-20, 1972

Numerous replies have been received on tear sheets from IHF Engineering Series Bulletin No. 8-71, "Assessment of Heat Stress and Strains," indicating interest in participating in a proposed Symposium on Heat Stress [illegible] lend information and support to efforts of Federal standards setters in carrying out their re[illegible]ibilities under the Occupational Safety and Health Act of 1970.

As a result of this [illegible]pression of interest, plans are being made to hold another workshop on January 19-20, 1972 in order to collect 1) all available information on environmental bioeffects from heat stress based on experience of industrial populations and 2) new data developed in governmental and industr[illegible] research programs during 1971 using the guidelines contained in the above mentioned bulletin.

An announcement is [illegible]ng mailed separately to those who have expressed interest requesting that abstracts be submit[illegible] by January 7 in order that these may be reproduced and distributed at the time of the work[illegible] From among these workshop presentations will be selected those considered to be most u[illegible] in support of criteria development and these will be used to help structure the proposed [illegible] Stress Symposium somewhat later in the year, if sufficient interest and support materialize[illegible]xpected. University of Pittsburgh Graduate School of Public Health (UPGSPH) - Department o[illegible]cupational Health Chairman Dr. David Minard, who is Science Advisor to IHF has agreed to chair [illegible] workshop in January and he and Dr. H. S. Belding, Professor of Environmental Physiolo[illegible]d Occupational Health at UPGSPH, will help guide industry's contributions towards development an[illegible]plication of meaningful criteria on which to base control standards.

The data presente[illegible] this workshop will be available in time to be introduced into discussion of heat stress and strains in the session on Threshold Limit Values at the 24th Annual Meeting of the American Academy of [illegible]cupational Medicine on February 10, in which several leading scientific and technical experts on [illegible]at physiology will participate, from industry and government as well as universities.

Findings of both of the above meetings should be of very real value to representatives of IHF's member companies who participate in the 8th Annual Engineering Discussional on March 7-8, at which one full session will deal with a comparison of costs and benefits of various types of controls of heat hazards in the industries represented. This session holds special interest because of interpretations of the "general duty" clause 5(a)1 under the Occupational Safety and Health Act regarding "recognized hazards": if these are recognized industry-wide, individual plants will not be allowed to escape penalty for non-compliance based on "ignorance." Participation in the IHF Engineering Discussional should help our members control problems of heat stress, which are being awarded high level priority by the Occupational Safety and Health Administration.

--R. T. P. deT.

Editor's Note: For purposes of accuracy, we are making the following changes in our Engineering Bulletin #8-71, "Assessment of Heat Stress and Strains", and our readers will wish to do the same:

(1) On p. vi, lines 12-15, change the sentence to read: Dr. Henschel showed the heat and work limits originally prepared for surface mining (e.g. heavy equipment [illegible]erators) and which had been modified and proposed for general use by t[illegible]merican Conference of Governmental Industrial Hygienists (ACGIH).

(2) On page [illegible] add to heading: "Notice of Intent to Establish Threshold Limit Value - [illegible]at Stress by the TLV Physical Agents Committee of ACGIH."

(3) On page 14, line 16, change "0.2%" to "0.1%".

Should the bulletin be reprinted, these changes will be made. --M. C. C.

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EDITORIAL

TRIAGE: AN ESSENTIAL ELEMENT IN PROVISION OF IHF SERVICES

As stated by Dr. G. H. Collings, Jr., Chairman of ne Occupational Health Institute, and others at the 36th Annual Meeting of IHF, the Occ ional Safety and Health Act of 1970 obsoletes the employer's *option* of whether or n have *any* occupational safety and health program to protect his employees. Under ew Act, *employers*, per se, have this responsibility, under penalty of law; and spec ed Occupational Safety and Health personnel function in an advisory nature. Managemer ll levels, especially the highest, must take an interest, therefore, in the ma n which a wide variety of employee safety and health related tasks are being c ed and reported. One result of this increasing interest has been need for immediate ration of various aspects of employee safety and health protection programs as de ed by Leo Teplow, Consultant, Organization Resources Counselors, Inc., (Industrial ne Digest Book Review #24, January 1971) in order to be prepared for OSHA inspections. inspections will be performed in most cases by individuals who have been primarily t anc experienced in *safety;* yet, the great majority of problems are expected to occu e area of *health*. It has been anticipated therefore, (and experience in the six mo nder the Act has proved this to be true) that the demands upon industrial hygiene er s will mushroom; and a system will need to be developed which uses to best advant - ability in IHF to *evaluate, quantitate* and *devise and document adequacy of cont* or occupational health hazards.

Many years ago in Volume I of *Industrial Hygien Tox cology* (Interscience Publishers, Inc., New York, 1948) Frank A. Patty of General Moto -por tion described the following types of industrial hygiene "in-plant" surveys:

a. *Preliminary* or "walk through" to tak ventory and decide if further survey is needed and if so t type

b. *Instrumented* survey, where indicatec

c. *Combined* medical and environmental s y wh re there is illness and/or complaints on the part of emp es.

d. *Research* - epidemiological studies (labo atory studies) having both environmental and biological as s, a d using sound biostatistical research design.

Under the new Act, *behavioral* as well as the *classical* thological and clinical aspects of occupational safety and health investigations are st ssed and will become of importance to design engineers. Triage, or sorting,to be effective, requires the highest possible professional skill. In order to make best use of available expertise, in expectation of a rapidly expanding demand for occupational safety and health field services in IHF, a triage function described in the Editorial on page iv, is being implemented. --R. T. P. deT.

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EDITORIAL

EW DIRECTION IN IHF OCCUPATIONAL SAFETY AND HEALTH RESEARCH AND EDUCATIONAL SERVICES

To initiate an effective triage function in establishment of priorities and in delivery of occupational safety and health services of all types within its membership (as described in the Editorial on p.) IHF has created the position of Director, Occupational Health and Safety Services and assigned this new post to Dr. Daniel C. Braun (see Industrial Hygiene Digest p. i, August 1970), who has been Manager of Occupational Medicine Services since 1970 and Chairman of IHF's Medical Committee since 1963, and whose training and experience in such matters is outstanding, in every respect.

Dr. Braun is one of the very few physicians in the U.S. whose entire medical career has been spent, since his graduation from the University of Pittsburgh School of Medicine in 1937, in providing occupational safety and health services of one type or another to industry. After hospital residency training in the surgery of trauma, Dr. Braun joined the Pittsburgh Coal Company, becoming Medical Director in 1944. As Pittsburgh Coal Company (now Consolidation Coal Company) was a member of the Foundation, he worked closely with the staff of IHF's fellowship at Mellon Institute and actively participated in pneumoconiosis research. In 1950, Dr. Braun joined the Foundation's staff full time as Medical Director, serving also as Lecturer in Occupational Medicine in the Department of Occupational Health of the University of Pittsburgh's Graduate School of Public Health which he had helped its chairman, Dr. A. G. Kammer to organize.) During the next 8 years, Dr. Braun assisted IHF member companies of all sizes and types, to develop and improve their occupational health programs in administration, facilities design, in epidemiological research studies, and consumer education. In 1957, he left IHF's staff to accept an appointment as Assistant Medical Director, United States Steel to help Foundation Trustee Dr. Robert O'Connor develop an occupational health program which won the Industrial Medical Association Award for greatest progress in . In his work at United States Steel Dr. Braun directed the health services rendered by hundreds of physicians some of whom performed comprehensive and some limited services for the operating divisions and subsidiary companies which Dr. Braun served as consultant. Among these was the American Bridge Division whose safety director worked closely with Dr. Braun in all health related matters.

Referring to the several types of Industrial Hygiene Surveys described by Frank A. Patty and cited in the editorial on p.111, Dr. Braun has worked within and directed services not only in each category, but in safety as well. His extensive experience and expertise make him the logical member of IHF's staff to perform the needed triage function in all areas of occupational safety and health. An important result of the appointment of Dr. Braun as a "generalist" in regard to the Occupational Safety and Health Administration will be to direct field studies requiring instrumentation and/or engineering design and controls. In this regard, IHF's role will increasingly be that of "broker catalyst", obtaining and using services of well qualified experts in various disciplines within studies planned, administered and reported by IHF.

Long range plans call for involvement of Fellows in Training in Occupational Safety and Health in IHF's programs in every discipline of environmental and occupational health required to provide comprehensive coverage of the needs of the Foundation's members. In this way, IHF will be in a good position to extend into the employee safety and health field the important recruitment and educational function begun in Mellon Institute, which has caused the Mellon Institute to be called the "West Point" of American industry.

Companies expecting to increase the number of professionals in the field of occupational safety and health should express their needs to IHF without delay in order to help ensure that they are met.

--R. T. P. deT.

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Threshold Limit Values of Airborne Contaminants

Adopted By

ACGIH

For 1971

PREFACE

AIRBORNE CONTAMINANTS

Threshold limit values refer to airborne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effect. Because of wide variation in individual susceptibility, however, a small percentage of workers may experience discomfort from some substances at concentrations at or below the threshold limit, a smaller percentage may be affected more seriously by aggravation of a pre-existing condition or by development of an occupational illness.

Simple tests are now available (J. Occup. Med. 9,537, 1967; Ann. N.Y. Acad. Sci., 151 Art. 2, p. 968, 1968) that may be used to detect those individuals hypersusceptible to a variety of industrial chemicals (respiratory irritants, hemolyt-

[illegible] the hyperreactive worker and thus in effect improve this "coverage" of the TLVs.

Threshold limit values refer to time-weighted concentrations for a 7 or 8-hour workday and 40-hour workweek. They should be used as guides in the control of health hazards and should not be used as fine lines between safe and dangerous concentrations. (Exceptions are the substances listed in Appendices A and E and those substances designated with a "C" or Ceiling value, Appendix C.)

Time-weighted averages permit excursions above the limit provided they are compensated by equivalent excursions below the limit during the workday. In some instances it may be permissible to calculate the average concentration for a workweek rather than for a workday. The degree of permissible excursion is related to the magnitude of the threshold limit value of a particular substance as given in Appendix C. The relationship between threshold limit and permissible excursion is a rule of thumb and in certain cases may not apply. The amount by which threshold limits 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 factors must be taken into consideration in arriving [illegible] a hazardous

Threshold limits are based on the best available information from industrial experience, from experimental human and animal studies, and, when possible, from a combination of the three. The basis on which the values are established may differ from substance to substance; protection against impairment of health may be a guiding factor for some, whereas reasonable freedom from irritation, narcosis, nuisance or other forms of stress may form the basis for others.

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The committe holds to the opinion that limits based on physical irritation should be considered no less binding than those based on physical impairment. There is increasing evidence that physical irritation may initiate, promote or accelerate physical impairment through interaction with other chemical or biologic agents.

In spite of the fact that serious injury is not believed likely as a result of exposure to the threshold limit concentrations, the best practice is to maintain concentrations of all atmospheric contaminants as low as is practical.

These limits are intended for use in the practice of industrial hygiene and should be interpreted and applied only by a person trained in this discipline. They are not intended for use, or for modification for use, (1) as a relative index of hazard or toxicity, (2) in the evaluation or control of community air pollution or air pollution nuisances, (3) in estimating the toxic potential of continuous uninterrupted exposures, (4) as proof or disproof of an existing disease or physical condition, or (5) for adoption by countries whose working conditions differ from those in the United States of America and where substances and processes differ.

Ceiling vs Time-Weighted Average Limits. Although the time-weighted average concentration provides the most satisfactory, practical way of monitoring airborne agents for compliance with the limits, there are certain substances for which it is inappropriate. In the latter group are substances which are predominantly fast acting and whose threshold limit is more appropriately based on this particular response. Substances with this type of response are best controlled by a ceiling "C" limit that should not be exceeded. It is implicit in these definitions that the manner of sampling to determine compliance with the limits for each group must differ; a single brief sample, that is applicable to a "C" limit, is not appropriate to the [illegible] sufficient number of samples are needed to permit a time-weighted average concentration throughout a complete cycle of operations or throughout the work shift.

Whereas the ceiling limit places a definite boundary which concentrations should not be permitted to exceed, the time-weighted average limit requires an explicit limit to the excursions that are permissible above the listed values. The magnitude of these excursions may be pegged to the magnitude of the threshold limit by an appropriate factor shown in Appendix C. It should be noted that the same factors are used by the Committee in making a judgment whether to include or exclude a substance for a "C" listing.

"Skin" Notation. Listed substances followed by the designation "Skin" refer to the potential contribution to the overall exposure by the cutaneous route including mucous membranes and eye, either by airborne, or more particularly, by direct contact with the substance. Vehicles can alter skin absorption. This attention-calling designation is intended to suggest appropriate measures for the prevention of cutaneous absorption so that the threshold limit is not invalidated.

Mixtures. Special consideration should be given also to the application of the TLVs 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 [illegible]ent, amplified by specific examples are given in Appendix B.

Nuisance Dusts. In contrast to fibrogenic dusts which cause scar tissue to be formed in lungs when inhaled in excessive amounts, so-called "nuisance" dusts have a long history of little adverse effect on lungs and do not produce significant organic disease or toxic effect when exposures are kept under reasonable control. The nuisance dusts have also been called (biologically) "inert" dusts, but the latter term is inappropriate to the extent that there is no dust which does not evoke some cellular response in the lung when inhaled in sufficient amount. However, the lung-tissue reaction caused by inhalation of nuisance dusts has the following characteristics: 1) The architecture of the air spaces remains intact. 2) Collagen (scar tissue) is not formed to a significant extent. 3) The tissue reaction is potentially reversible.

Excessive concentrations of nuisance dusts in the workroom air may seriously reduce visibility (iron oxide), may cause unpleasant deposits in the eyes, ears and

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nasal passages (Portland Cement dust), or cause injury to the skin or mucous membranes by chemical or mechanical action per se or by the rigorous skin cleansing procedures necessary for their removal.

A threshold limit of 10mg/M^3, or 30 mppcf, of total dust < 1% SiO_2, whichever is less, is recommended for substances in these categories and for which no specific threshold limits have been assigned. This limit, for a normal workday, does not apply to brief exposures at higher concentrations. Neither does it apply to those substances which may cause physiologic impairment at lower concentrations but for which a threshold limit has not yet been adopted. Some "inert" particulates are given in Appendix D.

Simple Asphyxiants - "Inert" Gases or Vapors. A number of gases and vapors, when present in high concentrations in air, act primarily as simple asphyxiants without other significant physiologic effects. A TLV may not be recommended for each simple asphyxiant [illegible] factor is the [illegible] mal oxygen content should be 18 percent by volume under normal atmospheric pressure (equivalent to a partial pressure, pO_2 of 135 mm Hg). Atmospheres deficient in O_2 do not provide adequate warning and most simple asphyxiants are odorless. Several simple asphyxiants present an explosion hazard. Account should be taken of this factor in limiting the concentration of the asphyxiant. Specific examples are listed in Appendix E.

Physical Factors. It is recognized that such physical factors as heat, ultraviolet and ionizing radiation, humidity, abnormal pressure (altitude) and the like may place added stress on the body so that the effects from exposure at a threshold limit may be altered. Most of these stresses act adversely to increase the toxic response of a substance. Although most threshold limits have built-in safety factors to guard against adverse effects to moderate deviations from normal environments, the safety factors of most substances are not of such a magnitude as to take care of gross deviations. For example, continuous work at temperatures above 90°F or over-time extending the workweek more than 25%, might be considered gross deviations. In such instances judgment must be exercised in the proper adjustments of the threshold limit values.

"Notice of Intent." At the beginning of each year, proposed actions of the Committee for the forthcoming year are issued in the form of a "Notice of Intent." This Notice [illegible] not only an opportunity

suggestions should be accompanied by substantiating evidence. The list of Intended Changes follows the Adopted Values in the TLV booklet.

Legal Status. By publication in the Federal Register (Vol. 36, No. 105, May 29, 1971) the "Threshold Limit Values for 1970" are now official federal standards for industrial air, except for the American National Standards and except for certain values for mineral dusts.

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ADOPTED VALUES
(In Alphabetical Order)

Substance	ppm[a]	mg/M3[b]
Abate	--	10
** Acetaldehyde		
Acetic acid	10	25
** Acetic anhydride		
Acetone	1,000	2,400
Acetonitrile	40	70
* 2-Acetylaminofluorene-Skin	--	A[1]
Acetylene	E	--
Acetylene dichloride, see 1, 2 - Dichloroethylene	--	--
Acetylene tetrabromide	1	14
Acrolein	0.1	0.25
Acrylamide-Skin	--	0.3
Acrylonitrile-Skin	20	45
Aldrin-Skin	--	0.25
Allyl alcohol-Skin	2	5
Allyl chloride	1	3
**C Allyl glycidyl ether (AGE)		
Allyl propyl disulfide	2	12
Alundum (Al_2O_3)	--	D
* 4-Aminodiphenyl-Skin.	--	A[1]
2-Aminoethanol, see Ethanolamine	--	--
2-Aminopyridine	0.5	2
** Ammonia		
Ammonium sulfamate (Ammate)	--	10
n-Amyl acetate	100	525
sec-Amyl acetate	125	650
Aniline-Skin	5	19
Anisidine (o, p-isomers) -Skin	--	0.5
Antimony & compounds (as Sb)	--	0.5
ANTU (alpha naphthyl thiourea)	--	0.3
Argon	E	--
Arsenic & Compounds (as As)	--	0.5
Arsine	0.05	0.2
* Asphalt (petroleum) fumes	--	5
Azinphos methyl-Skin.	--	0.2
Barium (soluble compounds)	--	0.5
C Benzene (benzol)-Skin.	25	80
Benzidine-Skin	--	A[1]
p-Benzoquinone, see Quinone	--	--
Benzoyl peroxide	--	5
Benzyl chloride	1	5
Beryllium	--	0.002
Biphenyl, see Diphenyl	--	--
Boron oxide	--	10
Boron tribromide	1	10
C Boron trifluoride	1	3
Bromine	0.1	0.7
Bromine pentafluoride	0.1	0.7
Bromoform-Skin	0.5	5
Butadiene (1, 3-butadiene)	1,000	2,200
Butanethiol, see Butyl mercaptan	--	--
2-Butanone	200	590
2-Butoxy ethanol (Butyl Cellosolve) -Skin	50	240
Butyl acetate (n-butyl acetate)	150	710
sec-Butyl acetate	200	950
tert-Butyl acetate	200	950
Butyl alcohol	100	300
sec-Butyl alcohol	150	450
tert-Butyl alcohol	100	300
C Butylamine-Skin	5	15
C tert-Butyl chromate (as CrO_3) -Skin	--	0.1
n-Butyl glycidyl ether (BGE)	50	270
Butyl mercaptan	0.5	1.5
p-tert-Butyltoluene	10	60
Cadmium (Metal dust and soluble salts)	--	0.2
C Cadmium oxide fume (as Cd)	--	0.1
Calcium carbonate	--	D
Calcium arsenate	--	1
Calcium oxide	--	5
** Camphor (Synthetic)		
Carbaryl (Sevin®)	--	5
Carbon black	--	3.5
Carbon dioxide	5,000	9,000
Carbon disulfide-Skin	20	60
Carbon monoxide	50	55
Carbon tetrachloride -Skin	10	65
Cellulose (paper fiber)	--	D
Chlordane-Skin	--	0.5
Chlorinated camphene -Skin	--	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
α-Chloroacetophenone (phenacylchloride)	0.05	0.3

Footnotes (a thru h) see Page 28

*1971 Addition
**See Notice of Intended Changes

Capital letters refer to Appendices

*1971 Addition

Capital letters refer to Appendices

**See Notice of Intended Changes

01 133 055

Substance	ppm[a]	mg/M³[b]
Chlorobenzene (monochlorobenzene)	75	350
o-Chlorobenzylidene malononitrile (OCBM)	0.05	0.4
Chlorobromomethane	200	1,050
2-Chloro-1, 3-butadiene see Chloroprene	--	--
Chlorodiphenyl (42% Chlorine) -Skin	--	1
Chlorodiphenyl (54% Chlorine) -Skin	--	0.5
1-Chloro, 2, 3-epoxy-propane, see Epichlorhydrin	--	--
2-Chloroethanol, see Ethylene chloro-hydrin	--	--
Chloroethylene, see Vinyl chloride	--	--
**C Chloroform (trichloro-methane)		
1-Chloro-1-nitropro-pane	20	100
Chloropicrin	0.1	0.7
Chloroprene (2-chloro -1, 3-butadiene) -Skin		
Chromic acid and chromates (as CrO_3)	--	0.1
Chromium, sol. chromic, chromous salts as Cr	--	0.5
Metal & insol. salts	--	1
Coal tar pitch volatiles (benzene soluble fraction) anthracene, BaP, phenanthrene, acridine, chrysene, pyrene)	--	0.2

**See Notice of Intended Changes

Substance	ppm[a]	mg/M³[b]
Cobalt, metal fume & dust	--	0.1
Copper fume	--	0.1
Dusts and Mists	--	1
Corundum (Al_2O_3)	--	D
Cotton Dust (raw)	--	1
Crag® herbicide	--	10
Cresol (all isomers) -Skin	5	22
Crotonaldehyde	2	6
Cumene-Skin	50	245
Cyanide (as CN)-Skin	--	5
Cyanogen	10	--
Cyclohexane	300	1,050
Cyclohexanol	50	200
Cyclohexanone	50	200
Cyclohexene	300	1,015
Cyclopentadiene	75	200
2, 4-D	--	10
DDT-Skin	--	1
DDVP, see Dichlorvos	--	--
Decaborane-Skin	0.05	0.3
Demeton®-Skin	--	0.1
Diacetone alcohol (4-hydroxy-4-methyl-	50	
diamine	--	--
	0.2	0.4
Diborane	0.1	0.1
1, 2-Dibromoethane (ethylene dibromide) -Skin		
Dibrom®	--	3
Dibutyl phosphate	1	5
Dibutylphthalate	--	5
C Dichloroacetylene	0.1	0.4
C o-Dichlorobenzene	50	300

**See Notice of Intended Changes

Substance	ppm[a]	mg/M³[b]
p-Dichlorobenzene	75	450
* Dichlorobenzidine-Skin	--	A[1]
Dichlorodifluoromethane	1,000	4,950
1, 3-Dichloro-5, 5-di-methyl hydantoin	--	0.2
** 1, 1-Dichloroethane		
1, 2-Dichloroethane	50	200
1, 2-Dichloroethylene	200	790
** Dichloroethyl ether-Skin		
Dichloromethane, see Methylene chloride	--	--
Dichloromonofluor-methane	1,000	4,200
C 1,1-Dichloro-1-nitroethane	10	60
1,2-Dichloropropane, see Propylene-dichloride	--	--
Dichlorotetrafluoro-ethane	1,000	7,000
Dichlorvos (DDVP) -Skin	--	1
Dieldrin-Skin	--	0.25
Diethylamine	25	75
	10	50
-Skin		
Diethylether, see Ethyl ether	--	--
Difluorodibromo-methane	100	860
C Diglycidyl ether (DGE)	0.5	2.8
Dihydroxybenzene, see Hydroquinone	--	--
** Diisobutyl ketone		
Diisopropylamine-Skin	5	20

Capital letters refer to Appendices

*1971 Addition

**See Notice of Intended Changes

01 133 0560

Substance	ppm[a]	mg/M3[b]
Dimethoxymethane, see Methylal	--	--
Dimethyl acetamide -Skin	10	35
Dimethylamine	10	18
*4-Dimethylaminoazobenzene	--	A[1]
Dimethylaminobenzene, see Xylidene	--	--
Dimethylaniline (N-dimethylaniline) -Skin	5	25
Dimethylbenzene Xylene	--	--
Dimethyl 1, 2-dibromo-2-dichloroethyl phosphate, see DiBrom		--
Dimethylformamide -Skin	10	30
2, 6-Dimethylheptanone, see Diisobutyl ketone	--	--
1, 1-Dimethylhydrazine -Skin	0.5	1
Dimethylphthalate	--	5
Dimethylsulfate-Skin	1	5
Dinitrobenzene (all isomers)-Skin	--	1
Dinitro-o-cresol-Skin	--	0.2
Dinitrotoluene-Skin	--	1.5
Dioxane (Diethylene dioxide)-Skin	100	360
Diphenyl	0.2	1
Diphenyl amine	--	10
Diphenylmethane diisocyanate (see Methylene bisphenyl isocyanate (MDI)	--	--

Capital letters refer to Appendices

*1971 Addition

Substance	ppm[a]	mg/M3[b]
Dipropylene glycol methyl ether-Skin	100	600
Di-sec, octyl phthalate (Di-2-ethylhexyl-phthalate)	--	5
Emery	--	D
Endosulfan (Thiodan®) -Skin	--	0.1
Endrin-Skin	--	0.1
Epichlorhydrin-Skin	5	19
EPN-Skin	--	0.5
1, 2-Epoxypropane, -see Propylene-oxide	--	--
2, 3-Epoxy-1-propanol, see Glycidol	--	--
Ethane	E	--
Ethanethiol, see Ethyl-mercaptan	--	--
Ethanolamine	3	6
**2-Ethoxyethanol-Skin		
2-Ethoxyethylacetate (Cellosolve acetate) -Skin	100	540
Ethyl acetate	400	1,400
Ethyl acrylate-Skin	25	100
Ethyl alcohol (ethanol)	1,000	1,900
Ethylamine	10	18
Ethyl sec-amyl ketone (5-methyl-3-heptanone)	25	130
Ethyl benzene	100	435
Ethyl bromide	200	890
Ethyl butyl ketone (3-Heptanone)	50	230
Ethyl chloride	1,000	2,600
Ethyl ether	400	1,200
Ethyl formate	100	300

Capital letters refer to Appendices

**See Notice of Intended Changes

Substance	ppm[a]	mg/M3[b]
Ethyl mercaptan	0.5	1
Ethyl silicate	100	850
Ethylene	E	--
Ethylene chlorohydrin -Skin	5	16
Ethylenediamine	10	25
Ethylene dibromide, see 1, 2-Dibromo-ethane	--	--
Ethylene dichloride, see 1, 2-Dichloro-ethane	--	--
C Ethylene glycol dinitrate and/or Nitroglycerin-Skin	0.2[d]	--
Ethylene glycol monomethyl ether acetate (Methyl cellosolve acetate)-Skin	25	120
Ethylene imine-Skin	0.5	1
Ethylene oxide	50	90
Ethylidine chloride, see 1, 1-Dichloro-ethane	--	--
N-Ethylmorpholine -Skin	20	94
Ferbam	--	10
Ferrovanadium dust	--	1
Fluoride (as F)	--	2.5
**Fluorine		
Fluorotrichloromethane	1,000	6,600
**C Formaldehyde	5	6
Formic acid	5	9
Furfuryl-Skin	5	20
**Furfuryl alcohol		
Gasoline	--	A[3]
Glass, fibrous[e] or dust		D

Footnotes (a thru h) see Page 28

Capital letters refer to Appendices

**See Notice of Intended Changes

01 133 0561

Substance	ppm[a]	mg/M3[b]
Glycerin mist	--	D
Glycidol (2, 3-Epoxy-1-propanol)	50	150
Glycol monoethyl ether, see 2-Ethoxyethanol	--	--
Graphite, (Synthetic)	--	D
Guthion, ⊙ see Azinphos-methyl	--	--
Gypsum	--	D
Hafnium	--	0.5
Helium	E	--
Heptachlor-Skin	--	0.5
Heptane (n-heptane)	500	2,000
Hexachloroethane -Skin	1	10
Hexachloronaphthalene -Skin	--	0.2
Hexane (n-hexane)	500	1,800
2-Hexanone	100	410
Hexone (Methyl isobutyl ketone)	100	410
sec-Hexyl acetate	50	300
Hydrazine-Skin	1	1.3
Hydrogen	E	--
Hydrogen bromide	3	10
C Hydrogen chloride	5	7
Hydrogen cyanide		
Hydrogen fluoride		
Hydrogen peroxide	1	1.4
Hydrogen selenide	0.05	0.2
Hydrogen sulfide	10	15
Hydroquinone	--	2
Indene	10	45
Indium and compounds, as In	--	0.1
C Iodine	0.1	1
Iron oxide fume	--	10
Iron salts, soluble, as Fe	--	1
Isoamyl acetate	100	525
Isoamyl alcohol	100	360
Isobutyl acetate	150	700
Isobutyl alcohol	100	300
**Isophorone		
Isopropyl acetate	250	950
Isopropyl alcohol	400	980
Isopropylamine	5	12
**Isopropylether		
Isopropyl glycidyl ether (IGE)	50	240
Kaolin	--	D
Ketene	0.5	0.9
**Lead		
Lead arsenate	--	0.15
Limestone	--	D
Lindane-Skin	--	0.5
Lithium hydride	--	0.025
L.P.G. (Liquified petroleum gas)	1,000	1,800
Magnesite	--	D
Magnesium oxide fume	--	10
Malathion-Skin	--	10
Maleic anhydride	0.25	1
Mercury (Alkyl compounds)-Skin	--	0.01
Mercury (All forms except alkyl)	--	0.05
Mesityl oxide	25	100
Methane	E	--
Methanethiol, see Methyl mercaptan	--	--
Methoxychlor	--	10
2-Methoxyethanol-Skin (Methyl cellosolve)	25	80
Methyl acetate	200	610
Methyl acetylene (propyne)	1,000	1,650
Methyl acetylene-propadiene mixture (MAPP)	1,000	1,800
Methyl acrylate-Skin	10	35
Methylal (dimethoxy-methane)	1,000	3,100
Methyl alcohol (methanol)	200	260
Methylamine	10	12
Methyl amyl alcohol, see Methyl isobutyl carbinol	--	--
*Methyl 2-cyanoacrylate	2	8
Methyl isoamyl ketone	100	475
Methyl (n-amyl) ketone (2-Heptanone)	100	465
**Methyl bromide-Skin		
Methyl butyl ketone, see 2-Hexanone	--	--
Methyl cellosolve-Skin, see 2-Methoxyethanol	--	--
Methyl cellosolve acetate		
		--
**C Methyl chloride	100	210
Methyl chloroform	350	1,900
Methylcyclohexane	500	2,000
**Methylcyclohexanol		
**o-Methylcyclohexanone-Skin		
Methylcyclopentadienyl manganese tricarbonyl (as Mn)-Skin	0.1	0.2
*Methyl demeton-Skin	--	0.5

Capital letters refer to Appendices

**See Notice of Intended Changes

*1971 Addition

01 133 0562

Substance	ppm[a]	mg/M³[b]
Methyl ethyl ketone (MEK), see 2-Butanone	--	--
Methyl formate	100	250
Methyl iodide-Skin	5	28
Methyl isobutyl carbinol-Skin	25	100
Methyl isobutyl ketone, see Hexone	--	--
Methyl isocyanate -Skin	0.02	0.05
Methyl mercaptan	0.5	1
Methyl methacrylate	100	410
*Methyl parathion-Skin	--	0.2
Methyl propyl ketone, see 2-Pentanone	--	--
C Methyl silicate	5	30
C α Methyl styrene	100	480
C Methylene bisphenyl isocyanate (MDI)	0.02	0.2
Methylene chloride (dichloromethane)	500	1,740
Molybdenum (soluble compounds)	--	5
(insoluble compounds)	--	10
Monomethyl aniline -Skin	2	9
C Monomethyl hydrazine-Skin	0.2	0.35
Morpholine-Skin	20	70
Naphtha (coal tar)	100	400
Naphthalene	10	50
β-Naphthylamine	--	A[1]
Neon	E	--
Nickel carbonyl	0.001	0.007
Nickel, metal and soluble cmpds, as Ni	--	1

Capital letters refer to Appendices
*1971 Addition

Substance	ppm[a]	mg/M³[b]
Nicotine-Skin	--	0.5
Nitric acid	2	5
Nitric oxide	25	30
p-Nitroaniline-Skin	1	6
Nitrobenzene-Skin	1	5
p-Nitrochlorobenzene -Skin	--	1
Nitroethane	100	310
Nitrogen	E	--
C Nitrogen dioxide	5	9
Nitrogen trifl		29
Nitroglycerin-Skin	0.2	2
Nitromethane	100	250
1-Nitropropane	25	90
2-Nitropropane	25	90
N-Nitrosodimethylamine (dimethylnitrosoamine) -Skin	--	A[1]
Nitrotoluene-Skin	5	30
Nitrotrichloromethane see Chloropicrin	--	--
Nitrous oxide	E	--
Octachloronaphthalene-Skin	--	0.1
Octane	400	1,900
Oil mist, particulate	--	5[f]
Oil mist, vapor	g)A[3]	--
Osmium tetroxide	--	0.002
Oxalic acid	--	1
Oxygen difluoride	0.05	0.1
Ozone	0.1	0.2
Paraquat-Skin	--	0.5
Parathion-Skin	--	0.1
Pentaborane	0.005	0.01
Pentachloronaphthalene-Skin	--	0.5
Pentachlorophenol -Skin	--	0.5

Footnotes (a thru h) see Page 28
Capital letters refer to Appendices

Substance	ppm[a]	mg/M³[b]
Pentaerythritol	--	D
Pentane	500	1,500
2-Pentanone	200	700
Perchloroethylene	100	670
Perchloromethyl mercaptan	0.1	0.8
Perchloryl fluoride	3	14
Petroleum Distillates (naphtha)	g)A[3]	
Phenol-Skin	5	19
p-Phenylene diamine -Skin	--	0.1
Phenyl ether (vapor)	1	7
Phenyl ether-Diphenyl mixture (vapor)	1	7
Phenylethylene, see Styrene	--	--
Phenyl glycidyl ether (PGE)	10	60
Phenylhydrazine -Skin	5	22
*Phenothiazine-Skin	--	5
Phosdrin (Mevinphos©) -Skin	--	0.1
Phosgene (carbonyl chloride	0.1	0.4
Phosphine	0.3	0.4
Phosphoric acid	--	1
Phosphorus (yellow)	--	0.1
Phosphoris pentachloride	--	1
Phosphorus pentasulfide	--	1
Phosphorus trichloride	0.5	3
Phthalic anhydride	2	12
Picric acid-Skin	--	0.1

Footnotes (a thru h) see Page 28
Capital letters refer to Appendices
*1971 Addition

01 133 0563

Substance	ppm[a]	mg/M3[b]
Pival®(2-Pivalyl-1, 3-indandione) ...	--	0.1
Plaster of Paris....	--	D
Platinum (Soluble Salts) as Pt.....	--	0.002
Polytetrafluoroethylene decomposition products	--	A2
Propane	E	--
β Propiolactone	--	A1
Propargyl alcohol -Skin	1	--
n-Propyl acetate ...	200	840
Propyl alcohol	200	500
n-Propyl nitrate ...	25	110
Propylene dichloride (1, 2-Dichloropropane).....	75	350
Propylene imine -Skin	2	5
Propylene oxide....	100	240
Propyne, see Methylacetylene	--	--
Pyrethrum.....	--	5
Pyridine	5	15
Quinone	0.1	
RDX-Skin		
Rhodium, Metal fume and dusts, as Rh...	--	0.1
Soluble salts	--	0.001
Ronnel	--	10
Rotenone (commercial).....	--	5
Rouge	--	D
Selenium compounds (as Se)	--	0.2
Selenium hexafluoride	0.05	0.4
Silicon carbide.....	--	D

Capital letters refer to Appendices

Substance	ppm[a]	mg/M3[b]
Silver, metal and soluble compounds	--	0.01
Sodium fluoroacetate (1080)-Skin	--	0.05
Sodium hydroxide ..	--	2
Starch	--	D
Stibine	0.1	0.5
Stoddard solvent ...	200	1,150
Strychnine.....	--	0.15
*Styrene (phenylethylene).....	100	420
Sucrose	--	D
Sulfur dioxide.....	5	13
Sulfur hexafluoride .	1,000	6,000
Sulfuric acid.....	--	1
Sulfur monochloride	1	6
Sulfur pentafluoride	0.025	0.25
Sulfuryl fluoride....	5	20
Systox, see Demeton®	--	--
2, 4, 5 T.....	--	10
Tantalum.....	--	0.2
TEDP-Skin	--	0.2
Teflon®decomposition products.....	--	A2
Tellurium		0.1
CTerphenyls	1	9
1, 1, 1, 2-Tetrachloro-2, 2-difluoroethane	500	4,170
1, 1, 2, 2-Tetrachloro-1, 2-difluoroethane	500	4,170
1, 1, 2, 2-Tetrachloroethane-Skin.....	5	35
Tetrachloroethylene, see Perchloroethylene.....	--	--

Capital letters refer to Appendices

*1971 Addition

Substance	ppm[a]	mg/M3[b]
Tetrachloromethane, see Carbon tetrachloride		
Tetrachloronaphthalene-Skin	--	2
Tetraethyl lead (as Pb) -Skin	--	0.100[h]
Tetrahydrofuran	200	590
Tetramethyl lead (as Pb) -Skin	--	0.150[h]
Tetramethyl succinonitrile-Skin.....	0.5	3
Tetranitromethane...	1	8
Tetryl (2, 4, 6-trinitrophenyl-methylnitramine)-Skin ...	--	1.5
Thallium (soluble compounds)-Skin (as Tl)	--	0.1
Thiram.....	--	5
Tin (inorganic cmpds, except SnH_4 and SnO_2) as Sn.....	--	2
Tin (organic cmpds) -Skin (as Sn).....	--	0.1
Tin oxide.....	--	D
	--	D
nate.....	0.02	0.14
o-Toluidine.....	5	22
Toxaphene, see Chlorinated camphene .	--	--
Tributyl phosphate ..	--	5
1, 1, 1-Trichloroethane, see Methyl chloroform	--	--
1, 1, 2-Trichloroethane-Skin	10	45
Trichloroethylene ...	100	535

Footnotes (a thru h) see Page 28

**See Notice of Intended Changes

01 133 0564

Substance	ppm[a]	mg/M^3[b]
Trichloromethane, see Chloroform ..	--	--
Trichloronaphthalene -Skin	--	5
1, 2, 3-Trichloropropane	50	300
1, 1, 2-Trichloro 1, 2, 2-trifluoroethane .	1,000	7,600
Triethylamine	25	100
Trifluoromonobromomethane	1,000	6,100
Trimethyl benzene ..	25	120
2, 4, 6-Trinitrophenol, see Picric acid ..	--	--
2, 4, 6-Trinitrophenylmethylnitramine, see Tetryl	--	--
Trinitrotoluene-Skin .	--	1.5
Triorthocresyl phosphate	--	0.1
Triphenyl phosphate .	--	3
Tungsten & compounds, as W		
Soluble.....	--	1
Insoluble.....	--	5
Turpentine	100	560
Uranium (natural) sol. & insol. compounds as U	--	0.2
C Vanadium (V_2O_5 dust)	--	0.5
(V_2O_5 fume)	--	0.1
* Vinyl acetate	10	30
Vinyl benzene, see Styrene	--	--
**C Vinyl chloride		
Vinylcyanide, see Acrylonitrile	--	--
Vinyl toluene	100	480
Warfarin	--	0.1

*1971 Addition
**See Notice of Intended Changes

Substance	ppm[a]	mg/M^3[b]
Xylene (xylol).....	100	435
Xylidine-Skin	5	25
Yttrium.....	--	1
Zinc chloride fume ..	--	1
Zinc oxide fume.....	--	5
Zirconium compounds (as Zr).....	--	5

a) Parts of vapor or gas per million parts of contaminated air at 25°C and 760

b) Approxi per cubic meter of air.

d) An atmospheric concentration of not more than 0.02 ppm, or personal protection may be necessary to avoid headache.

e) <5-7m in diameter.

f) As sampled by method that does not collect vapor.

g) According to analytically determined composition.

h) For control of general room air, biologic monitoring is essential for personnel control.

Radioactivity: For permissible concentrations of radioisotopes in air, see U.S. Department of Commerce, National Bureau of Standards Handbook 69, "Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure," June 5, 1959. Also, see U.S. Department of Commerce National Bureau of Standards, Handbook 59, "Permissible Dose from External Sources of Ionizing Radiation," September 24, 1954, and addendum of April 15, 1958. A report, Basic Radiation Protection Criteria, published by the National Committee on Radiation Protection, revises and modernizes the concept of the NCRP standards of 1954, 1957 and 1958; obtainable as NCRP Rept. No. 39, P.O. Box 4867, Washington, D.C. 20008.

*1971 Addition
**See Notice of Intended Changes

MINERAL DUSTS

Substance	m.p.p.c.f.[i]
SILICA, Crystalline	
**Quartz, ...	--
**Cristobalite, Crystalline	--
Amorphous, including natural diatomaceous earth	20
SILICATES (less than 1% crystalline silica)	
**Asbestos, all types	
Mica	20
Perlite	30
Portland Cement ..	50
Soapstone	20
Talc (non-asbestiform).....	20
Talc (fibrous) use asbestos limit	--
Tremolite (see Talc, fibrous)...	--
Graphite (natural) ...	15

01 133 0565

**"Inert" or Nuisance Particulates . see Appendix D	30 (or 10 mg/M^3 whichever is the smaller) of total dust <1% SiO_2

Conversion factors

mppcf x 35.3 = million particles per cubic meter
= particles per c.c.

i) Millions of particles per cubic foot of air, based on impinger samples counted by light-field technics.

**See Notice of Intended Changes for Mineral Dusts.

NOTICE OF INTENDED CHANGES (for 1971)

These substances, with their corresponding values, comprise those for which either a limit has been proposed for the first time, or for which a change in the "Adopted" listing has been proposed. In both cases, the proposed limits should be considered trial limits that will remain in the listing for a period of at least two years. If, after two years no evidence comes to light that questions the appropriateness of the values herein, the values will be reconsidered for the "Adopted" list. Documentation is available for each of these substances.

SUBSTANCE	ppm a)	mg/M^3 b)
+ Acetaldehyde	100	180
+ C Acetic anhydride	5	20
Allyl glycidyl ether	5	22
+ Bismuth telluride	--	10
+ Bismuth telluride (Se-doped)	--	5
+ Butane	500	1200
Butyl lactate	1	5
Camphor (synthetic)	2	12
+ Caprolactam (2-Oxohexamethylenimine)	--	5
+ Chloroform (trichloromethane)	25	120
Diazinon-Skin	--	0.1
+ 1, 2-Dibromoethane (ethylene dibromide) -Skin	20	145
2-N Dibutylamino-ethanol-Skin	2	14
+ 1, 1-Dichloroethane	200	820
+ Dichloroethyl ether -Skin	5	30
Diethylene triamine -Skin	1	4
+ Diisobutyl ketone	25	150
+ Diquat	--	0.5
+ Ethylene glycol, particulate	--	10
+ Ethylene glycol, vapor	100	260
+ 2-Ethoxyethanol-Skin	100	370
+ Fluorine	1	2
C Formaldehyde	2	3
+ Furfuryl alcohol	5	20
+ Hexachlorocyclopentadiene	0.1	1
+ Hexafluoroacetone	0.1	0.7
Iron pentacarbonyl	0.01	0.08
	10	55
		1050
[illegible] inorganic compounds fumes & dusts	--	0.15
+ Methylacrylonitrile -Skin	1	3
+ Methyl bromide-Skin	15	60
Methyl chloride	100	210
+ Methyl cyclohexanol	50	235
+ o-Methyl cyclohexanone -Skin	50	230

+ 1971 Revision or Addition
Capital letters refer to Appendices

+ 1971 Revision or Addition
Capital letters refer to Appendices

01 133 0566

SUBSTANCE	ppm[a]	mg/M³[b]
Methylcyclopentadienyl manganese tricarbonyl (as Mn)-Skin	0.1	0.2
+ Mineral wool fiber	--	D
+ Paraffin wax fume	--	1
+ Perlite	--	30mppcf
+ C Phenylphosphine	0.05	0.25
Propylene glycol monomethyl ether	100	360
Rosin Core Solder pyrolysis products (as formaldehyde)	--	0.1
+ Silicon	--	10
C Subtilisins (Proteolytic enzymes) (as 100% pure crystalline enzyme)	--	0.0003
+ Sulfur tetrafluoride	0.1	0.4
+ Toluene	100	375
Vanadium (V_2O_5 Fume) as V	--	0.05
Vinyl bromide	250	1100
Vinyl chloride	200	770
Wood dust (nonallergenic)	--	5

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

b) Approximate milligrams of particulate per cubic meter of air.

+ 1971 Revision or Addition
Capital letters refer to Appendices

NOTICE OF INTENDED CHANGES (Cont'd)
MINERAL DUSTS

SUBSTANCE	TLV
• Asbestos (All types) • Coal dust (bituminous)	5 fibers/ml > 5μ in length[j] 2 mg/m³ (respirable dust[k])
Cristobalite	Use one-half the value calculated from the count or mass formulae for quartz.
• 'Inert' or Nuisance Particulates	10 mg/M³ or 30 mppcf (whichever is the smaller) of total dust < 1% SiO_2
• Quartz	TLV in mppcf: $\frac{300^{m)}}{\% \text{ quartz} + 10}$ TLV for respirable dust in mg/m³: $\frac{10 \text{ mg/M}^{3n)}}{\% \text{ Respirable quartz} \times 2}$ TLV for "total dust", respirable and nonrespirable: $\frac{30 \text{ mg/M}^3}{\% \text{ quartz} + 3}$
Silica, fused	Use quartz formulae
Tridymite	Use one-half the value calculated from formulae for quartz.

j) As determined by the membrane filter method at 400-450 X magnification (4 mm objective) phase contrast illumination. Concentrations 5 fibers/ml but not to exceed 10, may be permitted for 15-minute periods each hour up to five times daily.

k) "Respirable" dust as defined by the British Medical Research Council Criteria (1) and as sampled by a device producing equivalent results (2).

(1) Hatch, T.E. and Gross, P., Pulmonary Deposition and Retention of Inhaled Aerosols, p. 149. Academic Press, New York, New York, 1964.

(2) Interim Guide for Respirable Mass Sampling, AIHA Aerosol Technology Committee, AIHA J: 31, 2, 1970, p. 133.

m) The percentage of crystalline silica in the formula is the value determined from airborne samples, except in those instances in which other methods have been shown to be applicable.

n) Both concentration and per cent quartz for the application of this limit are to be determined from the fraction passing a size-selector with the following characteristics:

Aerodynamic Diameter (μm) (unit density sphere)	% passing selector
≤ 2	90
2.5	75
3.5	50
5.0	25
10	0

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APPENDIX A

A[1] Because of the high incidence of cancer, either in man or animals, no exposure or contact by any route, respiratory, oral or skin should be permitted for the compounds:

2-Acetylaminofluorene
4-Aminodiphenyl
Benzidine & its salts
Dichlorobenzidine
4-Dimethylaminoazobenzene
beta-Naphthylamine
4-Nitrodiphenyl
N-Nitrosodimethylamine
beta-Propiolactone

Because of the extremely high incidence of bladder tumors in workers handling beta-naphthylamine and the potential carcinogenic activity of the other compounds, the State of Pennsylvania prohibits the manufacture, use and other activites that involve human exposure without express approval by the Department [illegible]

A[2] Polytet[illegible] tion products. Thermal decomposition of the fluorocarbon chain in air leads to the formation of oxidized products containing carbon, fluorine and oxygen Because these products decompose in part by hydrolysis in alkaline solution, they can be quantitatively determined in air as fluoride to provide an index of exposure. No TLV is recommended pending determination of the toxicity of the products, but air concentrations should be minimal.

A[3] Gasoline and/or Petroleum Distillates. The composition of these materials varies greatly and thus a single TLV for all types of these materials is no longer applicable. In general, the aromatic hydrocarbon content will determine what TLV applies. Consequently the content of benzene, other aromatics and additives should be determined to arrive at the appropriate TLV (Elkins, et al. A.I.H.A.J. 24, 99, 1963).

* Trade Names Algoflon, Fluon, Halon, Teflon, Tetran

APPENDIX B

B.1 THRESHOLD LIMIT VALUES FOR MIXTURES

[illegible] 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,

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

exceeds unity, then the threshold limit of the mixture should be considered as being exceeded. C_1 indicates the observed atmospheric concentration, and T_1 the corresponding threshold limit, (See Example 1A.a.).

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 $\left(\frac{C_1}{T_1} \text{ or } + \frac{C_2}{T_2} \text{ etc.}\right)$ itself has a value exceeding unity, (See Example 1A.b.).

2

Antagonistic action or potentiation may [illegible] combinations of atmospheres at present [illegible] 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 (trichloro

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ethylene). 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).

THRESHOLD LIMIT VALUES FOR MIXTURES

EXAMPLES

1A. General case, where air is analyzed for each component:

a. Additive effects. (note: It is essential that the atmosphere be analyzed both qualitatively and quantitatively for each component present, in order to evaluate compliance or noncompliance with this calculated TLV.)

$$\frac{C_1}{T_1} + \frac{C_2}{T_2} + \frac{C_3}{T_3} + \ldots\ldots = 1$$

Example No. 1: Air contains 5 ppm of carbon tetrachloride (TLV = 10 ppm) 20 ppm of ethylene dichloride (TLV = 50 ppm) and 10 ppm of ethylene dibromide (TLV = 25 ppm)

Atmospheric concentration of mixture =

5 + 20 + 10 = 35 ppm of mixture

$$\frac{5}{10} + \frac{20}{50} + \frac{10}{25} = \frac{25 + 20 + 20}{50} = 1.3$$

Threshold Limit is exceeded. Furthermore, the TLV of this mixture may be calculated by reducing the total fraction to 1.0; i.e.

$$\text{TLV of mixture} = \frac{35}{1.3} = 27 \text{ ppm}$$

Example No. 2: Air contains 200 ppm of hexane (TLV = 500 ppm) 100 ppm of methylene chloride (TLV = 500 ppm) and 20 ppm of perchlorethylene (TLV-100ppm)

Atmospheric concentration of mixture =

200 + 100 + 20 = 320 ppm of mixture

$$\frac{200}{500} + \frac{100}{500} + \frac{20}{100} \quad 200, 100, 100 \text{ ppm}$$

Threshold Limit is not exceeded. The TLV of this mixture = $\frac{320}{0.8}$ = 400ppm

1B. Special case when the source of contaminant is a liquid mixture and the atmospheric composition is assumed to be similar to that of the original material; e.g. on a time weighted average exposure basis, all of the liquid (solvent) mixture eventually evaporates.

a. Additive effects (approximate solution)

1. The percent composition (by weight) of the liquid mixture is known, the TLVs of the constituents must be listed in mg/M^3.

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Industrial Health Foundation
5231 Centre Avenue
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INDUSTRIAL HYGIENE DIGEST

LITERATURE AND NEWS

NEWS ITEMS

1130 EMOTIONALISM CITED IN POLLUTION EFFORTS.

American industry's efforts to improve the environment are being handicapped by legislation and regulations "based on incomplete, inconclusive and inaccurate information," Miles O. Colwell, M.D., vice president-health and environment for Aluminum Co. of America, told a meeting of the Inland Empire Waterways Association. "There is evidence that some states are ignoring completely the social and economic impact of their proposed and promulgated emission regulations. Their actions may well contribute to limiting the construction of new and the expansion of old facilities. They may unnecessarily restrict the production of consumer goods, the rendering of necessary service, and the creation of new jobs." He predicted that adequate environmental control would cost the nation "billions of dollars in the near future." Much early environmental legislation was unduly influenced "by emotionalism and irrational rhetoric." Too often, he said, timetables for improving conditions are arbitrary and unreasonable. While deadlines for halting toxic effluents from industrial facilities should be "quick, hard and fast," such harsh action against marginal plants with only "nuisance-type" emissions may force them to close because they don't have time to comply with restrictions. Pollution never will be eliminated, Dr. Colwell declared. "Pollution unfortunately is a by-product of production. The pristine environment sought by idealists and visionaries will come on the day we do away with jobs, with industry, with automobiles and airplanes, the day we begin to do without heat and light, the day we stop producing mountains of solid waste, in short, on the day man disappears from the face of the earth."

--Pittsburgh Post-Gazette October 19, 1971

Editor's Note: Reinforcing Dr. Colwell's opinions in an editorial viewpoint entitled "No quick and easy solutions" Abel Wolman of Johns Hopkins University quotes Publilius Syrus: Sententiae,(c.50 B.C.) as follows: "What is done hastily cannot be done prudently" citing the recent commentary of the General Accounting Office (GAO) on the accomplishments, or the lack of them, in pollution abatement to justify the quotation. The American public, its vocal leaders, and its vociferous groups have given almost unanimous consent to the desire for protecting and enhancing the quality of our environment. Legislators have rushed through the passage of dozens of bills translating this public enthusiasm into legislative fiat. Now comes the GAO with the not surprising suggestion that the decibels of rhetoric far exceed the record of accomplishment. It is not improbable that as much money was spent for abatement before the great surge of federal acts as after. Of greater significance to the citizen, however, is the official stand that the legal club is the answer to the environmental prayer. The deliberate policy, to make up for lost time and to erase all of the sins of the past, is to haul all offenders into court. This has a fascination for all devotees of an improved quality of life. Since even this policy is too slow for some, it is now being suggested that offenders be prosecuted upon a showing that they have violated a set of standards to be written into future law. Away with slothful administrators, less than diligent courts, and conniving violators. A charming accompaniment of this desire for the "instant enzyme" of corrective is the advent of the espionage system now being enthusiastically supported by some. If you detect a violation, report it. If the violator is convicted and fined, you get half the

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fine! A true neighborly virtue now being nurtured in the great cause of environmental protection (with the presumed legal sanction of "the bounty hunter" provision in the 1899 Rivers and Harbors Act). A more subtle, and perhaps more damaging, principle has emerged in the last few years, also assumed to be warranted in the good cause. It has been publicly paraphrased in the statement that "if you are ignorant of the possible effect of a material or an action, prohibit its use or its implementation." On the face of it, this pronouncement makes sense, but on examination it moves into nonsense. There really can be no answer to the casuistry embodied in the question "Who knows, but that such and such might some day do something?" If applied to anything we do or have done, the answer is bound to be less than definitive. The real difficulty in quick and easy solutions to problems generated in the environment rests forever in the fact that the issues are rarely, if ever, black or white. Their diagnosis and ultimate solution to the degradation they may or may not create lie in a joint assessment of tangible and intangible benefits and costs. Such assessments are complex, time consuming, irritating, and inevitably unsatisfactory to some. --Environ. Sci. Technol. 5: 981 (Oct.) 1971

1131 LABOR DEPARTMENT'S STANDARD FOR ASBESTOS CHALLENGED.

A New York physician associated with studies relating to asbestosis, a lung disease found among insulation workers, has taken strong exception to the Labor Department's standard for asbestos exposure among workers. In a letter to the Labor Secretary, Irvin J. Selikoff, M.D., chief, Division of Environmental Medicine, Mt. Sinai Hospital, New York City, said the asbestos standard published by the Labor Department as part of its initial standards package "is so wrong, and represents such serious hazard to workmen, that I advise its urgent revision." The standard for asbestos would allow workmen to be exposed to environments containing as many as 12 fibers per cubic centimeter of air, Dr. Selikoff noted. "Our research in one asbestos trade - insulation work - demonstrates that work in the past in areas with levels of two to three fibers per centimeter of air has resulted in a very great increase of death due to cancer and to asbestosis." Dr. Selikoff also stated in his letter that the proppsed level is much higher than actually now exists. "It is so high as to make totally ineffective current efforts by both industry and labor to control this unhappy occupational health hazard."

--Occ. Safety & Health Reporter p. 361 Sept. 9, 1971

Editor's Note: The Threshold Limit Value (TLV) notice of intended changes for 1971 published by the American Conference of Governmental Industrial Hygienists (see Nov. 1970 issue of the Industrial Hygiene Digest) on Asbestos cites not 12 but 5 fibers per cc. This is an intended value which is subject to revision at any time that new data becomes available: all TL intended values were scheduled to be reconsidered at the November 18 and 19 meeting of the TLV Committee, the British proposal (2 fibers 5um/cc) among them. The results of this re-evaluation will be incorporated in the intended changes for 1972 which are published in January ordinarily in the Industrial Hygiene Digest. --P. G.

1132 CABINET HEALTH DEPARTMENT URGED.

Legislation to create a separate federal Department of Health with Cabinet rank and direct access to the President will be introduced soon by Rep. Paul G. Rogers (D., Fla.), House Commerce Subcommittee chairman. The new health post he suggests would be headed up by "a good administrator" and "a top medical officer" such as the surgeon general of the U.S. Public Health Service. Announcing his plans at the American Hospital Association's recent annual convention, Rep. Rogers said a separate department is needed because the Department of Health, Education, and Welfare is overtaxed and "concern for health programs is running a poor third. The nation's health needs have been relegated to stepchild status."

--Amer. Med. News Sept. 6, 1971

Editor's Note: Addressing the First National Association of Manufacturers Joint Policy Committee Conference on "Industry-Government Dialogue for Action" on November 11, Dr. deTreville identified the above mentioned need recommending that the individual chosen by President Nixon be an advisor who is a

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physician deeply committed to health and safety of the public and thus of the workforce, (which makes up such a large percentage of the adult population of working age). It would be unfortunate to perpetuate any longer than necessary a system which still so often necessitates "illness" or "injury" as prerequisites to authorization and delivery of prepaid preventive health services to workers and their dependents. --M. C. C.

1133 WHEN CONDUCTING SOME CHEMICAL REACTIONS BE SURE SUN IS RIGHT.

When a chemist cannot duplicate a reaction he has carried out before, he may shrug off his frustration with a whimsical explanation, such as he stirred in the wrong direction, it was the wrong sunspot configuration, or the phase of the moon was wrong. No one has taken such explanations seriously until recently when a group of Russian scientists reported on a reaction which seems to vary according to the season of the year (Chem. Abst., 1970, 72, 11054d). The reaction, a photocondensation of phenanthrene compounds with maleic anhydride by artificial ultraviolet and infrared radiation followed three different reaction paths and yielded different ratios of products in spring, summer, and fall. The scientists conducted some 450 experiments over a 3½-year period. They ruled out such variables as reaction medium, temperature, and source, intensity, and wavelength of radiation. They finally concluded that the yields of the various products "may be influenced by factors which are determined by sun-earth interactions." --Chemistry 44: 5 (November) 1971

1134 THREAT OF LEAD IN AIR QUESTIONED.

According to a lengthy report by a National Research Council panel and prepared for the Environmental Protection Agency, the concentration of lead in the air of central cities is not an "identifiable current threat" to the general population. In the blood of the average city dweller, the lead concentration, the report says, is about half that necessary to cause biochemical changes in the body and about one fourth that at which the symptoms of lead poisoning begin to occur. Since airborne lead comes mainly from the combustion and dispersal of lead additives in gasoline, people exposed to unusually large amounts of automobile exhausts face a greater risk than does the average city dweller. In this high-risk group are traffic policemen, garage workers, and automobile mechanics. Also subject to such greater hazards are workers in lead-using industries. Even they, however, would have to develop much higher blood-lead concentrations than they actually do to show signs of lead poisoning, the report says. In the biggest U.S. cities, the air contains an average of about 20 times as much lead as does air in rural areas. However, because of the high degree of dispersal of automobile combustion products, the air's average lead content in most major American cities has not risen appreciably in the past 15 years, despite the marked increase in the use of cars.

--Chem. Eng. News 49: 13 (Sept. 13) 1971

1135 X-RADIATION TO TELEVISION SERVICEMEN.

Television servicemen in some instances are exposed to small amounts of x radiation while working on color TV receivers but the public health significance of their exposure is "minimal." This is the conclusion of a report by the HEW Bureau of Radiological Health on findings of an x-ray exposure survey of 70 Baltimore, Maryland TV repair shops. Bureau Director John C. Villforth pointed out that servicemen, unlike color TV viewers, often must be close to operating x-ray sources such as picture and high voltage tubes without the protection of receiver cabinet and internal shielding. Mr. Villforth also noted that x-radiation rates inside the sets usually were found to be below 0.5 milliroentgen per hour, the Federal limit for x-ray emissions outside TV receiver cabinets. This meant, he said, that in many cases the amount of x radiation penetrating the cabinets was "virtually zero." (A milliroentgen is a thousandth of a roentgen, a unit for measuring x-ray exposure.) The repair shop survey was conducted by the Bureau with the cooperation of the Maryland Department of Health and Mental Hygiene and the

01 133 0586

Electronic Industries Association as a pilot survey to determine if television servicemen might be incurring undue x-ray exposure risks as a result of their work. "On the basis of information obtained in this study, we feel safe in saying that the health significance of x-radiation exposure to television servicemen is minimal and that further efforts to evaluate occupational exposure to this group are unnecessary," Mr. Villforth said. "Under present circumstances, we do not see a need to establish a Federal limit on x-radiation rates inside TV receivers in addition to existing limitations on external x-ray emissions." --Ind. Med. Surg. 40: 36 (Aug.) 1971

1136 LASERS MAY FACE NEW BARRIERS.

The American National Standards Institute has drafted a proposed standard that calls for special precautionary measures with lasers of more than 0.04 milliwatts - a tiny fraction of the 5-milliwatt limit currently accepted by the industry as harmless. It is argued that "If the standard is set anywhere near the level they are talking about, it would destroy 95% of the applications for low power lasers." More than 90% of the 50,000 or 60,000 lasers in existence are considered low-powered, that is, having ratings of 5 milliwatts or less. One company claims that experiments with monkeys prove that the threshold for "detectable" eye damage is in the neighborhood of 7 to 10 milliwatts and that the threshold for skin injuries is higher. Unfortunately, there is wide disagreement on this point within the scientific community. But this week the Electronic Industries Association submitted a reply to ANSI citing 26 research papers that back up this claim. The EIA agrees that a tough limit should be set for lasers someone might stare into. But it argues that ANSI should allow 5-milliwatt lasers to be used unrestricted when only occasional glances at them are anticipated. An ANSI committee will meet later this month to consider arguments before drawing up a formal proposal. Many laser makers are confident that a standard that is more "practical" than the preliminary version will be adopted. But George M. Wilkening, chairman of the ANSI committee and head of health and safety at Bell Labs, warns that, in drafting the preliminary version, "We took questions of practicality into consideration." --Business Week (2196) p. 30 (Oct. 2) 1971

1137 PENCIL CHEWERS BEWARE.

Studies on lead in the paint of various brands of pencils have been done by the Department of Health, Education and Welfare. It found that most contained levels in excess of the maximum 1% recognized as safe by the American National Standards Institute. In the covering lacquer, one particular brand of pencils contained about 12% lead. Similar studies conducted in New York City revealed that lead paints were detected in 17 different brands of pencils manufactured by six different companies. Nearly one third of the pencils tested exceeded the 1% safe level. The Washington, D.C., Health Department found that yellow and green pencils, as well as large round pencils used routinely in the District's primary grades, also contained excessive amounts of lead. Recalling hazardous pencils is the responsibility of the Food and Drug Administration. However, results of FDA's initial tests revealed that a chromate salt, lead chromate, is the principal compound in pencil paints and some authorities say that lead chromates are not dangerous because they are insoluble in water. Others disagree, and say that lead chromate and elemental lead are indeed hazardous. When ingested, they enter an acid medium in which they are soluble. Nevertheless, the FDA will not label the salt dangerous until sufficient evidence is available. The pencil industry has promised not to produce pencils coated with lead-containing paint. But, on the other hand, no plans have been made to recall pencils already marketed. --Chemistry 44: 5(Nov.) 1971

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1138 ENVIRONMENTAL AGENCY REVIEWING TWO PESTICIDES.

The pesticides chlorodane and heptachlor are undergoing "extensive review" by the Environmental Protection Agency to determine if any of the uses for which they're currently registered are endangering the environment. The agency said all uses of the two chemicals are being looked into, but their application for control of soil insects, household insects, termites and foilage insects as well as lawn management are of "particular concern." The review is part of the government's ongoing analysis of all persistent pesticides. This category includes all chemicals in the aldrin-toxaphene group of organo-chlorines, to which chlordane and heptachlor belong. All of these, to a greater or lesser extent, require time to break down into harmless components. Precise government figures on chlordane-heptachlor use aren't available, but one analyst estimated that they accounted for a sizable amount of the 88.6 million pounds of organochlorines produced in 1970. This figure, in turn, compared with that year's total pesticide production of nearly 1.2 billion pounds. Interested persons have until Dec. 5 to submit their chlordane and heptachlor views to EPA. --Wall Street J. Oct. 18, 1971

1139 LITHIUM IN WATER.

Admissions to Texas state mental hospitals are lowest in areas where lithium levels in community water supplies and in human urine are high, says Dr. Earl B. Dawson of the University of Texas medical branch, Galveston. (Lithium carbonate has been approved by FDA for treatment of manic depressive psychosis and is reported effective for other psychological problems.) Dr. Dawson says the correlation holds for admissions for psychosis, neurosis, and personality problems, but not for schizophrenia, alcoholism, drug abuse, or mental retardation. --Chem. Eng. News 49: 47 (Sept. 13) 1971

1140 AIR BAGS FACE A SHOWDOWN FIGHT.

The air bag's problems are the extreme noise as the bag pops open and the danger that the explosively inflating bag itself can injure an occupant who is not in the normal sitting position. With a controlled-flow system, the noise is now down below 140 decibels. However, this noise reduction is accomplished only by a compromise: slowing the rate at which the air bag inflates. Without this, the noise level is still at least 157 decibels. Such a noise, like that of a shotgun fired in a confined space, can cause hearing loss, not to mention its effect on people with weak hearts. The industry cites other problems with the air bag as well. Sooner or later, no matter how reliable the design is, a malfunctioning sensor is bound to trigger inflation inadvertently as a driver is speeding along at 70 mph. The sudden appearance of the bag could cause a fatal accident. Any number of things can go wrong, the auto makers point out, with a system that may lie dormant for eight or ten years before it is activated for the first time. Auto company spokesmen and other critics of air bags generally concede the effectiveness of the bags in frontal impacts, but they doubt the value of the air bag in a lateral collision and insist it is useless in a rear impact or a rollover. Moreover, they point out, the bag automatically deflates after the initial impact and thus offers no protection as the car caroms off other objects. They shudder at the thought of installing second or third bags as backup protection in multiple collisions. Most auto companies say they will recommend the use of belts even in cars equipped with air bags. --Business Week (2189) 74-75 (Aug. 14) 1971

1141 FRAMINGHAM HEART STUDY PARTICIPANTS ASKED TO TAKE PART IN NEW STUDY.

Children of parents who have participated over the past twenty years in the National Heart and Lung Institute's Framingham Heart Study (FHS) are being invited to take part in the Framingham Offspring Study (FOS) sponsored by HEW's NHLI Epidemiology Branch, National Institutes of Health. Among the 5209

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persons originally entered in FHS, there were 1644 families in which both husband and wife participated. A random sample of 800 of these families has been selected for FOS. A unique feature of the new study is that the children will now be examined at approximately the same ages that their parents were when first examined 22 years ago. In no other investigation has it been possible to make direct comparisons of such factors as blood cholesterol of parents and their children at similar ages. Those enrolling will receive a cardiovascular examination similar to that which their parents have undergone every two years as participants in FHS. It includes 1) a medical history; 2) medical examination of the cardiovascular system; 3) an electrocardiogram; 4) a lung function test; and 5) blood-sample analysis for cholesterol, lipoproteins, and sugar. Major risk factors in coronary heart disease, aside from age and sex, that have been identified and quantified by FHS are: elevated blood levels of cholesterol and other fatty substances (collectively called lipids); elevated blood pressure; elevated blood uric acid levels and/or a tendency to gout or gouty arthritis; certain metabolic disorders, notably diabetes; obesity; certain modes of life and habits, such as cigarette smoking and lack of physical exercise. Individuals with various combinations of these "risk factors" may run up to a 30-fold increased risk from coronary attacks compared to persons with none of these risk factors working against them and certain of these risk factors are known to "run in families." FOS hopes to extend present knowledge about hereditary determinants of cardiovascular-disease and also as a factor possibly amplifying the adverse effects of potentially harmful habits or modes of life on the heart and blood vessels. Such data would provide a new dimension to present efforts to identify highly vulnerable persons before they experience serious symptoms and when the timely initiation of countermeasures against those "risk factors" that can be modified or eliminated may forestall or postpone the onset of potentially disastrous complications of atherosclerosis. --HEW News Oct. 26, 1971

1142 SURGEONS' CHIEF CITES FREEDOMS.

"A national health policy and national health programs can be designed to improve the care of the surgical patient," the new president of the American College of Surgeons told the group in his inaugural address. He prefers a system with several options for both patients and physicians, said Jonathan E. Rhoads, M.D., of Philadelphia. "Public health education becomes increasingly important as preventive medicine becomes a larger part of health care services. Advances in medical science have concentrated many expensive resources for the benefit of the very ill person. This has made virtually all of us medically indigent for certain types of illness. Universal insurance is needed against medical catastrophe and we need to have the ordinary types of medical and hospital care underwritten for those who cannot afford them. It is not clear that we will be able to reduce the cost of medical care without lowering its quality. It is clear that we must strive to increase its value."

--Amer. Med. News Nov. 1, 1971

1143 NON-HOSPITAL INTERNSHIPS OFFERED IN PREVENTIVE MEDICINE.

"To offset the disproportionate focus on treatment of disease rather than on the prevention of disease or maintenance of health," the Health Research Group, a Washington-based arm of Ralph Nader's consumer protection movement, is offering one-year, non-hospital internships for third- and fourth-year medical students, interns, and residents this summer. Listing as areas of concern food poisoning, death and septicemia from infected intravenous fluids, morbidity and mortality from improperly used drugs, black lung disease, byssinosis, mercury poisoning, asbestosis, and silicosis, the Health Research Group notes that "it has become increasingly apparent that many diseases...are the end-result of various forms of corporate and governmental irresponsibility." Participants in the project will be paid $4,500 pe The program will start a second shift in the summer of 1972. Further information can be obtai Andrea Hricko, Health Research Group, P.O. Box 19367, Washington, D.C. 20036.

--The Nation's Health S

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1144 TOXICOLOGY INFORMATION.

A toxicology information center has been established at Oak Ridge National Laboratory's (ORNL) biology division. Initially, the center is designed to answer questions and supply information on toxicology of pesticides and other potentially hazardous chemicals in the environment. Plans call for expansion to other aspects of toxicology such as drug interactions and their adverse effects. Data are being compiled in machine-readable form under the direction of Dr. David G. Doherty, a biochemist at ORNL.

--Chem. Eng. News 49: 47 (Sept. 13) 1971

1145 TECNOSECURIT '71 POSTPONED.

As a result of the new trends in the environment of the Italian producers and distributors of equipment for work safety and hygiene, it has been decided that the "Exhibition-Congress on equipment for work safety and hygiene", organised by COMIS (Centro Organizzazione Mostre Internazionali Specializzate) in collaboration with ASSECURIT (Associazione Italiana dei Produttori di Mezzi ed Attrezzature per la Sicurezza e l'Igiene del Lavoro e per la Protezione Civile) shall be a two-yearly Exhibition. The sixth edition of COMIS/LABOR has therefore been postponed until the autumn of next year, under the new title of TECNOSECURIT '72.

--COMIS release Sept. 23, 1971

COMING EVENTS

1146

Dec. 1-3	American Chemical Society Southwest Regional Meeting, San Antonio, Tex.
Dec. 1-4	American Medical Women's Association, New Orleans, La.
Dec. 2-3	Mechanisms of Enzyme Action, Intra-Science Symposium, Santa Monica, Cal.
Dec. 4-9	American Academy of Dermatology, Chicago, Ill.
Dec. 5-7	American Society of Hematology, San Francisco, Cal.
Dec. 6-9	Symposium on Underground Waste Management and Environmental Implications, Houston, Tex.
Dec. 6-10	National Fire Protection Association, Technical Committee Week, Denver, Colo.
Dec. 7-9	American Academy of Orthopaedic Surgeons short course on The Hand, Chicago, Ill.
Dec. 16-19	American Psychoanalytic Association, New York, N.Y.
Dec. 17-20	Indian Institute of Chemical Engineers, annual general meeting, Kanpur, India
Dec. 26-31	American Association for the Advancement of Science, 138th annual meeting, Philadelphia, Pa.

LEGAL DEVELOPMENTS

1147 FINAL REGULATIONS CLARIFY "EMPLOYEE REPRESENTATIVE."

The DOL* regulations under the Occupational Safety and Health Act of 1970 governing inspections, citations and penalties are expected to clarify who is considered to be an authorized employee representative for the purpose of accompanying a compliance officer during his inspection. The representative may be an employee working within the plant or an employee representative not employed at the plant. The decision as to who should represent the employees of a particular workplace would be left to the local union. The compliance officers, under the final regulations, are expected to resolve any disputes as to employee representation rather than "approve" the representative as originally proposed.

--J. Occ. Med. 13: 4(Sept.) 1971

*Department of Labor.

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1148 REGULATIONS ON CONTRACTS INVOLVING RISK TO HUMAN SUBJECTS BECOME EFFECTIVE.

An amendment to establish policy and procedures to be followed whenever individuals may be at risk as a consequence of participation as a subject in research, development, demonstration, or other activity being conducted under contract was adopted and became effective October 15, 1971. According to §3-4.55C1 Policy - It is the policy of the Department that no contract involving risk to human subjects shall be awarded until acceptable assurance has been given that the project or activity will be subject to initial and continuing review by an appropriate institutional committee(s) as described in Chapter 1-40, DHEW Grants Administration Manual. Except where the prime contractor holds a General Institutional Assurance (See §3-4.5502 b) a separate Special Assurance will be required of each subcontractor or cooperating institution having immediate responsibility for human subjects involved in performance of the contract. Contracts involving human subjects at risk will not be awarded to an individual unless he is affiliated with or sponsored by an institution which can and will assume responsibility for safeguarding the human subjects involved. --Federal Register 36: 20039-20040 (Oct. 15) 1971

1149 PROTECTIVE LEGISLATION URGED FOR POLLUTION-AFFECTED WORKERS.

UAW* President Leonard Woodcock, testifying before the Senate Public Works subcommittee on air and water pollution, called for laws that would safeguard workers against loss of jobs and income and provide assistance to communities where a plant is closed because of environmental pollution. Woodcock said the UAW's proposals would put an end to "political blackmail" in which workers and towns are threatened with job losses if anti-pollution laws are enforced and would "create a new and powerful financial incentive to induce pollution employers to step up to their environmental responsibilities." He proposed legislation which would give workers, individually or as a class, the right to sue their employers for damages whenever the workers lost wages, fringe benefit protections or seniority rights because of plant shutdown or layoffs resulting from environmental pollution by their employers. Woodcoc who first outlined the proposals to give workers the right to sue in a letter last March to Sen. Edmund S. Muskie (D-Me.), said the worker protections would be similar to provisions established under the law creating the National Railroad Passenger Corp. (Amtrak). The Amtrak provisions include, among others, maintenance of full pay for a displaced worker for a period equal to seniority up to six years, maintenance of the full range of fringe benefits for a displaced worker, payment of moving expenses for relocation, retraining, and compensation for any loss suffered by a displaced worker in sale of his home. He said that legislation initially might provide for a sharing of liability costs between an employer and the government in event of a plant shutdown or layoff related to pollution, with a graduated scale set up to shift the full liability to employers after three years. Woodcock said such legislation would create financial incentives that "would impel employers, wherever practicable, to abate pollution rather than cease operations." --J. Air Poll. Control Assn. 21: 519 (Aug.) 1971

*United Auto Workers.

1150 THE CONTROLLED SUBSTANCES ACT OF 1970.

On May 1, 1971 a number of Federal Laws will go out of existence, including the Federal Narcotic Act and will be replaced by Public Law 91-513 commonly called the Controlled Substances Act of 1970(CSA). Briefly the law requires that every person, not specifically exempted, who manufacturers, distributes, prescribes, administers or dispenses any controlled substance, or who proposes to engage in any activity utilizing controlled substances must register annually with the Attorney General. The registration function will be the responsibility of the Bureau of Narcotics and Dangerous Drugs (BNDD). The law recognizes five basic categories of Controlled Substances: L.S.D., marijuana, heroin, and all other substances for which there is no generally acceptable medical use: Opium and opium preparations - Chemical equivalents of opium or opiates, coca leaves and products of coca leaves, Methadone, injectab

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forms of Methamphetamine, also a long list of substances which can cause addiction or have a high incidence of abuse; Stimulants (amphetamines, phenmetrazine, solid forms of methamphetamine, etc.), depressants (most barbituates, glutethimide, Nalorphine, plus narcotics formerly in Class "B" and Paregoric); Barbital, chloral hydrate, phenobarbital, ethimamate, meprobamate, etc. and those preparations which were formerly listed as "exempt" narcotics. Details are explored in this article.

--Ind. Med. Surg. 40: 18-19 (Sept.) 1971

1151 PROTECTIVE CLOTHING STANDARDS IN UNDERGROUND COAL MINES.

Part 75 of Title 30, Code of Federal Regulations, Subchapter O-Coal Mine Health and Safety - Mandatory Health and Safety Standards, Underground Coal Mines, was amended and revised by adding § 75.1720 - Protective clothing; requirements which requires that on and after the effective data of this § 75.1720 each miner regularly employed in the active workings of an underground coal mine shall be required to wear the following protective clothing and devices: (a) Protective clothing or equipment and face-shields or goggles when welding, cutting, or working with molten metal or when other hazards to the eyes exist from flying particles. (b) Suitable protective clothing to cover those parts of the body exposed to injury when handling corrosive or toxic substances or other materials which might cause injury to the skin. (c) Protective gloves when handling materials or performing work which might cause injury to the hands; however, gloves shall not be worn where they would create a greater hazard by becoming entangled in the moving parts of equipment. (d) A suitable hard hat. (e) Suitable protective footwear. The provisions of § 75.1720 shall become effective 45 days after the date of publication in the Federal Register (Oct. 7, 1971).

--Federal Register 36: 19497-19498 (Oct. 7) 1971

1152 SUITS, INSURANCE PERIL BLOOD BANKS.

Rising insurance rates - present premiums are triple last year's - and lawsuits from hepatitis victims have produced a "desperately serious" situation that could result in some blood banks closing. New laws are being sought to safeguard blood banks from liability for hepatitis, the one remaining infectious disease which is uncontrolled. Two bills have been introduced before the state legislature to exempt blood banks - except in negligence - from hepatitis liability in Pennsylvania. Insurance companies have been looking at blood banks more critically in Pennsylvania since the Illinois Supreme Court last year held blood banks liable for hepatitis in Illinois. The Illinois legislature later passed a law overturning the Supreme Court and 37 states already have similar nonliability legislation. Blood Banks have begun a screening program involving the Australian antigen test to weed out hepatitis from donated blood. However, the test, which has just been developed, is only 25 to 30 per cent effective in pinpointing blood contaminated with hepatitis. Blood banks also have renewed efforts to recruit more volunteer donors in an effort to eliminate paid donors, who pose a 10 times greater risk of transmitting hepatitis than volunteer donors.

--Pittsburgh Press Oct. 27, 1971

1153 THE FDA -- ITS ROLE IN TESTING.

Kefauver-Harris amendments have given the Food-Drug Administration (FDA) the direction to say positively that, in its opinion, a drug is both safe and efficacious. Under the law, until 1962, the FDA did not have to make positive statements about drugs, only negative ones. If the FDA remained silent for sixty days after it received a New Drug Application (NDA), the drug in question was automatically allowed to be manufactured by failure of the FDA to say anything at all - by default, as it were. The 1962 FDA amendments have created many challenges from the public, Congress, pharmaceutical firms, the practicing physician, and various medical groups such as the American Society of Internal Medicine (ASIM). Some of the problem areas of the Kefauver-Harris Amendments are discussed in this article.

--Penna. Med. 74: 57-58 (Sept.) 1971

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BOOKS, PAMPHLETS, AND NOTICES

1154 THE JOB SAFETY AND HEALTH ACT OF 1970. Bureau of National Affairs Editorial Staff. *Available from:* Bureau of National Affairs, Inc., 1231 25th Street, N.W., Washington, D.C. 20037. 342 pp. (1971) *Price:* $15.00.

The Occupational Safety and Health Act of 1970 requires safe and healthful working conditions for virtually every employee in the United States. Effective April 28, 1971, the law directs the Secretary of Labor to set and enforce safety and health standards for business affecting interstate commerce - an estimated 4.1 million establishments with 57 million employees. The only employers exempted are the United States and state and local governments. But there are special provisions requiring standards for them. This operations manual is devoted to an analysis of the major provisions of the statute. It explains its background, meaning, and effect. The analysis and appendices of pertinent reports and congressional debates are designed to give employers, employees, governmental agencies, unions, and associations a broad-range view of the new job safety and health law. --Cond. from Introduction

Editor's Note: All those affected by the new Occupational Safety and Health Act, those interested in its enforcement and those concerned with its ramifications will find this a useful reference tool to investigate various aspects of the Act, compactly and succintly presented. The Bureau of National Affairs has also published a capsule version entitled ABC's of the Job Safety and Health Act prepared by its editorial staff, which is a handy pocket size edition containing the law in brief, which covers issuance of standards, enforcement of standards, imminent danger procedures, penalties, commission's authority, how the act affects other laws, what the law means to employers, to employees, to labor unions, to the states, to federal agencies; checklists of employer requirements and employee rights; and the full text of the Act. This 46 page booklet may be obtained from the Bureau of National Affairs for $2.00. --M. C. C.

1155 DISPOSAL OF SEWAGE AND OTHER WATERBORNE WASTES, 2nd Edition. K. Imhoff, W. J. Muller and D. K. B. Thistlethwayte. *Available from:* Ann Arbor Science Publishers, Inc. P.O. Box 1425, Ann Arbor, Michigan 48106. 405 pp. (1971) *Price:* $16.80.

The second edition of this text book has been expanded and rewritten to incorporate the progress made in the field of sewage and waste water treatment and disposal since the last edition was published. The authors, to increase the appeal of the work to an international market, have arranged the contents to suit countries where national conditions and tradition call for modifications to common European practice. *Disposal of Sewage* is divided into four parts. The first part provides a general background to the subject describing the quality and quantity of wastes produced under different circumstances - the second gives various methods of disposal, each with their advantages and disadvantages. The third section, essentially of a practical nature, describes various treatment processes, whilst the final part deals with particular problems of a small community where economic considerations prevent the use of sophisticated systems. This standard reference work covering in detail the problems of liquid water disposal including industrial effluents and water pollution control should prove to be a valuable source of information for all engineers, chemists, and medical officers as well as sewage and public health authorities and water conservancy boards. --Fly leaf modified

1156 INDUSTRIAL POLLUTION CONTROL HANDBOOK. H. F. Lund. *Available from:* McGraw-Hill Book Company, 330 West 42nd Street, New York, N.Y. 10036. 864 pp. (1971) *Price:* $29.50.

The *Industrial Pollution Control Handbook* is intended to help industry meet its obligation to the community, to provide good breathable air and water of drinking condition, and to accomplish this feat practically, economically, without excessive burden to itself. It is a communication bridge between

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the best practical experts on industrial pollution problems and all of the responsible industrial managers. This Handbook was conceived as a practical, easy-to-understand guide to solving pollution problems. From the beginning, pollution was looked at as a total system problem. The various interactions between air, water, and solid wastes must be evaluated by a plant or even an entire industry. The treatment of a water pollutant may create an air pollutant, for instance, an objectionable odor. And of course, the collection and handling of the dust particles from a bag house or cyclone will produce a solid waste disposal situation. Since pollution control is evolving as a total system, possibly a closed-loop phenomenon within a plant or complex, the primary section of this Handbook focuses on pollution control by industry types. Every major industry where pollution is a difficult problem has been described in a separate chapter: foundries, plating, pulp and paper, foods, chemicals, textiles, pharmaceuticals, aerospace, and even a separate review of European plant practices. Each chapter has been written by an expert practical contributor or team of contributors. In front of these bread basket-type chapters, is traced the evolution of industrial pollution control. This includes a statement of the problem, the history of federal legislation, and a similar treatise on state and local legislation. Air and water quality standards and criteria, always a difficult point of discussion, have also been clearly described. Also in this evolution section, other contributors present: air and water pollution control systems, disposal of collected wastes, joint municipal-industrial control programs, and finally, what practical areas of research are needed for pollution control. There have been many problems related to the design, installation, operation, and costs of control equipment. For the last five years, the author has stated that claimed operating efficiency, whether 78 or 99.9 percent, is only possible when the equipment is running. But if the equipment is stopped for any reason, the efficiency becomes zero. The last section on pollution control equipment is dedicated to help avoid, minimize, or hopefully eliminate the zero efficiency of control equipment. First, a plant department should be organized. Then the design details and fabrication materials of air and water pollution control equipment are thoroughly described. Probably the most often neglected aspects of control equipment are the proper training of operators, equipment start-up, and the specifics of performance guarantees. The latter, warns plant managers to demand protective contracts which will assure that claimed equipment efficiencies become actual efficiencies. A Glossary of nearly forty pages and a useful, descriptive, source index has been included. Also, contributors were encouraged to furnish capital, installation, and operating costs and each of these cost categories are broken down separately in the index. --Cond. from author's preface

1157 SYMPOSIUM ON THOUGHTS AND VIEWS OF THE IMPACT OF THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970, P. L. 91-596. H. H. Fawcett, Chairman. *Available from:* H. H. Fawcett, Session Arranger and Chairman, National Academy of Sciences-National Research Council, 2101 Constitution Ave. N.W. Washington, D.C. 20418, 60 pp. (1971) *Price:* Free on request.

This symposium sponsored by the Committee on Chemical Safety of the American Chemical Society discusses the impact of the new Occupational Safety and Health Act on the Chemical profession. The aspects of OSHA which have been designed are Historical Perspective by Professor J. M. Brown, The Legal Responsibility for Implementation and Enforcement by the Honorable George C. Guenther, the Role of HEW which under OSHA has broad responsibilities by Dr. Edward J. Fairchild, The Impact on Industry Mr. J. Sharp Queener, The Role of Unions Mr. E. D. Swisher, and an analysis of the ability to respond in Resources Available to Assist in Chemical Safety by Mr. Jack S. Snyder. These several aspects of OSHA were selected to provide a basic overview of some of its most visible and important facets. It is hoped that additional aspects as well as new developments will be presented in the future. This is a new act, and time will be required to develop the most effective, useful, and safest procedures for the occupational health and safety of the work force. --Introduction modified

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1158 NATIONAL ELECTRICAL CODE, 1971 (NFPA No. 70). National Fire Protection Association. *Available from:* National Fire Protection Association Publications Department, 60 Batterymarch Street, Boston, Mass. 02110. 536 pp. (1971) *Price:* Single copies $3.50, softcover, $4.95, hardcover; a schedule of discounts applies to orders for five or more of the softcover copies.

This new edition of the National Electrical Code supersedes all previous issues of the Code. The last edition was dated 1968. The Code is of primary importance to all concerned with installation, operation, manufacture, design and inspection of electrical wiring and equipment. It is intended for practical safeguarding of persons and of buildings and their contents from hazards arising from use of electricity for light, heat, power, radio, signaling and all other purposes. Five new articles, five completely revised articles, 463 other changes and 50 deletions are included. New articles pertain to temporary wiring, shielded nonmetallic-sheathed cable, flat cable assemblies, fixed outdoor electric de-icing and snow-melting equipment, and air conditioning and refrigerating equipment. Also new is a resume of Code changes since the 1968 edition; as before, all revisions also are clearly marked by vertical lines in the margin of the text itself. Articles which have undergone complete revision are those on liquid-tight flexible metal conduit, health care facilities, mobile homes and mobile home parks, recreational vehicles and recreational vehicle parks, and swimming and wading pools. Developed by the National Electrical Code Committee under the chairmanship of Richard Lloyd of Underwriters' Laboratories, Inc., the 1971 Code was adopted at the NFPA Annual Meeting on May 20, 1971, and approved by the American National Standards Institute on June 25, 1971.

--Cond. from NFPA release September 3, 1971

1159 STAYING ALIVE IN THE ARCTIC. Compiled by E. F. Crippen and K. Davis. *Available from:* Edward F. Crippen, M.D., 21580 Rambla Vista, Malibu, Calif. 90265. 24 pp. (1971) *Price:* $1.00.

This booklet has been prepared by the American Petroleum Institute, with the assistance of men who have faced and survived Arctic emergencies: to help you stay alive in a survival situation; to prevent you from being lost or frostbitten or injured while you work in the Arctic. Subjects covered include: Ten rules for survival; Preparing a survival kit; Emergency rations; First Aid Kit; Clothing; Cold weather hazards - severe chilling, frostbite; Immersion Foot (Trench foot); Snowblindness; Carbon Monoxide poisoning; Accidents; Burns; Heavy bleeding; Travel - making a trip plan; Emergencies; In glacier areas; Weather and travel; Traveling with a snowmobile; Direction guides; Water; Shelter; Building a fire - fire without a match, fire without wood; Signaling distress; and in case of emergency. A ground to air emergency code is included.

--Cond. from text

1160 RADIATION PROTECTION INSTRUMENTATION AND ITS APPLICATION (ICRU Report 20). International Commission on Radiation Units and Measurements. *Available from:* ICRU Publications, P.O. Box 30165, Washington, D.C. 20014. (1971) *Price:* 1-9 copies $3.50 each, 10-99 copies $3.25 each, 100 or more copies $3.00 each.

This report was prepared to give practical guidance on the problems of measurement and interpretation involved in the assessment of compliance with radiation protection recommendations. The new report includes a basic discussion of radiation quantities and units, of the interpretation of instrument readings in terms of such units, and of the accuracy usually required. The report also includes sections on various types of radiation detector. Since detailed descriptions of detectors and discussions of their operation are available elsewhere, the new report concentrates on instrument characteristics. The choice and use of instruments are discussed in four sections dealing respectively with sealed gamma-ray sources and sources of x rays and electrons, unsealed radioactive sources, reactors and sealed neutron sources, and accelerators of charged particles. There is a separate section of the report devoted to instruments for monitoring the radiation to which individuals are exposed. The report also includes a discussion of calibration procedures. In considering various types of instruments, the report discusses good and bad features, but provides no detailed descriptions of

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particular commercially available instruments. Information on the features of each type and a consideration of specific applications is provided so that specific types of instruments can be selected on an intelligent basis for each application. Since protection recommendations apply to all types of ionizing radiations, including both electromagnetic and corpuscular radiations capable of producing ions either directly or indirectly, methods of measurement for all these radiations over all ranges of energy that occur in practice are discussed. In general, the development of protection instrumentation has lagged behind the development of new sources of radiation, particularly as radiation energies have increased. One of the objectives of the new report is to stimulate the development of reliable protection instrumentation, as well as to encourage the effective utilization of existing instruments. --Cond. from release September 28, 1971

..81 GUIDE FOR SETTING UP A RECORD SYSTEM. American Association of Industrial Nurses. *Available from:* American Association of Industrial Nurses, Inc., 79 Madison Ave. New York, N.Y. 10016. (1971) *Price:* $1.50.

Recognizing that accurate record keeping is as essential in the employee health service as it is in any other department of the company, this *Guide for Setting Up A Record System* was prepared primarily for the nurse in industry (whether new or experienced) who works alone or with a part-time or on-call physician. It is designed to assist her in setting up a record system, or changing her present method of keeping records. It suggests ways of maintaining the records and using the information contained in them to improve her own work and to prepare meaningful reports for management.

--Occ. Health Nursing 19: 42 (Sept.) 1971

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INDUSTRIAL MEDICAL PRACTICE

1162 LEFT VENTRICULAR FUNCTION IN CHRONIC OBSTRUCTIVE LUNG DISEASE. G. L. Baum, et al. *New Engl. J. Med.* 285: 361-365, Aug. 12, 1971

In 15 patients with chronic obstructive lung disease, biventricular cardiac catheterization showed that left ventricular end-diastolic pressure was elevated in seven, and abnormal left ventricular function curves were found in 14. Analysis of left ventriculography revealed increased wall thickness or diastolic chamber size (or both) in nine of 10 observations and impaired ventricular performance in three of eight. The degree of functional impairment was not influenced by the presence or absence of right-sided heart failure. Appreciable coronary narrowing was found in only two of 10 subjects studied by cineangiography. Left ventricular dysfunction was present in most of the patients studied. The pathogenesis of the dysfunction is not clear. 32 references. --Authors' abst.

Editor's Note: According to an article by Dr. A. P. Fishman in this same issue of the New Engl. Journal of Medicine "hypertrophy of the left ventricle is a consequence of metabolic dysfunction of the myocardium as oxygen delivery and aerobic metabolism are compromised by hypoxemia and acidosis; other influences, such as electrolyte abnormalities and variations in intramyocardial distribution of blood flow, may also interfere with adequate oxygen delivery and uptake. The finding of left ventricular hypertrophy at autopsy in chronic bronchitis and emphysema and in 'chronic mountain sickness' is consistent with this hypothesis. So are the subtle hemodynamic disturbances in left ventricular performance that may be disclosed by elaborate physiologic technics during the life of less incapacitated patients with bronchitis, such as those reported by Baum et al (above)." --R. T. P. deT.

1163 SCREENING FOR HETEROZYGOUS α_1-ANTITRYPSIN DEFICIENCY. J. Lieberman, C. Mittman, and J. R. Kent. *J. Am. Med. Assn.* 217: 1198-1206, Aug. 30, 1971

The purposes of this study were to see whether a provocative test with diethylstilbestrol could distinquish between individuals with the normal and abnormal gene for antitrypsin activity and to evaluate the possibility of using this medication therapeutically in deficient subjects. In addition, a survey of serum antitrypsin activity was made in women to compare the range of activity in those taking female hormone to that in those who were not. Diethylstilbestrol caused serum trypsin-inhibitory capacity (STIC) values to rise into the low-normal range in most studied heterozygotes with α_1-antitrypsin deficiency, but never above 1.20 units; in control subjects, the stimulated STIC values exceeded 1.30 units. Subjects with homozygous antitrypsin deficiency did not respond to diethylstilbestrol. Lack of response to 3 mg of diethylstilbestrol daily for two weeks in a patient with 1.20 units or less of antitrypsin activity indicates that the patient's antitrypsin level is already maximally stimulated by his disease, and confirms a diagnosis of heterozygous α_1-antitrypsin deficiency. Women receiving oral contraceptive medication or other estrogenic hormones whose random antitrypsin assay shows a level of 1.20 units or less should be suspected of carrying the abnormal gene for antitrypsin deficiency. --Cond. from text

1164 ALPHA$_1$-ANTITRYPSIN AND PEPSIN INHIBITION. J. Lieberman. *New Engl. J. Med.* 285: 524-525, Aug. 26, 1971

In a report on alpha$_1$-antitrypsin deficiency in patients with pulmonary emphysema (New Engl. J. Med. 281: 279-284, 1969) data were presented to suggest that an increased frequency of peptic-ulcer disease may be found in patients with pulmonary emphysema and alpha$_1$-antitrypsin deficiency. Subsequent studies however, have shown that normal human serum contains no substance capable of inhibiting pepsin activity. The author concludes that the alpha$_1$-antitrypsin in human serum is not a pepsin inhibitor. The basis for an increased frequency of peptic-ulcer disease in patients with chronic obstructive lung disease remains unknown. --Cond. from text

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(NOTE: In order to evaluate compliance with this TLV, field sampling instruments should be calibrated, in the laboratory, for response to this specific quantitative and qualitative air-vapor mixture, and also to fractional concentrations of this mixture; e.g., 1/2 the TLV; 1/10 the TLV; 2 X the TLV; 10 X the TLV; etc.)

TLV of mixture =

$$\frac{1}{\frac{f_a}{TLV_a} + \frac{f_b}{TLV_b} + \frac{f_c}{TLV_c} + \cdots\cdots \frac{f_n}{TLV_n}}$$

Example No. 1: Liquid solvent contains (by weight) 50% heptane (TLV = 2000 mg/M^3) 30% methylene chloride (TLV= 1740 mg/M^3) 20% perchlorethylene (TLV = 670 mg/M^3)

TLV of mixture =

$$\frac{1}{\frac{0.5}{2000} + \frac{0.3}{1740} + \frac{0.2}{670}} = \frac{1}{.00025 + .00017 + .0003}$$

$$= \frac{1}{.00072} = 1390 \text{ mg/M}^3$$

Of this mixture: 50% or 695 mg/M^3 is heptane, 30% or 417 mg/M^3 is methylene chloride and 20% or 278 mg/M^3 is perchlorethylene

These values can be converted to ppm as follows:

heptane: 2000 mg/M^3 = 500 ppm
1 mg/M^3 = 0.25 ppm
695 mg/M^3 = 174 ppm

methylene chloride: 1740 mg/M^3 = 500 ppm
1 mg/M^3 = 0.287 ppm
417 mg/M^3 = 119 ppm

perchlorethylene:
670 mg/M^3 = 100 ppm
1 mg/M^3 = 0.15 ppm
278 mg/M^3 = 42 ppm

The TLV of this mixture =
174 + 119 + 42 = 335 ppm.

1B.b. General Exact Solution for Mixtures

[illegible] components [illegible]

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

(2) $C_1 + C_2 + \cdots\cdots + C_n = T;$

(2.1) $\frac{C_1}{T} + \frac{C_2}{T} + \cdots\cdots + \frac{C_n}{T} = 1.$

By the Law of Partial Pressures,

(3) $C_1 = ap_1,$

and by Raoult's Law,

(4) $p_1 = F_1 p_1^o.$

Combine (3) and (4) to obtain

(5) $C_1 = aF_1 p_1^o.$

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

(6) $\frac{F_1 p_1^o}{T} + \frac{F_2 p_2^o}{T} + \cdots + \frac{F_n p_n^o}{T}$

$\frac{F_1 p_1^o}{T_1} + \frac{F_2 p_2^o}{T_2} + \cdots + \frac{F_n p_n^o}{T_n}$

and solving for T,

(6.1) $T = \frac{F_1 p_1^o + F_2 p_2^o + \cdots + F_n p_n^o}{\frac{F_1 p_1^o}{T_1} + \frac{F_2 p_2^o}{T_2} + \cdots + \frac{F_n p_n^o}{T_n}}$

or $\frac{1}{\Sigma} = n F_1 p_1^o$

(6.2) $T = \frac{1}{\frac{1}{\Sigma}} = \frac{1}{n}$

$i = 1 \bigcirc \frac{F_1 p_1^o}{T_1}$

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T - Threshold Limit Value in ppm.
C - Vapor concentration in ppm.
p - Vapor pressure of component in solution.
po- 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.

1B.c. 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

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

$$F_1 p_1^o = (0.527)\ (73) = 38.2$$

$$F_2 p_2^o = (0.473)\ (125) = 59.2$$

TLV =

$$\frac{38.2 + 59.2}{\frac{38.2}{100} + \frac{59.2}{350}} = \frac{(97.4)\ (350)}{133.8 + 59.2} =$$

$$\frac{(97.4)\ (350)}{193.0} = 177$$

TLV = 177 ppm [illegible] when account is taken of vapor pressure and mol fraction in comparison above sample where such account is not taken.)

2. A mixture of one part of (1) parathion (TLV, 0.1) and two parts of (2) EPN (TLV, 0.5).

$$\frac{C_1}{0.1} + \frac{C_2}{0.5} = \frac{C_m}{T_m} \qquad C_2 = 2C_1$$

$$C_m = 3C_1$$

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

$$\frac{7C_1}{0.5} = \frac{3C_1}{T_m}$$

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

1C. TLV for Mixtures of Mineral Dusts.

For mixtures of biologically active mineral dusts the general formula for mixtures may be used.

For a mixture containing 80% talc and 20% quartz, the TLV for 100% of the mixture is given by:

$$TLV = \frac{1}{\frac{0.8}{20} + \frac{0.2}{2.5}} = 8.4\ mppcf$$

Essentially the same result will be obtained if the limit of the more (most) toxic component is used provided the effects are additive. In the above example the limit for 20% quartz is 10 mppcf.

For another mixture of 25% quartz, 25% amorphous silica and 50% talc:

$$TLV = \frac{1}{\frac{0.25}{2.5} + \frac{0.25}{20} + \frac{0.5}{20}} = 7.3\ mppcf$$

The limit for 25% quartz approximates 8 mppcf.

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APPENDIX C

PERMISSIBLE EXCURSIONS FOR TIME-WEIGHTED AVERAGE (TWA) LIMITS

The Excursion TLV Factor in the Table automatically defines the magnitude of the permissible excursion above the limit for those substances not given a "C" designation; i.e., the TWA limits. Examples in the Table show that nitrobenzene, the TLV for which is 1 ppm, should never be allowed to exceed 3 ppm. Similarly, carbon tetrachloride, TLV 10 ppm, should never be allowed to exceed 20 ppm. By contrast, those substances with a "C" designation are not subject to the excursion factor and must be kept below the TLV.

These limiting excursions are to be considered to provide a 'rule-of-thumb' guidance for listed substances generally, and may not provide the most appropriate excursion for a particular substance. Efforts are being made to develop such specific excursions, when indicated to be significantly [illegible] mended [illegible]

Substance	TLV ppm	Excursion Factor	Max. Conc. Permitted for short time ppm
Nitrobenzene	1	3	3
Carbon tetrachloride	10	2	20
o-Dichlorobenzene	50	1.5	75
Acetone	1000	1.25	1250
Boron Trifluoride	C1	-	1
Butylamine	C5	-	5
Styrene monomer	C100	-	100

For all substances:

	Excursion Factor
TLV >0-1 (ppm or mg/M^3),	=3
TLV >1-10 "	=2
TLV >10-100 "	=1.5
[illegible]	[illegible]

By definition in the Preface, a listed value bearing a "C" designation refers to a 'ceiling' value that should not be exceeded; all values should fluctuate below the listed value. This, in effect, makes the "C" designation a maximal allowable concentration (MAC). In general, the bases for assigning or not assigning a "C" value rest on whether excursions of concentration above a proposed limit for periods up to 15 minutes may result in a) intolerable irritation, b) chronic, or irreversible tissue change, or c) narcosis of sufficient degree to increase accident proneness, impair self-rescue or materially reduce work efficiency.

APPENDIX D

Some "Inert" or Nuisance Particulates[p)]

Alundum (Al_2O_3)	Kaolin
Calcium carbonate	Limestone
Cellulose (paper fiber)	Magnesite
Portland Cement	Marble
Corundum (Al_2O_3)	Pentaerythritol
Emery	Plaster of Paris
Glass, fibrous[q)] or dust	
Glycerin Mist	Rouge
Graphite (synthetic)	Silicon Carbide
Gypsum	Starch
Vegetable oil mists (except castor, cashew nut, or similar irritant oils)	Sucrose
	Tin Oxide
	Titanium Dioxide

p) When toxic impurities are not present.

APPENDIX E

Some Simple Asphyxiants - "Inert" Gases and Vapors[r)]

Acetylene	Hydrogen
Argon	Methane
Butane	Neon
Ethane	Nitrogen
Ethylene	Nitrous Oxide
Helium	Propane

r) As defined of pg. 6

01 133 0572

Threshold Limit Values of Physical Agents

Adopted By

ACGIH

For 1971

PREFACE
PHYSICAL AGENTS

These threshold limit values refer to levels of physical agents and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effect. Because of wide variations in individual susceptibility, exposure of an occasional individual, at, or even below, the threshold limit may not prevent annoyance, aggravation of a pre-existing condition, or physiological damage.

Threshold limit values refer to levels of exposure for an 8-hour workday for a 40-hour work week. Exceptions are those limits which are given a ceiling value(C). They should be used as guides in the control of health hazards and should not be used as fine lines between safe and dangerous levels of exposures.

These threshold limits are based on the best available information from industrial experience, from experimental human and animal studies, and when possible, from a combination of the three.

These limits are intended for use in the practice of industrial hygiene and should be interpreted and applied only by a person trained in this discipline. They are not intended for use, or for modification for use, (1) in the evaluation or control of the levels of physical agents in the community, (2) as proof or disproof of an existing physical disability, or (3) for adoption by countries whose working conditions differ from those in the United States of America.

These values are reviewed annually by the Committee on Threshold Limits for Physical Agents for revisions or additions, as further information becomes available.

Ceiling Value - There are some physical agents which produce physiological response from short intense exposure and whose threshold limit is more appropriately based on this particular response. Physical agents with this type of response are best controlled by [illegible] limit which is a maximum level of exposure which should not be exceeded.

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As Legislative Code - The Conference recognizes that the Threshold Limit Values may be adopted in legislative codes and regulations. If so used, the intent of the concepts contained in the Preface should be maintained and provisions should be made to keep the list current.

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01 133 0573

APPENDIX C

PERMISSIBLE EXCURSIONS FOR TIME-WEIGHTED AVERAGE (TWA) LIMITS

The Excursion TLV Factor in the Table automatically defines the magnitude of the permissible excursion above the limit for those substances not given a "C" designation; i.e., the TWA limits. Examples in the Table show that nitrobenzene, the TLV for which is 1 ppm, should never be allowed to exceed 3 ppm. Similarly, carbon tetrachloride, TLV 10 ppm, should never be allowed to exceed 20 ppm. By contrast, those substances with a "C" designation are not subject to the excursion factor and must be kept below the TLV.

These limiting excursions are to be considered to provide a 'rule-of-thumb' guidance for listed substances generally, and may not provide the most appropriate excursion for a particular substance. Efforts are being made to develop such specific excursions, when indicated to be significantly [illegible] mended [illegible].

Substance	TLV ppm	Excursion Factor	Max. Conc. Permitted for short time ppm
Nitrobenzene	1	3	3
Carbon tetrachloride	10	2	20
o-Dichlorobenzene	50	1.5	75
Acetone	1000	1.25	1250
Boron Trifluoride	C1	-	1
Butylamine	C5	-	5
Styrene monomer	C100	-	100

For all substances:

	Excursion Factor
TLV >0-1 (ppm or mg/M^3),	=3
TLV >1-10 "	=2
TLV >10-100 "	-1.5
TLV >100-1000 "	[illegible]

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Threshold Limit Values of Physical Agents

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NOISE

These threshold limit values refer to sound pressure levels that represent conditions under which it is believed that nearly all workers may be repeatedly exposed without adverse effect on their ability to hear and understand normal speech. The medical profession (1, 2) has defined hearing impairment as an average hearing threshold level in excess of 25 decibels (ANSI S3.6 - 1969) at 500, 1000, and 2000 Hz, and the limits which are given have been established to prevent a hearing loss in excess of this value. These values should be used as guides in the control of noise exposure and, due to individual susceptibility, should not be regarded as fine lines between safe and dangerous levels.

Continuous or Intermittent

The sound level shall be determined by a sound level meter, meeting the standards of the American National Standards Institute and operating on the A-weighting network with slow meter response. Duration of exposure shall not exceed that listed in Table I.

1. Guides for the Evaluation of Hearing Impairment. Transactions of the American Academy of Ophthalmology and Otolaryngology, pp. 167-8 (March - April, 1959).
2. Guides to the Evaluation of the Permanent Impairment; Ear, Nose, Throat and Related Structures. Journal of the American Medical Association 197:489 (August 1961).

TABLE I

Permissible Noise Exposures

Duration per day Hours	Sound Level dBA a)
8	90
6	92
4	95
3	97
2	100
1-1/2	102
1	105
3/4	107
1/2	110
1/4	115*

* Ceiling Value: No exposure in excess of 115 dBA

a) Sound level in decibels as measured on a standard level meter operating on the A-weighting network with slow meter response.

These values apply to total time of exposure or a number of short-term exposures but does not apply to impact or impulsive type of noises.

When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the following fractions:

$$\frac{C1}{T1} + \frac{C2}{T2} + \cdots \frac{Cn}{Tn}$$

exceeds unity, then, the mixed exposure should be considered to exceed the threshold limit value, C1 indicates the total time of exposure at a specified noise level, and T1 indicates the total time of exposure permitted at that level. Noise exposures of less than 90 dBA do not enter into the above calculations.

Impulse or Impact Noise. It is recommended that exposure to impulsive or impact noise should not exceed 140 decibels peak sound pressure level (ceiling value).

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6943Å LASERS

Eye Protection

The threshold limit values for exposure of the eye refer to levels of laser energy at the cornea under conditions to which nearly all workers may be exposed without adverse effects. These threshold limit values should be used as guides in the control of exposures to the eye from Q-Switched, and Non-Q-Switched laser energy at 6943Å, and should not be regarded as fine lines between safe and dangerous levels. They are based on the best available information from experimental studies.

Adopted

The values apply to direct illumination or specular reflected laser energy (6943Å) at the cornea and do not apply to laser energy at any other wave length or operational mode.

Mode	Energy Density Joules/cm^2
Q-Switched (1n sec. - 1μ sec. pulse)	1 x 10^{-7}*
Non-Q-Switched (1μ sec. - 0.1 sec. pulse)	1 x 10^{-6}*

* Ceiling Value

CONTINUOUS WAVE LASERS

Eye Protection

The threshold limit values for exposure of the eye refer to levels of laser energy at the cornea under conditions to which nearly all workers may be exposed without adverse effects. These threshold limit values should be used as guides in the control of exposures to the eye from Continuous Wave laser energy in the 4000Å to 7500Å region of the spectra, and should not be regarded as fine lines between safe and dangerous [illegible] based on the best available information from experimental studies.

Adopted Values

The values apply to direct illumination or specular reflected continuous wave laser energy (4000Å to 7500Å) at the cornea and do not apply to laser energy at any other wave length or operational mode.

Mode	Power Density Watt/cm^2
Continuous Wave (~0.1 sec.)	1 x 10^{-5}*

* Ceiling Value

LASERS

Skin Protection

The threshold limit values for exposure of the skin to levels of laser energy in the visible, near infrared, and infrared portions of the spectra are under conditions which it is believed nearly all workers may be exposed without adverse effects.

These values should be used as guides in the control of exposure to pulsed and continuous wave laser energy, and should not be regarded as fine lines between [illegible] dangerous levels. These threshold limit values are based on the best available information from experimental studies.

The notation "SKIN PROTECTION" refers to the potential risk of exposure of the skin to laser energy. These limits are not directly related to, or part of, the threshold limit value for eye protection and are intended to suggest that appropriate control measures may be necessary to prevent damage to the skin.

Adopted Values

The values apply to the maximum intensity of laser energy incident on the skin (excluding eyes) in the visible, near infrared and infrared wave lengths.

Mode	
Pulsed	0.1 Joules/cm^2* (Energy Density)
Continuous Wave	1.0 Watts/cm^2* (Power Density)

* Ceiling Value

01 133 0577

NOTICE OF INTENT TO ESTABLISH
THRESHOLD LIMIT VALUES

MICROWAVES

These Threshold Limit Values refer to microwave energy in the frequency range of 100 MHz to 100 GHz and represent conditions under which it is believed that nearly all workers may be repeatedly exposed without adverse effect.

These values should be used as guides in the control of exposure of microwaves and should not be regarded as a fine line between safe and dangerous levels. The values will be reviewed annually by the Committee on Physical Agents for revisions or additions as further information becomes available.

Recommended Values

The Threshold Limit Value for occupational microwave energy exposure where power densities are known and exposure time controlled is as follows:

1. For average power density levels up to but not exceeding 10 milliwatts per square centimeter, total exposure time shall be limited to the 8-hour workday (continuous exposure).
2. For average power density levels from 10 milliwatts per square centimeter up to but not exceeding 25 milliwatts per square centimeter, total exposure time shall be limited to no more than 10 minutes for any 60 minute period during an 8-hour workday (intermittent exposure).
3. For average power density levels in excess of 25 milliwatts per square centimeter, exposure is not permissible (ceiling value).

NOTE: For repetitively pulsed sources the average power density may be calculated by multiplying the peak power density by the duty cycle. The duty cycle is equal to the pulse duration in seconds times the pulse repetition rate in hertz.

NOTICE OF INTENT TO ESTABLISH
THRESHOLD LIMIT VALUES

ULTRAVIOLET RADIATION

These threshold limit values refer to ultraviolet radiation in the spectral region between 200 and 400 nm and represent conditions under which it is believed that nearly all workers may be repeatedly exposed without adverse effect. These values for exposure of the eye or the skin apply to ultraviolet radiation from arcs, gas, and vapor discharges, and incandescent sources, but do not apply to ultraviolet lasers or solar radiation. These levels should not be used for determining exposure of photosensitive individuals to ultraviolet radiation. These values should be used as guides in the control of exposure to continuous sources where the exposure relation shall not be less than 0.1 sec.

These values should be used as guides in the control of exposure to ultraviolet sources and should not be regarded as a fine line between safe and dangerous levels. The values will be reviewed annually by the Committee on Physical Agents for revisions or additions as further information becomes available.

Recommended Values.

The threshold limit value for occupational exposure to ultraviolet radiation incident upon skin or eye where irradiance values are known and exposure time is controlled are as follows:

01 133 0578

1. For the near ultraviolet spectral region (320 to 400 nm) total irradiance incident upon the unprotected skin or eye should not exceed 0.1 W/cm^2.

2. For the actinic ultraviolet spectral region (200 - 315 nm), radiant exposure incident upon the unprotected skin or eye should not exceed the values given in Table 1 within a 24-hour period.

3. To determine the effective irradiance of a broadband source weighted against the peak of the spectral effectiveness curve (270 nm), the following weighting formula should be used:

$$H_{eff} = \sum H_\lambda S_\lambda \Delta_\lambda$$

where:

H_{eff} = effective irradiance relative to a monochromatic source at 270 nm

H_λ = spectral irradiance in $W/cm^2/nm$

S_λ = relative spectral effectiveness (unitless)

Δ_λ = band width in nanometers

4. Permissible exposure time in seconds for exposure to actinic ultraviolet radiation incident upon the unprotected skin or eye may be computed by dividing 0.003 J/cm by H_{eff} in W/cm^2. The exposure time may also be determined using Table 2 which provides exposure times corresponding to effective irradiances in $\mu W/cm^2$.

TABLE 1

Wavelength (nm)	TLV (mJ/cm^2)	Relative Spectral Effectiveness S_λ
200	100	0.03
210	40	0.075
220	25	0.12
230	16	0.19
240	10	0.30
250	7.0	0.43
254	6.0	0.5
260	4.6	0.65
270	3.0	1.0
280	3.4	0.88
290	4.7	0.64
300	10	0.30
305	50	0.06
310	200	0.015
315	1000	0.003

TABLE 2

Duration of Exposure Per Day	Effective Irradiance, H_{eff} ($\mu W/cm^2$)
8 hrs.	0.1
4 hrs.	0.2
2 hrs.	0.4
1 hr.	0.8
1/2 hr.	1.7
15 min.	3.3
10 min.	5
5 min.	10
1 min.	50
30 sec.	100
10 sec.	300
1 sec.	3,000
0.5 sec.	6,000
0.1 sec.	30,000

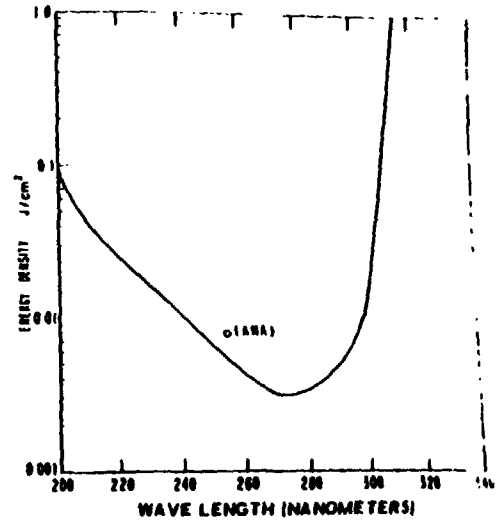


Figure 1 Proposed Threshold Limit Values for Ultraviolet Radiation

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NOTICE OF INTENT TO ESTABLISH THRESHOLD LIMIT VALUES

HEAT STRESS

These Threshold Limit Values refer to heat stress conditions under which it is believed that nearly all workers may be repeatedly exposed without adverse health effects. The TLVs shown in Table I are based on the assumption that nearly all acclimatized, fully clothed workers with adequate water and salt intake should be able to function effectively under the given working conditions without exceeding a deep body temperature of 38°C(WHO technical report series #413, 1969 Health Factors Involved in Working Under Conditions of Heat Stress).

Since measurement of deep body temperature is impractical for monitoring the workers' heat load, the measurement of environmental factors is required which most nearly correlate with deep body temperature and other physiological responses to heat. At the present time Wet Bulb-Globe Temperature Index (WBGT) is the simplest and most suitable technique to measure the environmental factors. WBGT values are calculated by the following equations:

1. Outdoors with solar load:
   WBGT = 0.7WB + 0.2GT + 0.1DB
2. Indoors or Outdoors with no solar load:
   WBGT = 0.7WB + 0.3GT

where

WBGT = Wet Bulb-Globe Temperature Index
WB = Natural Wet-Bulb Temperature
DB = Dry-Bulb Temperature
GT = Globe Thermometer Temperature

The determination of WBGT requires the use of a black globe thermometer, a natural (static) wet-bulb thermometer, and a dry-bulb thermometer.

TABLE I

Permissible Heat Exposure Threshold Limit Values
(Values are given in °C. WBGT)

	Work Load		
Work - Rest Regimen	Light	Moderate	Heavy
Continuous work	30.0	26.7	25.0
75% Work - 25% Rest	30.6	28.0	25.9
50% Work - 50% Rest	31.4	29.4	27.9
25% Work - 75% Rest	32.2	31.1	30.0

Higher heat exposures than shown in Table I are permissible if the workers have been undergoing medical surveillance and it has been established that they are more tolerant to work in heat than the average worker. Workers should not be permitted to continue their work when their deep body temperature exceeds 38.0° C.

APPENDIX A

HEAT STRESS

I. Measurement of the Environment

The instruments required are a dry-bulb, a natural wet-bulb, a globe thermometer, and a stand. The measurement of the environmental factors shall be performed as follows:

A. The range of the dry and the natural wet bulb thermometer shall be -5°C - 50°C with an accuracy of ± 0.5°C. The dry bulb thermometer must be shielded from the sun and the other radiant surfaces of the environment without restricting the airflow around the bulb. The wick of the natural wet-bulb thermometer shall be kept wet with distilled water for at least 1/2 hour before the temperature reading is made. It is not enough to immerse the other end of the wick into a reservoir of distilled water and wait until the whole wick becomes wet by capillarity. The wick shall be wetted by direct application of water from a syringe 1/2 hour before each reading. The wick shall extend over the bulb of the thermometer, covering the stem about one additional length. The wick should always be clean and new wicks should be washed before using.

B. One globe thermometer, consisting of a 15 cm. (6-inch) diameter hollow copper sphere, painted on the outside with a matte black finish or equivalent shall be used. The bulb or sensor of a thermometer (range -5°C - 100°C with an ac-

01 133 0580

curacy of ± 0.5°C) must be fixed in the center of the sphere. The globe thermometer shall be exposed at least 25 minutes before it is read.

C. One stand shall be used to suspend the three thermometers so that they do not restrict free air flow around the bulbs, and the wet-bulb and globe thermometer are not shaded.

D. It is permissible to use any other type of temperature sensor that gives identical reading to a mercury thermometer under the same conditions.

E. The thermometers must be so placed that the readings are representative of the condition where the men work or rest, respectively.

The methodology outlined above is more fully explained in the following publications:

1. "Prevention of Heat Casualties in Marine Corps Recruits, 1955-1960, with Comparative Incidence Rates and Climatic Heat Stresses in other Training Categories," by Captain David Minard, MC, USN, Research Report No. 4, Contract No. MR 005.01-0001.01, Naval Medical Research Institute, Bethesda, Maryland, 21 February 1961.

2. "Heat Casualties in the Navy and Marine Corps, 1959-1962, with Appendices on the Field Use of the Wet Bulb-Globe Temperature Index," by Captain David Minard, MC, USN, and R.L. O'Brien, HMC, USN. Research Report No. 7, Contract No. MR 005.01-0001.01, Naval Medical Research Institute, Bethesda, Maryland, 12 March 1964.

3. Minard, D.,: Prevention of Heat Casualties in Marine Corps Recruits. Military Medicine 126(4): 261-272, 1961.

II. Work Load Categories

The heat produced by the body and the environmental heat together determine the total heat load. Therefore, if work is to be performed under hot environmental conditions, the workload category of each job shall be established and the heat exposure limit pertinent to the work load evaluated against the applicable standard in order to protect the worker from exposure beyond the permissible limit.

A. The work load category may be established by ranking each job into light, medium, and heavy categories on the basis of type of operation, where the work load is ranked into one of said three categories, i.e.

(1) light work: e.g., sitting or standing to control machines, performing light hand or arm work,

(2) moderate work: e.g., walking about with moderate lifting and pushing,

(3) heavy work: e.g., pick and shovel work,

the permissible heat exposure limit for that work load shall be determined from Table 1.

B. The ranking of the job may be performed either by measuring the worker's metabolic rate while performing his job or by estimating his metabolic rate by the use of the scheme shown in Table A. Tables available in the literature listed below and in other publications as well may also be utilized.

1. Per-Olaf Astrand and Kaare Rodahl "Textbook of Work Physiology" McGraw Hill Book Company, New York, San Francisco, 1970.

2. Ergonomics Guide to Assessment of Metabolic and Cardiac Costs of Physical Work. Amer. Ind. Hyg. J. 1971. (In Press).

3. Energy Requirements for Physical Work. Purdue Farm Cardiac Project. Agricultural Experiment Station. Research Progress Report No. 30, 1961.

4. J.V.G.A. Durnin and R. Passmore "Energy, Work and Leisure." Heinemann Educational Books, Ltd. London 1967.

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TABLE A

Assessment of Work Load

Average values of metabolic rate during different activities.

A. Body position and movement	Kcal./min.
Sitting	0.3
Standing	0.6
Walking	2.0-3.0
Walking up hill	add 0.8 per meter (yard) rise

B. Type of Work	Average Kcal./min.	Range Kcal./min.
Hand work light	0.4	0.2-1.2
heavy	0.9	
Work with one arm		
light	1.0	0.7-2.5
heavy	1.8	
Work with both arms		
light	1.5	1.0-3.5
heavy	2.5	
Work with body		
light	3.5	2.5-15.0
moderate	5.0	
heavy	7.0	
very heavy	9.0	

Light hand work: writing, hand knitting

Heavy hand work: typewriting

Heavy work with one arm: hammering in nails (shoemaker, upholsterer)

Light work with two arms: filing metal, planing wood, raking of a garden

Moderate work with the body: cleaning a floor, beating a carpet

Heavy work with the body: railroad track laying, digging, barking trees

Sample Calculation Using a heavy hand tool on an assembly line

A. Walking along	2.0 Kcal./min.
B. Intermediate value between heavy work with two arms and light work with the body	3.0 Kcal./min.
	5.0 Kcal./min.
C. Add for basal metabolism	1.0 Kcal./min.
Total	6.0 Kcal./min.

Adapted from Lehmann, G.E., A. Muller and H. Spitzer: Der Kalorienbedarf bei gewerblicher Arbeit. Arbeitsphysiol. 14 (1950), 166-235.

III. Work - Rest Regimen

The permissible exposure limits specified in Table I and Diagram A are based on the assumption that the WBGT value of the resting place is the same or very close to that of the work place. If the resting place is air conditioned and its climate is kept at or below 24°C (75°F.) WBGT, the allowable resting time may be reduced by 25%. The permissible exposure limits for continuous work are applicable where there is a work-rest regimen of a 5-day work week and an 8-hour work day with a short morning and afternoon break (approximately 15 minutes) and a longer lunch break (approximately 30 minutes). Higher exposure limits are permitted if additional resting time is allowed. All breaks, including unscheduled pauses and administrative or operational waiting periods during work may be counted as rest time when additional rest allowance must be given because of high environmental temperatures.

It is common experience that when the work on a job is self-paced, the workers will spontaneously limit their hourly work load to 30 - 50% of their maximum physical performance capacity. They do this either by setting an appropriate work speed or by interspersing unscheduled breaks. Thus the daily average of the workers' metabolic rate seldom exceeds 330 kcal/hr. However, within an 8 hour work shift there may be periods where the workers' hourly average metabolic rate will be higher.

IV. Water and Salt Supplementation

During the hot season or when the worker is exposed to artificially generated heat, drinking water shall be made available to the workers in such a way that they are stimulated to frequently drink small amounts, i.e., one cup every 15 - 20 minutes (about 150 ml or 1/4 pint).

The water shall be kept reasonably cool (10 - 15°C or 50.0 - 60.0°F.) and shall be placed close to the workplace so that the worker can reach it without abandoning the work area.

The workers should be encouraged to salt their food abundantly during the hot season and particularly during hot spells. If the workers are unacclimatized, salted

01 133 0582

drinking water shall be made available in a concentration of 0.1% (1 g NaCl to 1.0 liter or 1 level teaspoon of salt to 10 quarts of water). The added salt shall be completely dissolved before the water is distributed, and the water shall be kept reasonably cool.

V. Other Considerations

A. Clothing: The permissible heat exposure TLVs are valid for light summer clothing as customarily worn by workers when working under hot environmental conditions. If special clothing is required for performing a particular job and this clothing is heavier or it impedes sweat evaporation or has higher insulation value, the worker's heat tolerance is reduced, and the permissible heat exposure limits indicated in Table I and Diagram A are not applicable. For each job category where special clothing is required, the permissible heat exposure limit shall be established by an expert.

B. Acclimatization and Fitness: The recommended heat stress TLVs are valid for acclimated workers who are physically fit.

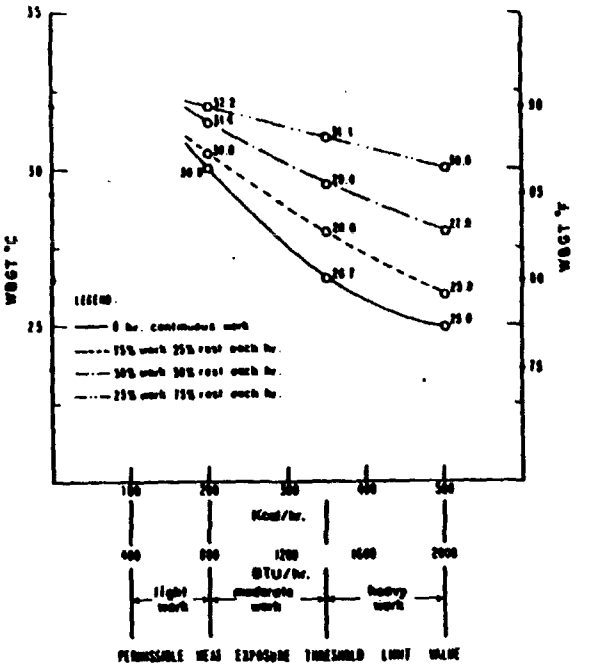


Diagram A - Permissible Heat Exposure Threshold Limit Value

RADIATION

See U.S. Department of Commerce National Bureau of Standards, Handbook 59, "Permissible Dose from External Sources of Ionizing Radiation," September 24, 1954, and addendum of April 15, 1958. A report, Basic Radiation Protection Criteria, published by the National Committee on Radiation Protection, revises and modernizes the concept of the NCRP standards of 1954, 1957 and 1958; obtainable as NCRP Rept. No. 39, P.O. Box 4867, Washington, D.C. 20008.

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1165 INFLUENZA IMMUNISATION IN INDUSTRY. D. D. Walker. *Trans. Soc. Occ. Med.* 21: 87-92, July 1971

Influenza is a costly disease, especially to industry in terms of working days lost. It is the only major cause of sickness absence where the possibility of prevention by immunisation exists. Vaccines are available which give good protection against the disease and which may also help to produce attenuated or sub-clinical infections. In the absence of accurate forecasts of epidemics, they must be administered annually. The disadvantages of immunisation against influenza are such that it is not recommended for general use, but are not so great as to preclude its use on a selective basis. A more intensive immunisation programme in industry is desirable if the burden of influenza is to be reduced and it is suggested that this might be carried out on a geographical basis. In addition, if it is accepted that protection should be given to those suffering from chronic bronchitis, preventive measures might also be directed at those industries where bronchitis is especially prevalent.

--Author's summary

1166 HUMAN COPPER DEFICIENCY. G. G. Graham. *New Engl. J. Med.* 285: 857-858, Oct. 7, 1971

Depending on the mammalian species involved, copper deficiency can cause anemia, neutropenia, defective collagen and elastin, skeletal and cardiovascular lesions and demyelination and degeneration of the nervous system. Cases of mixed iron and copper deficiency in milk-fed infants with anemia were recognized 40 years ago. Failure to confirm these findings, the generous copper stores of the newborn liver, and the abundance of copper in most foods, led to the concept that deficiency of this metal could not occur in humans. During the past few years copper depletion and deficiency have been identified as not uncommon in severely malnourished infants with chronic diarrhea, particularly those rehabilitated with modified cow's-milk preparations that contain very little copper. Neutropenia is usually found early, often accompanied by anemia, possibly owing to failure of iron absorption. In more protracted cases aregenerative anemia and scurvy-like bone lesions have appeared. Any malnourished infant, child or adult suffering from chronic or recurrent malabsorption or diarrhea and consuming a restricted diet should be watched for the development of neutropenia, with or without anemia, pathologic fractures and radiologic bone changes. A low serum copper or ceruloplasmin, suggestive of copper depletion, would then support the diagnosis of copper deficiency, an easily remedied condition. Research now in progress promises to elucidate the important role of copper, not only in iron "absorption" but in its utilization. More than anything, this work should help us understand how the availability of any essential nutrient depends on body stores, rates of utilization, dietary content, intestinal absorption, unusual losses from the body and integrity of homeostatic mechanisms. --Cond. from text

1167 PHOSPHATIDYLSERINE: SELECTIVE ENHANCER OF HISTAMINE RELEASE. A. Goth, H. R. Adams and Mary Knoohuizen. *Science* 173: 1034-1035, Sept. 10, 1971

Phosphatidylserine, in contrast with other phospholipids, markedly enhanced histamine release from rat peritoneal mast cells induced by dextran or protein antigens. This enhancing effect was selective for dextran and protein antigens and did not extend to the action of compound 48/80 or chymotrypsin. These findings suggest a role for phosphatidylserine in the response of mast cells to antigens.

--Authors' abst.

1168 EPIDEMIC MYCOPLASMA PNEUMONIA. B. L. Evatt, et al. *New Engl. J. Med.* 285: 374-378, Aug. 12, 1971

Twenty-six of 55 members and pledges of a college fraternity became infected with *Mycoplasma pneumoniae* over a three-week period in the fall of 1968. The epidemic curve suggested a common source of exposure. The only period in which members and pledges shared a common environment before the outbreak was on a single day when all were present at a catered banquet for pledge initiation ceremonies. The precise source and means of infection could not be identified. 20 references. --Authors' abst.

01 133 0598

1169 ASPERGILLUS INFECTION COMPLICATING CARDIAC TRANSPLANTATION. M. J. Gurwith, E. B. Stinson and J. S. Remington. *Arch. Int. Med.* 128: 541-545, Oct. 1971

During the initial two-year period of the cardiac transplant program at Stanford University Hospital, a 28% incidence of invasive pulmonary aspergillosis was observed. The diagnosis was based on postmortem findings in two patients, and on isolation of the fungus from percutaneous lung aspirates or transtracheal aspirates in the other three. *Aspergillus* was isolated from multiple cultures of sputum from four of the five patients. Local or systemic amphotericin B therapy or both was administered to three patients, and in two of them long-term treatment was necessary. Among the multiple underlying predisposing factors responsible for the high incidence of aspergillosis in cardiac transplant patients, pulmonary factors relatively unique to cardiac transplantation as well as immunosuppression appeared to play major roles. 22 references. --Authors' abst.

1170 HISTOPATHOLOGICAL DEFINITION AND CLASSIFICATION OF TUMOURS. L. H. Sobin. *WHO Chronicle* 25: 363-366, August 1971

Since 1957, WHO has been responsible for organizing and co-ordinating a programme for the development of a uniform, internationally acceptable morphological classification of tumours that would facilitate communication between pathologists, clinicians, epidemiologists, and statisticians engaged in studies on cancer. A random survey of 18 recent reports in the English literature on lung cancer showed that eight different systems of histopathological nomenclature were being used. WHO is issuing a series of histological classifications of tumours in order to improve international communication and limit the wastage of data in this field. --Cond. from text

1171 MALARIA CHEMOTHERAPY. L. H. Schmidt. *Bull. Southern Res. Inst.* 24: 3-14, 1971

An expanded malaria research program - a product of U.S. involvement in Southeast Asia - has resulted in significant progress toward new drugs. This article describes some of the newest and most promising of these drugs, which are now in human studies. --Editor's abst.

1172 CARDIAC ABNORMALITIES (FROM KALURESIS) DUE TO LICORICE INTOXICATION. H. J. Robinson, F. S. Harrison and J. T. L. Nicholson. *Penna. Med.* 74: 51-54, March 1971

Potassium was recognized by Ringer in 1883 as essential for normal myocardial function. Structural as well as functional abnormalities of the cardiovascular system resulting from potassium ion depletion have been well documented. Hypokalemia has been associated with multiple etiologies including prolonged diarrhea or vomiting, familial periodic paralysis, primary aldosteronism, a variety of renal abnormalities, diabetic acidosis, severe alkalosis, versene poisoning, and corticosteroid or diuretic therapy. The kaluretic effect of licorice ingestion is a less frequently considered etiology for potassium ion depletion. The case reports of licorice induced hypokalemia reviewed by other authors emphasized the disturbances of neuromuscular function, renal function, acid base equilibrium and hypertension. The case reported here, however, describes significant cardiac dysfunction associated with licorice ingestion. --Cond. from text

1173 RESPIRATORY MECHANICS - AIRWAY COLLAPSE. E. G. Vail. *Aerosp. Med.* 42: 975-979, Sept. 1971

Pulmonary function tests were conducted on 37 healthy adults. The experimental data indicate that maximum expiratory flow rates are limited by collapse of the segmental bronchi. Maximum inspiratory flow rates are limited, during performance of maximum breathing capacity (MBC), by closure of the subsegmental bronchi. Maximum expiratory flow rates during MBC are also limited by collapse of the subsegmental bronchi. If airway closure/collapse occurred in the small bronchi, bronchioles, terminal bronchioles, or respiratory bronchioles, then the flow rate would have to exceed 18 liters per second. --Author's abst.

01 133 0599

1174 TIME ZONE TRANSITIONS AND BUSINESS EXECUTIVES. R. T. W. L. Conroy. *Trans. Soc. Occ. Med.* 21: 69-72, July 1971

Circadian (or 24 hour) rhythms in man are currently a very active field of research. These rhythms have a number of applications in occupational medicine; their implications for business executives making long East-West or West-East journeys across time zones are of particular interest. Examples of physiological and psychological disturbances in test subjects flying across time zones are described. Replies from medical advisers to leading companies concerned with the problem are commented on and a survey of 315 senior executives in a number of major British and American companies detailed. From the replies received, it emerged that 87.5 per cent of the executives had sleep disturbances following such journeys and that business negotiations were conducted by 50 per cent before gaining a night's sleep, even though less than 20 per cent claimed to be fully fit when so doing. Comments and advice to executives making long East-West or West-East flights are suggested. --Author's summary

1175 THE INTERNAL CLOCK OF THE INTERNATIONAL JET TRAVELLER. D. R. O'Donnell. *Med. J. Austral.* 1: 1227-1230, June 5, 1971

The paper commences with a brief description of some aspects of air travel 50 years ago, and subsequent development to jet travel. This leads into a discussion of travel fatigue and its causes, with particular reference to alteration of the circadian rhythm. A formula for estimating end-of-travel rest periods is offered, along with suggestions for minimizing fatigue with particular emphasis on adequate planning and their application to the aeroplanes of tomorrow. --Author's abst.

1176 PSYCHOPHYSIOLOGIC AND CONVERSION MECHANISMS: THE AVIATOR'S EMOTIONAL FACE CURTAIN. J. A. Pursch and R. F. Reinhardt. *Aerosp. Med.* 42: 1015-1017, Sept. 1971

Psychophysiologic and conversion mechanisms as an unconscious expression of the student pilot's decreasing motivation for further flight training are discussed. Flight students in this category are characterized by a family life style of excessive use of rationalization, blaming others for their own shortcomings, exaggerating minor complaints into disabling symptoms and manifesting very little subjective concern about them (la belle indifference). They don't look for disability compensation and they unconsciously force the examiner into removing them from flight status. If this is not swiftly accomplished they are apt to develop new symptoms. Four case histories are used to illustrate how the flight surgeon can interview the failing student by listening with a "third ear" for such checkpoints as life style, problem-solving techniques, slips of the tongue and metaphores. These data along with health record and flight record information then point to the proper disposition. --Authors' abst.

1177 THE HEALTH OF WOMEN. J. Peel. *Brit. Med. J.* 3: 267-271, July 31, 1971

The greater involvement of women in full- or part-time employment in industry, business, and the professions makes them equally liable to the environmental stresses and accidents associated with such a way of life. Women are as equally involved in the health hazards associated with pollution in our modern society and in the risks due to the greater mobility of populations and the frequency of travel. In the world in which we live today there have been very substantial changes since the sixteenth century, and in the care of the female members of the community there has been great progress. This article discusses in some detail many of the problems concerned with the health of women. The author covers the field in a general way and highlights some of the many problems related to health that are particularly relevant today. --Cond. from text

01 133 0600

1178 ISSUES IN THE ORGANIZATION OF MEDICAL CARE. R. N. Podell. *New Engl. J. Med.* 284: 586-589, March 18, 1971

In recent years there has been increasing debate over the most effective and efficient ways to organize both individual medical practices and large health-care systems. Part of this debate has focused on the attempt to define the appropriate level of responsibility, educational requirements and functional relations among the many kinds of physician and nonphysician personnel who work in the health field. The debate is of general concern because of the difficulty in fulfilling the professed goals of the health-care system: providing high-quality services in sufficient quantity and equitable distribution at prices the consumer can afford. From this arise many issues currently in controversy - for example, earlier specialization, the family physician, physician assistants, national health insurance, quality of care control, utilization review and fee controls. The issues are of particular concern to each kind of health worker, for their resolution will have important effects upon the character of each health career: its scope of responsibility; working conditions; educational requirements; earning potential; social stature; and self-image. This paper examines several of the issues of current debate through a study of the American podiatrist. The podiatrist in the United States is a highly trained health worker who in the scope of his practice, independence of judgment and financial rewards is very similar to the physician. Nevertheless, the proper role of podiatry in health care remains controversial. By examination of the profession of podiatry a different perspective can be obtained upon some of the controversial issues in health-care organization that face the medical profession as well. --Cond. from text

SKIN DISEASES AND BURNS

1179 DIRECT SCANNING ELECTRON MICROSCOPY OF HUMAN SKIN. C. M. Papa and Beverly Farber. *Arch. Dermatol.* 104: 262-270, Sept. 1971

Scanning electron microscopy (SEM) offers a unique view of biological materials, spanning the gap between light microscopy and conventional transmission electron microscopy. Dermal and epidermal sheets obtained by sodium bromide separation of human skin may be directly examined with the scanning electron microscope. Unique views of four surfaces, the stratum corneum, basal cell layer, papillary dermis, and deeper cutis, as well as appendageal structures, are readily available. The simple technique utilized may be further modified by incubating the epidermal sheet in DOPA for selective study of melanocytes. --Cond. from text

1180 ELECTRICAL BURNS OF THE MOUTH IN CHILDREN. A. B. Ackerman and G. L. Goldfaden. *Arch. Dermatol.* 104: 308-311, Sept. 1971

Electrical burns of the mouth occur primarily in toddlers, between ages 1 and 2 years, who are disposed to placing objects in their mouth. When a child sucks on the free end of a "live" multiple-outlet extension plug, the electrolyte-containing saliva drools into the plug, completing the electrical circuit. Rarely, chewing through the insulation of the wire produces the same effect. The flow of electrons through tissue creates an incremental release of heat energy, resulting in a burn. The mouth burn is only one potential injury from electrical extension plugs. Cardiac arrhythmias and death occur when there is large contact, good grounding, and passage of greater current through the chest. The prognosis for healing of mouth burns with a good cosmetic result depends upon the extent of tissue destruction and judicious management. It is difficult to estimate, early, the exact amount of tissue injury, because the damage in electrical burns is usually deeper and wider than is clinically evident. Recognition of the cause of injury is crucial, because management of mouth burns in children must be directed to conserving as much tissue as possible in order to minimize disfigurement. Although early excision and repair has been advocated, the conservative approach, which allows spontaneous healing followed by a reconstructive procedure, is preferred. --Cond. from text

01 133 0601

1181 RESEARCH INTO PSORIASIS - THE LAST DECADE. S. Shuster. *Brit. Med. J.* 3: 236-239, July 24, 1971

Psoriasis is a disease of faulty epidermopoiesis possibly due to impaired autocontrol mechanisms. The need for organ growth is obvious in many tissues, seen with compensatory hypotrophy of the liver and kidney. In the skin such "consumer control" implies a predominantly local mechanism: it would not do, for example, if the response to new boots was thick skin on the buttock as well as on the blister. The local response to a wound is epidermal proliferation and the idea of a local wound hormone was therefore inevitable. A stimulator control has been suggested by some and is obviously a possibility. A contrary view - and one more in keeping with the law of negative feedback (surely one of the greatest ideational consequences of technology?) - is of an inhibitory control. At present most of the little work which has been done is on the inhibitor systems - chalones - and there is now some evidence of chalone control of the kidneys, lungs, and blood cells, as well as skin. While it is far too soon to be certain about the nature of epidermal chalone, there is enough evidence to suggest that it exists. The next step - for which there is now a line-up for a healthy scientific race - is establishing whether psoriasis is a chalonosis. 124 references. --Cond. from text

1182 CUTANEOUS STREPTOCOCCAL INFECTIONS IN VIETNAM. A. M. Allen, D. Taplin, and L. Twigg. *Arch. Dermatol.* 104: 271-280, Sept. 1971

Disabling ecthymatous pyoderma was endemic in every American combat unit examined in the Mekong Delta region of Vietnam. It clearly reached epidemic proportions in some infantry battalions, and was responsible for more man-days lost from field duty in these units than all other nonbattle causes combined. In one battalion we studied, over 10% of the men were unable to perform normal field duty because of bacterial pyoderma, and at least that many men had lesions which had not progressed to the point of disability. Recent reports have indicated that the problem with pyoderma in Vietnam was not unique to the Mekong Delta. Thus, in terms of morbidity, tropical bacterial pyoderma was often the leading medical problem among American soldiers stationed in the lowland areas of Vietnam. The predominant lesions were ecthymatous ulcers of the lower extremities, 90% of which yielded group A β-hemolytic streptococci on culture. Combat-related exposure to environmental sources of minor skin trauma appeared to account for the greater than threefold difference between combat and support troops in prevalance of pyoderma involving the foot and ankle. Pyodermas were more than 2½ times as prevalent in whites as in those with darker skins, a difference which existed independent of environmental exposure. Systemic addition of penicillin to standard topical treatment significantly reduced healing time. Coagulase-positive staphylococci were commonly isolated from pyodermas, but evidence is adduced that they were secondary wound colonizers rather than primary pathogens. --Cond. from text

CHEMICAL HAZARDS

1183 STANDARDS FOR THE PREVENTION OF OCCUPATIONAL LEAD POISONING. R. A. Kehoe. *Arch. Environ. Health* 23: 245-248, October 1971

A conference authorized by the Permanent Commission and International Association on Occupational Health met in Amsterdam in November of 1968, as one of a series of similar meetings of special groups under this same sponsorship, to engage in the presentation of prepared papers, and in discussions of standards for the maintenance of satisfactory environmental conditions, and for the medical and hygienic supervision of workmen for the preservation of their safety, health, and well-being while employed in establishments engaged in the production and use of lead and its inorganic compounds. Nine papers and reports have been included in this issue of the *Archives*. --Cond. from text

Editor's Note: These nine papers are: Certain biological effects of lead upon the animal organism, A. de Bruin; Biochemical tests for the appraisal of exposure to lead, M. K. Stankovic; Delta-Aminolevulinic Acid Synthetase and Adenosine Triphosphate activity in acute Saturnine intoxication in rabbits, A. Gajdos and M. Gaydos-Torok; Environmental contamination by Lead from a mine and smelter,

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D. Djuric, et al.; Biochemical responses to provocative chelation by Edetate Disodium Calcium, J. Teisinger; Occupational exposure to inorganic compounds of Lead, H. Urbanowicz; Lead concentration found in human blood in association with Lead Colic, T. Beritic; Prevention of long-term sequelae following the absorption of Lead, D. Malcolm; and Interrelationship of biochemical responses to the absorption of inorganic Lead, R. L. Zielhuis. --M. C. C.

1184 MERCURY ANALYSES AND TOXICITY: A REVIEW. R. A. Baker and M. D. Luh. *Ind. Wastes* IW21-IW29, May/June 1971

Recent intensification of interest in mercurial discharges and their effect on the ecology have accelerated investigation of the analytical detection and quantification of this pollutant. Surveys require speedy yet accurate procedures which are not subject to interferences by other constituents in natural or waste waters. The objective of this review is to summarize some of the known toxicological effects of mercurials and to examine the various analytical procedures used in its identification and quantification. 67 references. --Cond. from text

1185 ORGANOPHOSPHATE POISONING. D. T. Teitelbaum. *J. Am. Med. Assn.* 217: 1704, Sept. 20, 1971

Milby is to be complimented on his excellent brief summary of poisoning with organophosphorus pesticides (see Industrial Hygiene Digest abstract #1081, October 1971). The hazard to workers in pesticide manufacturing, farming, and transportation industries from these compounds is great. At the same time, the importance of the organophosphorus pesticides in suicide and intentional overdosage should be stressed. For example, in India, parathion has replaced the barbiturates as the drug of choice in suicide attempts. In his own practice the author has seen three extremely severe intentional suicidal ingestions of malathion within the last year. All three patients survived by vigorous decontamination and use of pralidoxine and atropine in massive doses, as well as intensive respiratory care and other medical support. In one case a young girl required 600 mg intravenously and 3 gm of pralidoxine intravenously in the first 24 hours, following ingestions of a pint of 50% malathion solution. One point should be stressed regarding the clinical signs of adequate atropinization. Milby points out that dry flushed skin, tachycardia as high as 140 beats per minute, and dilated pupils are the sought after end-points in the administration of atropine. In the author's own experience, none of these is particularly reliable, and the single most useful sign of adequate atropinization in acute anticholinesterase poisoning is cessation of oral and trachael secretions. Ultimately, that is the goal one seeks in atropine therapy and it should be kept in mind when the drug is administered.

--Letter to the editor, modified

1186 PREVENTIVE EFFECT OF PRETREATMENT WITH LOW DOSE OF METALS ON THE ACUTE TOXICITY OF METALS IN MICE. H. Yoshikawa. *Ind. Health* 8: 184-191, Dec. 1970

The present study was designed to obtain the precise information on the tolerance to the acute toxicity of various kinds of metals. This tolerance was determined by the difference of mortality between the mice given the lethal doses of metals with and without pretreatment. From the results of this experiment, it was found that metals were divided into 3 groups as follows: Group I: Metals with which the mortality caused by challenge are reduced with pretreatment. These metals which can develop a tolerance against their own toxic action are Ag, As, Cd, Hg, In, Pb, Mn, and Sn. Group II: Metals with which their pretreatment had no effect on mortality caused by challenging are Cu, Ni, Se, and Tl. Group III: Metals with which pretreatment increased their mortality and these metals became more toxic by pretreatment: Ba, Cr, Fe, and Zn. From these results, it can be concluded that pretreated mice show a tolerance to the toxic action of most of contaminant metals and do not to that of essential metals. Moreover, it was found that metals belonging to Group I have the ability to develop a cross-tolerance while those of Group II and III do not. 18 references. --Cond. from author's abst.

01 133 0603

1187 EVALUATION OF THE PSYCHOPHYSIOLOGICAL FUNCTION IN HUMANS EXPOSED TO THE 'THRESHOLD LIMIT VALUE' OF 1,1,1-TRICHLOROETHANE. M. Salvini, S. Binaschi, and M. Riva. [illegible] 28: 286-292 July 1971

The effects on the psychophysiological functions in human beings of exposure to 1,1,1-trichloroetnane (methylchloroform; MC) were evaluated by exposing six male university students to an average vapour concentration of 450 p.p.m. for two periods of 4 hours, separated by a 1½-hour interval. Each subject was examined on two different days, one day undertaking a set of tests in an atmosphere containing MC vapour and on the other day in a "control" atmosphere which did not contain MC. On each of the two days a series of tests was performed at 8:30 a.m. and repeated at 6 p.m. They comprised a perception test with tachistoscopic presentation, Wechsler Memory Scale, a complex reaction time test, and a manual dexterity test. A crossed scheme analysis was used. After the two exposures no disturbances in motor function, coordination, equilibrium or behaviour patterns were observed in any of the subjects; there were some complaints about eye irritation at the peak exposure periods. The following conclusion may be drawn from the results. In humans exposed to a vapour concentration of MC of 450 p.p.m. the psychophysiological functions studied were not decreased. The low percentage reduction in performance which was observed is not statistically significant. In the perception test an interaction between exposure to MC and mental fatigue was observed. --Authors' abst.

1188 THE ABSORPTION OF PHOSGENE BY AQUEOUS SOLUTIONS AND ITS RELATION TO TOXICITY. T. Nash and R. E. Pattle. *Ann. Occ. Hyg.* 14: 227-233, Sept. 1971

Phosgene is poorly absorbed when the gas in air is passed at a moderate rate through water or neutral buffer in a simple bubbler. Absorption is unchanged in acid solution but increased in alkaline, and increased still more in solutions containing non-ionized amines, phenoxide ions or sulphite. It is concluded from data on the solubility and rate of hydrolysis that phosgene in molecular form can penetrate all three layers of the blood-air barrier and that its effects are caused by molecular phosgene and not by hydrochloric acid. The upper respiratory tract is protected against phosgene by hydrolysis in the mucus layer; chlorine, by contrast, can penetrate the layer and attack the tissues.

--Authors' abst.

1189 STUDIES ON NITROGLYCOL POISONING: ON SOME PROPERTIES OF AN ENZYME WHICH DECOMPOSES NITROGLYCOL INTO INORGANIC NITRATE. H. Tsuruta and H. Hasegawa. *Ind. Health* 8: 99-118, October 1970

An enzyme, which catalyzes the decomposing reaction of nitroglycol or nitroglycerin into inorganic nitrate and ethylene glycol mononitrate, was found in the blood and in the liver. This enzyme was named as "Nitrate forming enzyme". Both the enzymes in the blood and in the liver showed the same properties, but they were clearly different from nitrite forming enzyme reported by Heppel and Hilmore (J. Biol. Chem. 183: 129, 1950). Nitrate forming enzyme was extracted from acetone powder of the liver and partially purified by ammonium sulfate fractionation. The value of Michaelis constant of the enzyme was about 3.0mM at pH 7.4 and 37°C, and the value of optimum pH was 6.3. This enzyme acts on nitroglycol without reduced glutathione (GSH) as a co-factor, although nitrite forming enzyme can not act in the absence of GSH. A significant property of this enzyme is the inactivation by the substrate itself, and it appears at very low concentrations of nitroglycol. 17 references.

--Authors' abst. modified

1190 NERVOUS DISORDER IN ACUTE CARBON MONOXIDE POISONING. M. Sato and H. Hasegawa. *Ind. Health* 8: 168-183, Dec. 1970

In acute carbon monoxide poisoning the action of carbon monoxide on living organism has not been recognized to be explained satisfactory on the basis of oxygen lack alone, and thus some factors which might explain the essential properties of carbon monoxide poisoning have been assumed and investigated. The authors have found a factor by examining animals exposed to carbon monoxide biochemically and pharmacologically.

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The factor in acute carbon monoxide poisoning was the velocity of carboxyhemoglobin formation, but not carboxyhemoglobin formation in itself. This factor may be named as the inner circumstance factor corresponding to the outer circumstance factor. This factor may also be considered to have some important roles not only in carbon monoxide poisoning but also in many other poisonings.

--Authors' abst. modified

1191 PULMONARY OEDEMA FOLLOWING EXPOSURE TO TRICHLORETHYLENE. A. J. Seage and M. W. Burns. *Med. J. Austral.* 2: 484-486, Aug. 28, 1971

Trichlorethylene ($CH\ Cl{:}C.Cl_2$) is a commonly used industrial solvent, for example in the dry-cleaning industry. It also holds an established place in medical practice, principally as an obstetric analgesic. Over the years, an anomaly has become apparent in that while its use in medicine has been comparatively free of harmful effects, its industrial use has been fraught with the hazard of sudden death. Such fatal collapse of healthy workers after exposure to trichlorethylene, some of whom developed pulmonary oedema, has gone unexplained. The case reported here of a man who developed non-fatal pulmonary oedema after exposure to trichlorethylene and subsequent ingestion of ethyl alcohol, suggests that alcohol may be a serious precipitating factor in the cardio-respiratory toxicity of trichlorethylene in industry.

--Cond. from text

INDUSTRIAL DUSTS

1192 A COMPARISON OF MASS AND FIBRE CONCENTRATIONS OF ASBESTOS DUST IN SHIPYARD INSULATION PROCESSES. P. G. Harries. *Ann. Occ. Hyg.* 14: 235-240, Sept. 1971

Measurements have been made of the mass and fibre concentrations of dust produced during shipyard processes involving asbestos insulating materials. Comparison of the results of measuring total dust, "respirable" dust and fibre concentration show that gravimetric measurements are not suitable for environmental monitoring in Naval Dockyards. The membrane filter technique for estimating fibre concentration is recommended for that purpose. --Author's abst.

1193 TOXIC GASES IN TOWER SILOS. B. T. Commins, F. J. Raveney and M. W. Jesson. *Ann. Occ. Hyg.* 14: 275-283, Sept. 1971

Toxic gases are evolved from crops during the preparation of silage for winter feeding of animals. Very dangerous concentrations may be reached in the course of fermentation in tower silos. Several fatalities have occurred following exposure to silage gases and the cause of death has commonly been attributed to nitrogen dioxide poisoning. There is usually no need for men to enter silo towers but they may have to go in to cover stored crops with plastic sheets to prevent mould formation, or to remove this sheeting before unloading the silage, or they may have to enter when there is a breakdown of unloading machinery. The concentrations of toxic gases liberated in tower silos have been measured. The relevance of these concentrations to the health of workers exposed to these gases is discussed.

--Cond. from text

1194 ASBESTOS DUST CONCENTRATIONS IN SHIP REPAIRING. P. G. Harries. *Ann. Occ. Hyg.* 14: 241-254, Sept. 1971

A survey of the asbestos fibre concentrations associated with work involving asbestos insulating materials has been undertaken in Devonport Dockyard. The results show that application and removal of asbestos materials both create high dust concentrations, and measures to reduce the health hazards associated with such processes are described. The results of sampling after the introduction of preventive measures are briefly presented and these results indicate that the precautions are effective in reducing the asbestos dust concentrations in shipyard insulation processes. --Author's abst.

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1195 SEQUENTIAL OBSERVATIONS ON PULMONARY FUNCTIONAL DERANGEMENTS IN BAGASSOSIS. D. E. Jenkins, et al. [illegible] 128: 535-540, October 1971

Bagassosis developed in three patients following repeated exposure to bagasse handled in the manufacture of mud used for oil drilling operations. Physiologic studies were carried out with prolonged observations. All patients recovered without corticosteriod therapy. Main abnormalities were reduction in lung volumes, diminished diffusing capacity, hypoxemia, and low pulmonary compliance. No airways obstruction or impairment of intrapulmonary gas distribution was noted. Functional defects improved within two months; maximum recovery was achieved after six months. Since all patients were treated symptomatically, the speed and extent of recovery may be considered as a baseline for persons with normal pulmonary function results before and after illness who have had no more than one clinical episode of bagassosis.

--Authors' abst.

1196 ALLERGIC BRONCHOPULMONARY ASPERGILLOSIS. M. C. Jordan, C. W. Bierman, and P. P. VanArsdel. [illegible] Med. 128: 576-581, Oct. 1971

Allergic bronchopulmonary aspergillosis has been reported infrequently in the United States. Two patients with this syndrome are described. Both had pulmonary infiltrates, peripheral eosinophilia, positive immediate skin responses to *Aspergillus*, and serum precipitins against *Aspergillus* extract. One patient also developed a "late" Arthus-type skin reaction. Lung biopsy specimens of both patients showed peribronchiolar and alveolar infiltration with plasma cells and eosinophils. Excellent clinical responses to corticosteroids were observed and the fungi were eliminated from the sputum. The specificity of immunologic and cutaneous tests in fungal hypersensitivity was investigated in 26 subjects, ten of whom had asthma related to fungal allergens. No false-positive reactions to *Aspergillus* occurred. However, serum samples from 25 subjects demonstrated precipitin reactions with *Helminthosporium* extract. Immunoelectrophoresis revealed that these precipitins were nonspecific reactions with serum beta lipoprotein and did not involve γ-globulin. 20 references. --Authors' summary

1197 INSULATION WORKERS IN BELFAST: COMPARISON OF A RANDOM SAMPLE WITH A CONTROL POPULATION. W. F. M. Wallace and J. H. M. Langlands. *Brit. J. Ind. Med.* 28: 211-216, July 1971

A sample of 50 men was chosen at random from the population of asbestos insulators in Belfast and matched with a control series of men of similar occupational group with respect to age, height, and smoking habit. Significantly more of the insulators complained of cough and sputum and had basal rales on examination. Clubbing was assessed by means of measurements of the hyponychial angle of both index fingers. These angles were significantly greater in the group of insulators. Twenty-one insulators had x-rays which showed pleural calcification with or without pulmonary fibrosis; one control x-ray showed pulmonary fibrosis. The insulators had no evidence of airways obstruction but static lung volume was reduced and their arterial oxygen tension was lower than that of the controls and their alveolar-arterial oxygen gradient was greater. 34 references. --Authors' abst.

1198 INSULATION WORKERS IN BELFAST: MORBIDITY IN MEN STILL AT WORK. J. H. M. Langlands, W. F. M. Wallace, and Marion J. C. Simpson. *Brit. J. Ind. Med.* 28: 217-225, July 1971

Two hundred and fifty-two (93%) of the insulation workers in Belfast were examined by chest x-ray, questionaire, clinical examination, and tests of respiratory function. The frequency of chest x-ray abnormality lung field or pleural, increased from 13% in men who had worked for less than 10 years to 85% in men who had worked for 30 or more years in the industry. Pleural calcification was found in 15 x-rays. There was evidence suggesting that some men had pleural fibrosis or calcification due to exposure to asbestos in childhood. Rales were present in 61% and clubbing in 11% of men with lung field abnormality, but these were not common when the x-rays showed only pleural abnormality. Where the lung fields were involved there was a restrictive defect with impairment in lung function most

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marked in the forced vital capacity and single breath carbon monoxide transfer factor, but where the pleura was involved without lung field involvement there was a tendency to impairment of ventilatory function with a normal transfer factor. Cigarette smoking was associated with a greater impairment of lung function than was x-ray abnormality. --Authors' abst.

1199 INSULATION WORKERS IN BELFAST: MORTALITY 1940-66. P. C. Elmes and Marion J. C. Simpson. *Brit. J. Ind. Med.* 28: 226-236, July 1971

One hundred and seventy men were identified as making up the total population of insulation workers in Belfast in 1940. This is an analysis of all the information about deaths that has emerged from tracing these men up to the end of 1966. Five remain untraced, and the mortality experience of the remainder is compared with that of other men in Northern Ireland over the period. There were 98 deaths when only 37 were expected. The number of deaths occurring exceeded those expected throughout the period 1940-66 and the increase was statistically significant during the period 1950-55 and onwards. There was an especially high mortality (compared with other Northern Ireland males) due to cancer of the lung, mesothelioma of the pleura and peritoneum, cancer of the gastrointestinal tract, and fibrotic lesions of the lungs. The ratio of observed over expected deaths was 2.6 for all causes, 3.9 for all cancers, and 17.6 for cancers of the lower respiratory tract and pleura. Those men finally classified as dying from lung cancer showed evidence of lung fibrosis whereas those classified as dying from mesothelioma did not. Comparisons within the group failed to show any relationship between age at first exposure or duration of exposure and the excessive mortality. There were too few non-smokers to show the significance of smoking. --Authors' abst.

1200 ACUTE BRONCHIOLITIS FOLLOWING PROVOCATIVE INHALATION OF "ALCALASE" - A PROTEOLYTIC ENZYME USED IN THE DETERGENT INDUSTRY. C. A. Mitchell and B. Gandevia. *Med. J. Austral.* 1: 1363-1367, June 26, 197[illegible]

A pulmonary reaction characterized by the development of bilateral inspiratory and expiratory fine [illegible] was observed in 11 of 29 subjects on brief exposure to aerosol "Alcalase", a proteolytic enzyme used in detergent powders. The concentration of "Alcalase" producing the reaction varied from 0.01 to 10 mg/ml (tending to be lower in skin-sensitized subjects), within the range likely to be encountered under the working conditions obtaining at the time. The pulmonary reaction occurred alone in four subjects. In the remaining seven subjects, it was associated with, although temporally independent of, an immediate or late bronchial reaction, as indicated by the development of asthmatic symptoms and a decrease in FEV_1. Symptoms were absent or minimal in the absence of a bronchial reaction. Neither skin sensitivity nor symptoms on industrial exposure were related to the development of rales on challenge. The reaction, which presumably occurs in the bronchioles or small airways, raises the possibility of long-term effects, and raises special problems and obligations in medical surveillance during individual exposures and as a long-term procedure. --Authors' abst.

1201 THE USE OF DUST RESPIRATORS IN THE PREVENTION OF RECURRENCE OF FARMER'S LUNG. C. A. Gourley and G. D. Braidwood. *Trans. Soc. Occ. Med.* 21: 93-95, July 1971

The wearing of dust respirators has been advised for the prevention of dust-induced pulmonary disease in agricultural workers (Medical Research Council 1968). The effectiveness of such respirators in the prevention of recurrence of farmer's lung has been questioned (Medical Research Council 1968). This article reports the results of a "provocative trial" carried out on a farmer who suffers from farmer's lung, together with findings from other farmers who have been using respirators for some months. --Authors' summary modified

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1202 PRICK-TESTS AND SEROLOGICAL TESTS IN THE DIAGNOSIS OF ALLERGIC REACTIVITY TO ENZYMES USED IN WASHING PRODUCTS. M. J. How and G. W. Cambridge. Brit. J. Ind. Med. 28: 303-307, July 1971

Standardized prick-test antigens for use in the detection of allergic reactivity to enzymes (Alcalase and Maxatase) used in washing products have been prepared. These materials contained all the potentially allergenic components of the crude enzyme preparations. Tests showed that these materials were more appropriate, as prick-test antigens, than the crystalline enzyme. The presence of reagin-mediated, immediate-type allergy in factory workers was confirmed by prick-tests and passive transfer tests. Sera from these subjects and controls contained enzyme-specific haemagglutinating antibody and gave precipitin-like reactions with solutions of Alcalase and Maxatase. The latter reaction involved serum components electrophoretically similar to, or identical with, a-globulins. --Authors' abst.

PHYSICAL ASPECTS OF THE ENVIRONMENT

1203 THERMAL LIMITS FOR INDUSTRIAL WORKERS. C. R. Bell and A. J. Watts. *Brit. J. Ind. Med.* 28: 259-264, July 1971

The literature on relationships between man's comfort, efficiency, and physical well-being and the nature of his thermal working environment is diverse and highly specific. Industrial practice requires more general "concensus" data on which to base reasonable recommendations for the establishment of thermal environmental limits. A series of three such limits is proposed which provide protection of the workers' comfort, efficiency, and physiological safety. For sedentary workers it is suggested that in summer an upper limit of 21.8° C C.E.T. is advisable if not less than 80% of workers are to be free from discomfort. Against a similar criterion in winter a lower limit of 15.5° C C.E.T. is proposed. An extrapolation of data from laboratory to industrial work-places provides a suggested limit for efficiency at skilled tasks at 26.7° C C.E.T. Finally, a limit of environmental severity based upon an absence of severe physiological distress in 95% of exposed workers is proposed which varies with the age and physical fitness of the workers and the physical demands of the work they are called upon to perform. 37 references. --Authors' abst.

1204 HEAT ACCLIMATIZATION BY THE PREVENTION OF EVAPORATIVE COOLING. E. Shvartz and D. Benor. *Aerosp. Med.* 42: 879-881, August 1971

The effect of a heat-acclimatization program was assessed in 5 male subjects by a work-heat test (5 km/hr; 50 C; 20% relative humidity). The acclimatization program included 4 exposures to 40° C, over a period of 2 weeks during which the men walked on a treadmill at a speed of 3.5 km/hr while wearing vapor-barrier suits. Acclimatization resulted in final mean heart rate, rectal temperature, skin temperature, and sweat rate of 125 beats/min, 37.8 C, 37.7 C, and .918 kg/hr respectively. Three of the subjects, whose pre-acclimatization values were compared, showed mean heart rate, rectal temperature, skin temperature and sweat rate decrease of 21 beats/min, 1.0 C, 0.1 C and .113 kg/hr respectively. Sweat rate, expressed as per degree rise in rectal temperature, about doubled. These results suggest that preventing evaporative cooling presents a major factor in heat acclimatization. --Authors' abst.

1205 THE NURSE'S ROLE IN INDUSTRIAL HEARING CONSERVATION. Debra Glover. *National Safety News* 104: 82-84, Sept. 1971

In the not too distant past, management - in its insensitivity to the problem of hearing loss and in its conservative attitude as far as its responsibility towards the employee - frustrated the industrial nurse's most enthusiastic efforts, Today, management is better informed, and it is aware of the necessity for assuming responsibility in the establishment and development of an effective hearing

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conservation program. Much of the success of a hearing conservation program depends upon the competence and enthusiasm of the nurse, who is often the only link between management and the employee. The nurse's attitudes, enlightened or otherwise, expressed verbally or by general demeanor, can augment or frustrate the best intentions of plant management. --Cond. from text

1206 HEALTH HAZARDS OF A COMPRESSED-AIR ENVIRONMENT. Anon. *Occ. Health Bull.* 25: 1-4,(No. 11/12) 1970

This general discussion of the hazards of work in compressed air covers: exposure (classes of workers concerned); effects of pressure on the body; hazards (decompression sickness, nitrogen narcosis, embolism, ruptured eardrums, poisoning from contaminated air); compressed air contaminants, their sources and symptoms; purity standards for compressed air (CO : 10 ppm by volume, CO_2 : 500 ppm by volume, oil and particulate matter : 5 mg/m^3 up to 2 atm, 1 mg/m^3 above 2 atm). Reference is made to the fact that most of the workers involved are inadequately trained. --Occ. Safety & Health Absts.

1207 AN EPIDEMIOLOGICAL STUDY OF LENS OPACITIES AMONG STEEL WORKERS. J. Wallace, et al. *Brit. J. Ind. Med.* 28: 265-271, July 1971

To investigate the relationship between the prevalence of cataract and heat exposure, two groups of steel workers, differing widely in their heat exposure, were examined. Estimates of heat exposure were based on detailed industrial histories and (a) subjective estimates of heat exposure associated with various occupations and (b) actual measurements. Only two cases of cataract were found that would be generally accepted as "occupational" in origin, but a higher prevalence of the common form of cataract was found in the heat-exposed group than in the non-exposed group. --Authors' abst.

1208 PHYSIOLOGICAL RESPONSES TO COOLING THE HEAD AND NECK VERSUS THE TRUNK AND LEG AREAS IN SEVERE HYPERTHERMIC EXPOSURE. A. T. Kissen, J. F. Hall, and F. K. Klemm. *Aerosp. Med.* 42: 882-888, August 1971

Physiologic responses to an hour, hyperthermic stress (66 C ambient air, 10 mm Hg ambient vapor pressure), where the head was maintained in comfort, were compared with those obtained under unventilated and air-cooled undergarment (MA-3) conditions. Head and MA-3 ventilation temperature was 15.5C. Air flow to the head and one MA-3 sub-condition was 5 cfm. For the remaining MA-3 sub-condition it was 12 cfm. Head ventilation, involving merely 8% of total body surface area, more effectively reduces physiologic strain (in terms of cardiovascular and sudomotor responses) than ventilation of 60% (MA-3) of total body surface area under equivalent (5 cfm) or even operational (12 cfm) conditions. The premise is advanced that inclusion of the cold sensitive facial area in the cooling system design inhibits the otherwise active discharge of neural impulses from thermoreceptors. Depression of this neurogenic activity significantly attenuates the response of heat-compensatory mechanisms. --Authors' abst.

1209 EFFECT OF A LOCAL COOLING VEST WITH CO_2-ICE AS COOLING MATERIAL ON THE PHYSIOLOGICAL FUNCTIONS OF MAN IN A HOT ENVIRONMENT. T. Miura, et al. *J. Sci. Labour* 47: 309-338, June 1971 (Jap.)

An experiment was conducted for purpose of examining the effect of a local cooling vest with CO_2-ice as cooling material upon the physiological functions of man in a hot environment. Results obtained were as follows: Regarding O_2 intake and respiration rate, no significant differences were found between subject with and without cooling vest; The rise of skin temperature on the chest and the back as well as the mean skin temperature of the whole body surface due to heat exposure was significantly suppressed by the cooling vest; The rectal temperature would rise up to 38-38.5°C during heat exposure without a cooling vest; The rise as such was also suppressed by the cooling vest; The effect of the cooling vest was slightly noted on the heart rate; The local perspiration on the chest was significantly reduced by the cooling vest; The air temperature and relative humidity under fatigue dress were significantly lowered by the cooling vest; The extrarenal water loss during exposure to heat was reduced by the

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cooling vest; Regarding the specific gravity of the whole blood, serum refractive index, hematocrit, urinary excretion of Na, K, total 17 OHCS and vanillylmanderic acid, no significant difference was found between subjects with and without cooling vests. In short, the local cooling vest with CO_2-ice as cooling material seems to be feasible in attenuating the heat stress of workers under hot environmental conditions. --Cond. from authors' abst.

1210 EFFECT OF ACCLIMATIZATION TO ALTITUDE AND COLD ON BASAL HEART RATE, BLOOD PRESSURE, RESPIRATION AND BREATH-HOLDING IN MAN. C. S. Nair, et al. *Aerosp. Med.* 42: 851-855, August 1971

Basal heart rate, blood pressure, respiration and maximum breath-holding time were studied in 20 healthy subjects of age group 22-28 years at an altitude of 11,000 ft. They were divided into two groups. One group was subjected to hypoxia, while the other group was exposed to hypoxia and cold simultaneously. The results indicate that simultaneous exposure to hypoxia and cold brought about a return of heart rate to near sea-level values and elevated basal minute ventilation. Basal blood pressure and respiratory rate did not show any significant change. Maximum breath-holding time showed a trend towards a rise after 10 days, while the other group (hypoxia alone) lagged behind in this response. --Authors' abst.

RADIOACTIVITY AND X-RADIATION

1211 DIAGNOSTIC RADIATION AND THE PROTECTION OF THE PATIENT. J. L. Weeks. *Ind. Med. Surg.* 40: 24-28, August 1971

The reasons for current views on radiological protection are discussed in relation to medical practice. The need for careful evaluation of diagnostic procedures involving the use of ionizing radiation is emphasized, together with the need for achieving and maintaining high standards of radiological technique. --Author's abst.

1212 AN INEXPENSIVE rf SHIELD FOR USE WITH RADIATION SURVEY INSTRUMENTS. W. S. Properzio. *Health Physics* 19: 442, Sept. 1970

Description of an open-mesh bag consisting of silvered nylon, in which instruments can be placed to protect them from radio frequency interference when conducting radiation surveys. The open weave ensures satisfactory legibility of the dials and the flexibility of the material permits easy manipulation of instrument controls. The bag has very little effect on the radiation response of instruments. --Occ. Safety & Health Absts.

1213 RESPONSE OF THE DOG TO 24,000 AND 1285 MHz MICROWAVE EXPOSURE. S. M. Michaelson, J. W. Howland, and W. B. Deichmann. *Ind. Med. Surg.* 40: 18-23, August 1971

Comparison of chronic exposure of dogs exposed to 24,000 MHz and 1,285 MHz, 20-24 mW/cm^2 demonstrated certain transitory physiologic effects which are not significant when compared with matched controls. Long-term follow-up showed no abnormalities in the exposed animals at either energy level. The results of these chronic exposures performed at 20 mW/cm^2 at both ends of a wide band of microwave frequencies (24,000 MHz; 1,285 MHz) support the safety of the 10 mW/cm^2 standard for microwave exposure. --Authors' conclusion

1214 THE INTENSITY AND SPECTRAL DISTRIBUTION OF ULTRAVIOLET EMISSION FROM WELDING ARCS IN RELATION TO THE PHOTODECOMPOSITION OF GASES. J. A. Dahlberg. *Ann. Occ. Hyg.* 14: 259-267, Sept. 1971

The intensity and spectral distribution of the ultraviolet emission from arcs produced during the welding of cast iron, stainless steel, aluminum and copper, both with covered electrodes and with inert gas shields, have been measured. From a knowledge of the relevant parameters, the extent of photochemical

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breakdown corresponding to the measured intensity of emission over each wavelength interval may be calculated. By this means the photodecomposition of trichloroethylene to phosgene and dichloroacetyl chloride has been calculated; the results obtained are of the same order as the concentrations measured in welding shops. --Author's abst.

ENVIRONMENTAL MEASUREMENTS

1215 A PORTABLE, BATTERY-OPERATED, IMMEDIATE-READOUT DUST-PARTICLE ANALYZER. V. Withstandley, W. J. Moroz and G. W. Anderson. *J. Air Poll. Control Assn.* 21: 571-573, Sept. 1971

A portable, battery-operated, electro-optical dust analyzer operating on the principle of light scattering from individual dust particles in air drawn through a high-intensity light field has been developed for monitoring dust levels where external power may be unavailable. The instrument is convenient to operate and requires no special operator training. The prototype described is undergoing further design improvements, but testing has shown that it operates satisfactorily. The unit is now available commercially. --Cond. from text

1216 INSTRUMENTAL METHOD SUBSTITUTES FOR VISUAL ESTIMATION OF EQUIVALENT OPACITY. H. C. McKee. *J. Air Poll. Control Assn.* 21: 488-490, August 1971

Many air pollution control regulations limit the emission of visible effluents, based on the visual observation of "equivalent opacity." Because of difficulties encountered in using visual observation, the Texas Air Control Board developed a method of calibration which made it possible to use an instrumental method for measuring visible emissions. A legal regulation based on this instrumental method has been in effect for almost two years. Despite minor difficulties in calibration and maintenance, results have been satisfactory. The use of the instrumental method avoids many of the difficulties inherent in using a regulation based on visual observation, and continued use of the instrumental method is anticipated. --Author's abst.

PREVENTIVE ENGINEERING

1217 DISPOSAL OF SOLID WASTES. P. A. Witt. *Chem. Eng.* 78: 62-78, Oct. 4, 1971

Solid wastes differ from air and water pollutants in that they remain at the point of origin until a management decision is made to dispose of them. The technology is available and awaits no major breakthrough, only management's decision to spend the money. The most economic methods should be evaluated first from the standpoint of minimum adverse effects upon the company's image. In isolated cases, it may be possible to make a profit from byproducts obtained from solid wastes, but the best that can be hoped for as of now is a means to minimize disposal costs. Recycling, incineration, landfill or ocean dumping are all means of disposing of process wastes and plant trash. Which disposal method is best should be based on economics and on pollution abatement regulations. Data are given on both. 69 references. --Cond. from text

1218 COOLING HOT GASES FROM DRY PROCESS CEMENT KILNS. C. D. Doyle and S. A. Reigel. *Pit and Quarry* July 1971

The major source of dust emissions in a cement plant is the kiln. A typical emission value for the dry process kiln is 46 lb. of dust per bbl. of cement produced. In addition to the dust emissions, the average kiln also produces approximately 2,000 lb. of hot gas per bbl. It is because of the large volumes of gas generated that the dust collection equipment on the kiln represents such a large capital expenditure in a cement plant. The hot, dust-laden gases exit the kiln at 1200°-1600° F., depending upon kiln operation. Since most of the dust is smaller than 10 microns in size, the common dust collection sy

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on a kiln consists of inertial collectors in series with either an electrostatic precipitator or a fabric collector baghouse. The maximum operating temperature of a baghouse is 550°F. when equipped with fiberglass bags. On the other hand, the collection efficiency of electrostatic precipitators is increased with the addition of moisture in the carrier gas, thus lowering the apparent electrical resistivity of the entrained dust. The economic advantages of evaporative systems to obtain both cooling and humidification have made them the most frequently used systems on dry process kilns. There are two basic approaches to evaporative cooling in cement kilns: (a) the introduction of spray water in the kiln feed end prior to the gas exiting, and (b) the design of a separate vessel in which the spray is evaporated. Recently, the authors conducted several plant inspections supplemented by discussions with plant and corporate personnel of installations involving both types of systems. This paper is devoted to the results of these investigations. --Cond. from text

1219 DON'T LET THE COLD AIR IN - USE A DOORWAY HEATER. J. W. Weems. *Plant Eng.* 25: 134-135, Sept. 16, 1971

Door heaters are mandatory in ensuring the success of the overall building heating system by maintaining adequate heat when doors are open. The design of the door heater is just as important as its placement and application. Effective designs are based upon a proper combination of cfm, discharge velocities, temperature of discharge air and discharge pattern. While there are a number of variations, these four criteria, in proper proportion, must be considered basic to the design of satisfactory door heaters. --Cond. from text

1220 ROOFTOP HEATING AND COOLING UNITS. Anon. *Plant Eng.* 25: 31-36, Sept. 30, 1971

Use of rooftop heating and cooling units for comfort conditioning at industrial plants is growing in popularity. Although these units invariably have higher operating and maintenance costs than central systems, their lower first cost and ease of installation are advantages that plant engineers are finding hard to ignore. With all of these advantages, it would seem that the rooftop system is the ideal choice. Unfortunately, it is not without faults and plant engineers would be well advised to study each shortcoming carefully to minimize future difficulties. The development of a specification chart, which is included in this article, seems to have raised more questions than it has answered. Nevertheless, the chart supplies basic data that should prove helpful in selecting rooftop units. Subsequent articles, now being developed, will deal with the fine points of system efficiency and provide additional information to aid in interpreting the chart data. --Cond. from text

COMMUNITY AIR HYGIENE

1221 NATIONAL AIR QUALITY STANDARDS FOR AUTOMOTIVE POLLUTANTS - A CRITICAL REVIEW. J. M. Heuss, G. J. Nebel, and J. M. Colucci. *J. Air Poll. Control Assn.* 21: 535-544, Sept. 1971

A critical review of the studies which form the basis for the national air quality standards for carbon monoxide, nitrogen dioxide, hydrocarbons, and photochemical oxidants indicates that the standards are unduly restrictive. The adverse effects associated by the Environmental Protection Agency (EPA) with these pollutant concentrations are not substantiated by the data. Moreover, in setting the standards, EPA did not give proper attention to studies which show no adverse effects at these concentrations and extrapolated the results of other studies of questionable validity. This has resulted in air quality standards so restrictive that they may be exceeded by natural processes alone. Based on all of the available data, less restrictive standards are suggested which would adequately protect the public health and welfare. 52 references. --Authors' summary

Editor's Note: In a discussion of the above by D. S. Barth, et al, in the same issue of the Journal of the Air Pollution Control Association it was stated "Which concern should take priority in the establishment of National Air Quality Standards, economic considerations or protection of the public

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health? We strongly embrace the concept that the protection of the public health must take precedence. At the same time, however, we are implementing major research programs to develop missing scientific data; and, when the results of this research become available, we stand ready to recommend alteration of our standards as indicated whether it be up or down. Until these results are available, however, we feel that the existing standards are appropriate and that they represent a reasonable and prudent definition of the air pollution control needs in the United States to assure adequate protection of the public health. We cannot accept the thesis that adverse health effects for each air pollutant for defined concentrations and exposure times must be proved beyond the shadow of a doubt to everyone's satisfaction before protective action can be taken. Adverse effects must be prevented; they must not be permitted to occur. The Environmental Protection Agency's regulatory program presently reflects this preventive-medicine philosophy, and we submit that no other approach can be countenanced." --M.C.C

1222 EARTH DAY HISTOPLASMOSIS. R. J. Fass and S. Saslaw. *Arch. Int. Med.* 128: 588-590, Oct. 1971

In the United States, histoplasmosis is endemic in the Mississippi-Missouri-Ohio River Valley where a warm, moist environment provides optimal conditions for the growth of *Histoplasma capsulatum* in a favorable soil. Infection is not limited to this geographic area, however, and in both endemic and nonendemic areas, microenvironments of both high and low incidence of infection exist. Diagnosis of a case of histoplasmosis in a schoolteacher led to the clarification of the etiology of an epidemic of an influenza-like illness involving an intermediate school in Delaware, Ohio. The onset of the illness in those involved occurred within a several day period. The common denominator was the Earth Day activities of students and faculty in their clean-up program two weeks earlier on April 22, 1970. --Cond. from text

1223 POLLUTION - THE RISK AND INSURANCE PROBLEM. W. G. Brockmeier. *For the Defense* 12: 77-80, Sept. 1971

This article discusses in part the history and development of pollution insurance with respect to the general liability policy. However, this is only a part of the total impact of the pollution problem on industry and risk management. In fact, pollution and its attendant problems are truly problems in industrial risk management and not problems in insurance. Industrial management must be involved in the identification of the risk, in the elimination or reduction of the hazard, in the decision of whether or not to assume the risk and in the determination of how the risk might be transferred, if at all. We must perhaps face the fact that the results of pollution are, by and large, really not a subject of insurance. For one thing, the results of certain activities are fairly foreseeable in many instances. Secondly, pollution may be viewed as a dynamic risk rather than a static risk. In this context, we must realize that a certain degree of pollution is inevitable in any industrial society. The balance between the benefit to society resulting from carrying on the industrial activity in a particular manner must be weighed against the loss to society due to the resulting decrease in the quality of the environment. This balancing process will be largely a matter of the consensus of society, to be arrived at through the political process. --Cond. from text

1224 AIR POLLUTION CONTROL TRAINING IN COLLEGES AND UNIVERSITIES IN THE UNITED STATES. H. M. Cota. *J. Air Poll. Control Assn.* 21: 559-562, Sept. 1971

A nationwide survey of air pollution control training efforts in the United States at colleges and universities was carried out for the S-11 Education and Training Committee, Air Pollution Control Association. Information from 91 schools having four year or graduate programs and five community colleges was received. Questions include type of course work, backgrounds of participating faculty and students, and eventual placement. At the present time about 70% of those in training are graduate students. It was found that most students taking initial employment in air pollution control activities had the M.S. degree. Recommendations for updating this information are made. --Author's abst.

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MANAGEMENT ASPECTS

1225 OCCUPATIONAL HEALTH PROGRAMS AT THE FEDERAL LEVEL FOR THE NEXT TEN YEARS. M. M. Key and S. J. Reno. *Am. J. Public Health* 61: 1583-1585, August 1971

This paper offers an historical review, an assessment of the present status, and some indication of the immediate future of federal programs in the field of occupational health. The next ten years will see occupational health programs finally obtain the visibility and importance they deserve. Such attainment will not be without the traumatic experiences of reorganization and increased work demands. Workers, their leaders, and the public will recognize the problems and demand their solution. Demands created by new legislation will tax the resources of our profession to the maximum. The competition for public funds in the 70s will be even more severe than in the 60s, but hopefully the planners will finally realize that preventive dollars are better spent than are medical care dollars. Those who have been working to protect and enhance the health of the American worker will eventually have the satisfaction of seeing this achieved on a national basis for all workers. --Cond. from text

1226 APPLIED CONCEPTS OF AUTOMATION IN AN OCCUPATIONAL MEDICAL PROGRAM. J. L. Craig and O. M. Derryberry. *Ind. Med. Surg.* 40: 9-17, August 1971

This is a discussion of the various ways automation has been adapted to the occupational health program of the Tennessee Valley Authority. TVA has found that automation relieves the medical staff of time-consuming medical and administrative tasks; it frees clerical personnel for other work; it assists in maintaining accurate, dependable records; it aids in monitoring the health of employees; it helps to detect needs in the health services; and it makes medical data easily retrievable. Automation in the TVA health program described is divided into three major categories: (1) Automation of medical records; (2) Computer electrocardiography; (3) Automated centralized medical laboratory.

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1227 NEW COMMISSION FOR STUDY OF ACCREDITATION OF SELECTED HEALTH EDUCATION PROGRAMS. J. F. Volker. *J. Am. Med. Assn.* 218: 238-239, Oct. 11, 1971

The medical profession and academic institutions need to consider the most effective ways to assure that allied health personnel will be adequately prepared to meet their practice responsibilities. It is hoped that this will be accomplished by the Commission for the Study of Accreditation of Selected Health Educational Programs (SASHEP), which was announced in December 1970, and will be conducted over a 21-month period. The public interest requires that a means be found to promote collaboration between professional associations in allied health and educational institutions in an effort to create a new system of accreditation that will make possible a coherent, flexible, and rational approach to manpower development. --Cond. from text

1228 CONTINUING MEDICAL EDUCATION IN THE SOVIET UNION. P. B. Storey. *New Engl. J. Med.* 285: 437-442, August 19, 1971

Physicians in the USSR practice within a system organized for flow of health-care services to the public, and for flow of patients to appropriate back-up diagnostic and therapeutic facilities. The present medical-education policy of the USSR Ministry of Health is oriented toward increasing the qualifications of all physicians. This poses a complex problem for postgraduate medical education in the Soviet Union. To meet the challenge the Ministry has evolved an educational system that binds all phases of medical education and is *noteworthy for its commitment of personnel, financial and organizational resources to the lifelong improvement of a physician's knowledge and skills.* The most important role is that of the 13 Institutes for Advanced Education of Physicians, under the leadership of the Central Institute in Moscow. --Author's abst.

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1229 DOCTORS AND THE COMMON MARKET. Anon. *Brit. Med. J.* 3: 133, July 17, 1971

The Government's white paper on the Common Market, published last week after the B.M.J. had gone to press refers to organized medicine in a single sentence: "Accession to the Community will not alter in any way the National Health Service." This bleak statement is largely true. There are no reciprocity agreements for medical qualifications within the European Economic Community (EEC); there is no uniformity in specialist or postgraduate training, and there is not even any arrangement for reciprocal benefits for nationals of one member state from the social or health services of another. Accession to the E.E.C. would not leave medicine totally unaffected. Animal health standards within the community are to be the subject of an expert working group (para 151 of the white paper), and this will have important implications for current British policy on diseases such as brucellosis. Mobility of labour within the community could mean that more Europeans would come here seeking work in the N.H.S.; or lower-paid workers in the Health Service might find better prospects in Europe. The current negotiations have again ignored medicine; but this should not have come as a surprise, since European medical opinion is agreed that during negotiations of this kind "if the price of cauliflowers is right who cares a damn about the doctor?" --Cond. from text

1230 THE DILEMMA OF A DRUG ABUSE PROGRAM. W. W. Stewart, et al. *Ind. Med. Surg.* 40: 29-32, Aug. 1971

The point the authors are trying to convey in this article is that industry today must look beyond the factory fence when social and behavioral problems, such as drug abuse, occur. This is a report of the steps one large corporation is taking to help combat this serious problem within its own confines and within the community, for drug abuse is a community problem and employees are part of that community. --Cond. from text

1231 THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 WILL COMPLEMENT THE PRESENT WORKMEN'S COMPENSATION SYST'
Anon. *J. Am. Insur.* 47: 27-29, Sept./Oct. 1971

The Williams-Steiger Occupational Safety and Health Act is a law to assure workers that they do not have to take unreasonable risks on the job. But is can also be described as a conservation measure because it states that by providing a safe working place, the country will "preserve our human resources." The act states that anyone who is in a business affecting interstate commerce is covered by the law. This applies not only in all of the states and the District of Columbia but also in all U.S. territories. However, the law does make an exception of employees who work in industries that are already regulated by federal laws such as the Atomic Energy Act of 1954 or the Federal Coal Mine Health and Safety Act. The only other workers not covered under this law are federal employees, but the law states that government employees must work under conditions that at least meet the minimum standards of the Williams-Steiger Act. The employer must provide his employees with places of employment that are free from recognized hazards causing or likely to cause serious physical harm and also must comply with specific safety standards that are required by the Williams-Steiger Act. The law emphasizes that safety and health are not short-range propositions. An employee who works with dangerous chemicals or gases should be able to work his entire professional life without suffering any ill effects. If any condition does not meet the standards established by the act, the compliance officer informs the employer of this and later issues a written citation ordering the employer to correct the situation within a specified period of time. Willful or repeated violations can result in penalties up to $10,000 for each violation. If a violation is considered a "serious violation" (where there is substantial possibilities that death or serious physical harm could result) a fine is mandatory. --Cond. from text

01 133 0615

1232 ELEMENTS OF THE MEDICAL PROCESS: THEIR PLACE IN MEDICAL CARE PLANNING. Katharine O. Elsom. *J. Am. Med. Assn.* 217: 1226-1232, August 30, 1971

In planning for medical care, the thing which medical care is designed to deal with, human disease, is an ever-changing phenomenon. Since evidence now points to the increasing part that human perception probably will play in initiation of the diseases of tomorrow, new kinds of practitioners differently educated, will be needed to deal with these problems. Financial arrangements will be required which take these changes into account, while imaginative new practice arrangements will be needed. Realization of these facts constitutes an important component in successful planning for future medical care services. Efforts to improve the structure of medical care services through revisions in financing and administration are increasingly attracting persons from outside the medical profession with previous training in finance, insurance, engineering, and administration. Because such persons are unfamiliar with the nature of the medical process, their expectations of what medicine can achieve are often unrealistic. Knowledge of the nature of the component parts of the medical process, diagnosis, treatment, and prevention, discloses that while in each instance there are objective data that can be utilized effectively, important limitations exist. Furthermore at each point in the medical process the physician's clinical judgment is crucial. Future planning for the financing and organization of medical care must provide for this element in order to be successful. --Cond. from text

1233 HOW TO IMPLEMENT THE WEED SYSTEM. J. W. Hurst. *Arch. Intern. Med.* 128: 456-462, Sept. 1971

Obstacles to implementing the Weed system for improving medical records so as to improve patient care, medical education, and research relate to the acceptance of an innovative system, to the mechanics of the system, and to the creation of an excellent problem list. Obstacles to acceptance and mechanics can be overcome by a small group of interested people who make a sincere effort to influence those around them but the creation of an excellent problem list requires intense work and a thought process that is the essence of a medical education. The method of creating an excellent problem list is discussed. --Author's abst.

ACCIDENTS AND PREVENTION

1234 ACCIDENTS DURING WORK AND TIME OF THE DAY. D. P. Nogueira. *Ind. Med. Surg.* 40: 28-30, Sept. 1971

To test the working hypothesis that the occurrence of accidents during work is related, in some way, to the "biological rhythm," 1,572 accidents occurring between 1961 and 1969 were studied in two groups of textile workers of the same constitution, working on alternated weeks, respectively, in the morning and in the afternoon-evening shifts. Each accident was related to the time of day when it occurred. The higher incidence of accidents was observed, in both groups, at the time of day when the biological efficiency was low; inversely, the lower incidence of accidents coincided with the periods when the biological efficiency was high, thus apparently confirming the working hypothesis.

--Author's abst. modified

1235 PERSONALITY CHARACTERISTICS OF INDUSTRIAL WORKERS INVOLVED IN ACCIDENTS: A PSYCHOLOGICAL STUDY. S. Ghosh and D. Banerjee. *Indian J. Ind. Med.* 16: 105-112, Sept. 1970

An investigation of 3 psychological factors (intelligence, speed and accuracy of eye-hand co-ordination, and capacity for perceptual speed or visual discrimination) in 138 workers from an Indian automobile factory (foundry, body shop, press shop and machine shop), who were injured in industrial accidents, and of 58 controls without accident doing identical work in the same factory. The results of the various tests, which are discussed and tabulated, clearly indicate that the accident group was less intelligent and had poorer eye-hand co-ordination, whereas no significant difference could be demonstrated between the 2 groups as regards their capacity for sensory-motor discrimination or perceptual speed (Drake's modified test). --Occ. Safety & Health Absts.

01 133 0616

1236 ALCOHOL AS A CAUSE OF SUDDEN UNEXPECTED DEATH. W. Laurie. *Med. J. Austral.* 1: 1224-1227, June 5, 1971

Alcoholism and heavy drinking are a grave public-health problem throughout Australia, and are responsib for 3% of all deaths. A summary is given of the ways in which alcohol can kill, and attention is drawn to two little-recognized, fairly common ways in which alcohol can cause sudden death - by cardiomyopathy, and by an interaction of relatively small doses of alcohol and psychotropic drugs. --Author's abst.

1237 REPETITION INJURIES IN PROCESS WORKERS. D. Ferguson. *Med. J. Austral.* 2: 408-412, Aug. 21, 1971

An investigation was undertaken in a large electrical factory to determine the nature of upper-limb injuries attributed to process work. Methods included analysis of injury records of 77 women whose injuries caused them to lose time at work, examination of some of these subjects, and a study of their tasks. The injuries fell into two broad groups, namely well-defined clinical syndromes such as supraspinatus tendinitis and tennis elbow, and ill-defined symptom complexes. Work overload and faults in job and equipment design were principal influences in causation. There is need for ergonomic appraisal in the design of process work, and for adequate occupational medical surveillance. --Author's abst.

1238 REDUCTION OF YOUNG DRIVER CRASHES IN A CONTROLLED PILOT STUDY. S. H. Schuman, Roberta McConochie, and D. C. Pelz. *J. Am. Med. Assn.* 218: 233-237, Oct. 11, 1971

Previous research indicates a high accident rate for young male drivers aged 18 to 20 years. In a pilot study, high-school seniors in a countermeasure program achieved a 50% reduction in their accident rate compared to a control group during a two-year follow-up period. A similar reduction occurred in the accident rate per 100 drivers weighted by severity of crashes among the countermeasure drivers. The results are not statistically significant, but show promise for current trials in large populations. The countermeasure program had two components, small group discussions weekly for seven weeks, and personalized driving letters sent to pilot program seniors at six-month intervals following the discussion workshop. --Authors' abst.

1239 A NEW DRUG DELIVERY SYSTEM FOR THE EYE. L. B. Morgan. *Ind. Med. Surg.* 40: 11-13, Sept. 1971

Although many extraordinary precautions have been instituted to protect the eyes of most industrial employees, accidental eye injuries continue to occur. The vital aspects of vision dictate that employees with any eye injuries receive immediate attention, care and treatment. Perhaps one of the foremost problems is that of promoting adequate drug delivery and penetration to the ocular and intraocular tissue. The presently available ophthalmic drugs for topical use are available as aqueous solutions, viscous solutions and ointments or gels. None of these dosage forms permits prolonged or continuous retention of the drug at the tissue site requiring medication. In 5 to 20 minutes the drug is diluted by tears and dissipated. Continuous delivery of the medication to ocular tissue requires continued application by the patient or by an attending nurse every ten minutes particularly during the critical phases of therapy. A new device for continuous drug delivery to the eye or for use as a unique technic for ocular lavage has been developed. The device offers many distinct advantages in the updated care of industrial ocular injuries. --Cond. from text

1240 LIVER INJURIES. Anon. *Med. J. Austral.* 2: 62-63, July 10, 1971

Although liver injuries are becoming increasingly common in most countries, many surgeons still feel that they are rare and unrewarding to treat. A recent Australian book by J. M. Little ("The Management of Liver Injuries", 1970, E. & S. Livingstone, Edinburgh) on the subject has confirmed the high morta of certain types of liver trauma, but has also documented the remarkable reduction in mortality that

01 133 0617

can follow the introduction of a planned regime of aggressive treatment. Little and Williams (Brit. J. Surg., 1969, 56: 603, August) have pointed out the mortality of liver injury alone can be kept low among those patients who reach hospital alive. Only one of the six deaths reported by them could be attributed to liver injury, the other five being due to associated injury, particularly to brain damage. What should be done by the surgeon in the small hospital who unexpectedly encounters a massive liver injury at laparotomy? Simple injuries can be dealt with by suture and drainage, but those that produce devitalized liver are probably best treated in a major centre. When this seems necessary, temporary haemostasis can be achieved by packing the wound and closing the abdomen. This will allow the patient to be moved with reasonable safety, and although the results of this form of management are not yet known, a few patients have survived difinitive surgery in a major hospital after transport in this fashion. --Cond. from text

1241 SAFETY IN THE LABORATORY: INCOMPATIBLE MATERIALS. Anon. *Safety Newsletter* 3, Sept. 1971

Certain combinations of chemicals are remarkably explosive, poisonous, or hazardous in some other way, and these are generally avoided as a matter of course. There are many others that are perhaps equally dangerous, but the list, which is given, although not complete, may serve as a memory refresher. Some of the combinations include: Alkali metals, such as calcium, potassium, and sodium with water, carbon dioxide, carbon tetrachloride, and other chlorinated hydrocarbons; Ammonia, anhydrous with mercury, halogens, calcium hypochlorite, or hydrogen fluoride; Oxalic acid with silver or mercury; Potassium permanganate with glycerine, ethylene glycol, benzaldehyde, sulfuric acid. --Cond. from text

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New York, N.Y. 10020

Petroleum Today
American Petroleum Inst.
1271 Ave. of the Americas
New York, N.Y. 10020

Plant Eng.
Plant Engineering
1301 S. Grove Ave.
Barrington, Ill. 60010

Pollution Abstracts Inc.
6811 La Jolla Boulevard
P.O. Box 2369
La Jolla, California 92037

S.A.E. Journal
Society of Automotive
Engineers
485 Lexington Ave.
New York, N.Y. 10017

Safety News Letter
National Safety Council
Chicago, Ill. 60611

Safety Standards
U.S. Dept. of Labor
Bur. of Labor Stds.
Washington, D.C. 20210

Science
Am. Assn. for Advancement
of Science
1515 Mass. Ave., N.W.
Washington, D.C. 20005

Scientific Research
McGraw Hill, Inc.
McGraw Hill Bldg.
330 W. 42nd St.
New York, N.Y. 10036

Skin & All. News
Skin & Allergy News
4907 Cordell Ave.
Washington, D.C. 20014

Smaller Manufacturer
Smaller Manufacturers
Council
Chamber of Comm. Bldg.
Pittsburgh, Pa. 15219

Sound and Vibration
Acoustical Publications,
Inc.
27101 E. Oviatt Rd.
Bay Village, Ohio 44140

Spotlight on Safety
N.Y. State Dept. of Labor
State Campus
Albany, N.Y. 12226

Stanford Research Inst. J.
Stanford Research Institute
Menlo Park, Calif. 94025

Staub Reinhalt. Luft
VDI-Verlag GmbH
4 Dusseldorf 1
Post Box 1139
Dusseldorf, Germany

Technol. Rev.
Technology Review
Alumni Association
Massachusetts Institute
of Technology
Cambridge, Mass. 02139

Tenn. Ind. Hyg. News
Tennessee Industrial
Hygiene News
The Tenn. Dept. of Public
Health
Nashville, Tenn. 37201

Texas Health Bulletin
Texas State Dept. of Health
1100 W. 49th Street
Austin, Texas 78756

Thorax
British Medical Association
B.M.A. House, Tavistock Sq.
London, WC1, England

Tin and Its Uses
Tin Research Institute
483 W. Sixth Ave.
Columbus, Ohio 43201

Today's Health
American Medical Assn.
535 N. Dearborn St.
Chicago, Ill. 60610

Toxicol. & Appl. Pharmacol.
Toxicology & Applied
Pharmacology
Academic Press
111 Fifth Avenue
New York, N.Y. 10003

Trans. Soc. Occ. Med.
The Transactions of the
Society of Occ. Medicine
11 St. Andrew's Place
London NW 1 4LE, England

Tufts Health Science Rev.
Tufts-N. England Med. Cent.
Office of Comm. & Pub. Aff.
171 Harrison Avenue
Boston, Mass. 02101

WHO Chronicle
World Health Organization
Chronicle
World Health Organization-
Sales Section
Geneva, Switzerland

Work-Environ.-Health
Work-Environment Health
Institute of Occ. Health
Helsinki, Finland

SUPLEMENTAL LIST OF JOURNALS FOR NOVEMBER DIGEST

Bull. South Res. Inst.
Bulletin Southern Research Institute
2000 Ninth Avenue South
Birmingham, Alabama 35205

For the Defense
Defense Research Institute, Inc.
1212 W. Wisconsin Ave.
Milwaukee, Wisconsin 53233

Health Phys.
Health Physics
Pergamon Press, Inc.
44-01 21st Street
Long Island City, New York 11101

Indian J. Ind. Med.
Indian Journal of Industrial Medicine
19 Nilmoni Mitter Street
Calcutta 6, India

Ind. Wastes
Industrial Wastes
P.O. Box 1901
Clinton, Iowa 52732

Occ. Health Bull.
Occupational Health Bulletin
New Jersey State Department of Health
Bureau of Adult and Occupational Health
17 West State Street
Trenton, New Jersey 08608

Pit & Quarry
Pit & Quarry Publications
105 W. Adams Street
Chicago, Ill. 60603

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