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Industrial Hygiene Digest

INDUSTRIAL HEALTH NEWS

LITERATURE ABSTRACTS

MEDICAL

ENGINEERING

CHEMICAL

TOXICOLOGICAL

LEGAL . . . decisions and trends

APRIL, 1957
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INDUSTRIAL HYGIENE FOUNDATION

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FOUNDATION FACTS

Foundation Facts is a monthly news-letter issued to industrial concerns holding membership in Industrial Hygiene Foundation. The Foundation is a nonprofit association of industries for the advancement of healthful working conditions.

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No. 4

SCHRENK RECEIVES CUMMINGS MEMORIAL AWARD

Dr. H. H. Schrenk, Research Director of Industrial Hygiene Foundation, received the Donald E. Cummings Memorial Award from the American Industrial Hygiene Association for outstanding contributions to the knowledge and practice of the profession of industrial hygiene. The award was made at the Association's 18th Annual Meeting at the Industrial Health Conference in St. Louis on April 24.

Dr. Schrenk has directed environmental studies in industries throughout the United States and Canada and has been in charge of the programs of toxicological and biological research carried on in the Foundation's research laboratory.

Before joining the Foundation's staff Dr. Schrenk was associated with the Bureau of Mines from 1928 to 1948 where he was Chief of the Health Branch and directed laboratory and research investigations in industrial hygiene. The following year he joined the Commissioned Corps of the United States Public Health Service as Scientist Director. He served as Chief, Environmental Investigations Branch, Division of Industrial Hygiene. He directed the Donora smog investigation conducted by the United States Public Health Service.

In his Cummings Memorial Lecture on "The Growth and Progress in Industrial Hygiene", Dr. Schrenk stressed the need for research in industrial hygiene to keep abreast of the new industrial developments and the hazards which may accompany them.

"The creation of new materials carries with it the responsibility to make certain that the usefulness is not outweighed by risks to health," he said.

The benefits of many of the products available today, among them pesticides, synthetic fibers, high energy fuels and new plastics, would not be available today and utilized if it had not been for the efforts of industrial hygienists in evaluating and controlling hazards. The role industrial hygiene plays in industrial progress is probably best illustrated by the development of nuclear energy and its application to industrial processes, Dr. Schrenk pointed out.

In order to be prepared for the industrial and social changes which are occurring at an ever-increasing pace, new tools, instruments and analytical procedures must be available to the industrial hygienist. An excellent example of progress in the analytical field, Dr. Schrenk stated, is the spectacular advance in gas chromatography. He pointed out also the rapid expansion in the fields of spectroscopy, photometry, electro-analytical chemistry, nuclear magnetic resonance, and polarographic instrumentation, and the many contributions in the more conventional analytical field.

"A knowledge of these new developments is essential in the development of the more practical instruments which are in day-to-day use in the field," he said.

"The true value of analytical tools depends upon our ability to interpret the results of such measurements in terms of a quantitative relationship with harmful or objectionable effects. This in turn requires a knowledge of the biological response to offending agents," Dr. Schrenk said.

Thus, the industrial hygienist cannot work alone in protecting the health of workers and consumers. "Laboratory studies of biological response serve the dual purpose of providing data for establishing standards and of providing better diagnostic

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INDUSTRIAL HYGIENE DIGEST
Literature and News

NEWS ITEMS

441 Occupational Health News.

The following are titles of brief papers in the Occupational Health News Section of the A. M. A. Archives of Industrial Health for March: "Comparative Dust Sizing Yields Unexpected Results" (abstracted separately); "The American Union of Occupational Medicine, Its Formation and Objectives"; "Dust Exposure in the Brick and Tile Industries of Tennessee"; "Excitation Sources for Spectrographic Analysis"; "Occupational Health and Coast Guard Buoy Repair"; "Occupational Health and the Academic Life"; "Shielded Psychrometer for Measuring Environmental Temperatures in the Presence of Radiant Heat"; "Industrial Hygiene Records Aid Houston Department"; "Hazards of Laboratory Refrigerators"; and "Field Markings Are Seasonal Hazard for Football Players". It is announced that this Section, in which the Occupational Health Program of the U. S. Public Health Service, has cooperated, is discontinued with this number.

442 Course in Occupational Health.

The Institute of Industrial Medicine, New York University-Bellevue Medical Center, will offer for the third time a two-months' course in occupational health for physicians, September 16 to November 8, 1957. The course content covers the following areas: Preventive Medicine, Administrative Medicine, Occupational Diseases, and Industrial Hygiene. Didactic instruction will be supplemented with field trips to industrial plants, governmental agencies concerned with industrial health, and union health centers. Opportunity will be given to attend medical, surgical, and clinical-pathological conferences held in the New York University-Bellevue Medical Center. Further information can be obtained from the Office of the Associate Dean, N. Y. U. Post-Graduate Medical School, 550 First Avenue, New York 16, N. Y.

443 Hygienic Guide Series.

The following additions to the Hygienic Guide Series are announced in the March number of the American Industrial Hygiene Association Quarterly: ozone; acetone; acrylonitrile (propenenitrile, vinylcyanide); methyl ethyl ketone (butanone); and acetic acid. These Guides are obtainable at 25 cents each from the American Industrial Hygiene Association, 14125 Prevost, Detroit 27, Mich., or can be consulted in the Quarterly.

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OCCUPATIONAL DISEASE STATISTICS

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

	Colo. Feb. 1957	Conn. Feb. 1957	Ind. Feb. 1957	Mo. Feb. 1957	Pa. Feb. 1957	Pa. Mar. 1957	Total
Anthrocosilicosis					3		3
Anthrax						3	3
Carbon tetrachloride, with acute hepatitis			1				1
Dermatitis	18	51*	7**	16	31	35	158
Lead	5				7	5	17
Platinosis						1	1
Pneumoconiosis	1				1	36	38
Pneumoconiosis (suspected)						19	19
Respiratory irritation					2	4	6
Silicosis	1	2			3	57	63
Silicosis (suspected)					3	11	14
Silico-tuberculosis		1			1		2
Solvents	2						2
Trichloroethylene, acute poisoning			1				1
Tuberculosis						2	2
Miscellaneous	1						1
Total	28	54	9	16	51	173	331

* Causes listed: abnormalities of temperature, inorganic dust, nitro and amino compounds, chemicals undetermined, and undetermined, one each; chloronaphthalene and chlorodiphenyl, plating solutions, and dyes and inks, two each; rubber chemicals and synthetic resins and chemicals, three each; soap solutions and glue, six; solvents, N. O. C., eleven; and oils, fats and waxes, sixteen.

** Causes listed: synthetic abrasives, insulation, plating chemicals, rust proofing chemicals, paper, detinning, and cause not stated, one each.

COMING EVENTS

- 445 May 5-10 National Tuberculosis Association, Annual Meeting, Kansas City, Mo.
May 6-8 Air-Conditioning and Refrigeration Institute, Annual Meeting,
Hot Springs, Va.
May 6-9 American Trudeau Society, 52nd Annual Meeting, Kansas City, Mo.
May 6-10 American Foundrymen's Society, 61st Annual Convention, Cincinnati, O.
May 6-10 Association of Food and Drug Officials of the United States, 61st Annual
Conference, Louisville, Ky.
May 12-16 Institute of Food Technologists, Industrial Exhibits, Pittsburgh, Pa.

May 13-15	Radiation Research Society, Annual Meeting, Rochester, N. Y.
May 14-16	Industrial Nuclear Technology Conference, Chicago, Ill.
May 16-17	National Industrial Conference Board, General Session, New York, N. Y.
May 20-22	Chemical Specialties Manufacturers Association, 43rd Midyear Meeting, Chicago, Ill.
May 20-24	National Fire Protection Association, Annual Meeting, Los Angeles, Calif.
June 2-6	Air Pollution Control Association, Golden Anniversary Meeting, St. Louis, Mo. (See news item in March Digest)
June 3-5	American Society of Refrigerating Engineers, 53rd Annual Meeting, Miami Beach, Fla.
June 3-7	American Medical Association, Annual Meeting, New York, N. Y.
June 6-8	Manufacturing Chemists' Association, 85th Annual Meeting, White Sulphur Springs, Va.
June 9-13	American Society of Mechanical Engineers, Semiannual Meeting, San Francisco, Calif.
June 10-12	American Nuclear Society, Third Annual Meeting, Pittsburgh, Pa.
June 11-13	American Meteorological Association, General Meeting, Monterey, Calif.
June 13-14	Malleable Founders' Society, Annual Meeting, Colorado Springs, Colo.
June 16-21	American Society for Testing Materials, 60th Annual Meeting, Atlantic City, N. J.
June 17-21	Canadian Medical Association, Annual Meeting, Edmonton, Alta.
June 20-23	Society of Nuclear Medicine, 4th Annual Meeting, Oklahoma City, Okla.
June 24-27	American Society of Heating and Air-Conditioning Engineers, Semiannual Meeting, Murray Bay, Que.
July 1-6	Twelfth International Conference on Occupational Health, Helsinki, Finland. (See news item in January Digest)
July 8-12	Fourth International Poliomyelitis Conference, Geneva, Switzerland.

LEGAL DEVELOPMENTS

446 New Legislation.

Death benefits have been increased in Idaho, effective July 1, 1957. In Nebraska nonresident employers now come under the provisions of the compensation act. South Dakota has extended compensation coverage to elected public officials. In Arizona and Tennessee all references and texts have been revised to reflect the text of the revised statutes, but the statutory provisions remain unchanged.

-- Commerce Clearing House

447 Occupational Disease—Asbestosis—Sufficient Evidence of Exposure—Evidence to Support Board's Finding.

The employee was properly denied compensation where she failed to prove that she was suffering from any lung affliction or asbestosis. The evidence showed that there was an insignificant amount of asbestos dust in the air, and that the employee when x-rayed, was not suffering from any lung disease attributable to her employment. The court held that the Board's award must be affirmed if the findings of the board could have been reasonably made upon consideration of all the evidence before it. The court further held that it was not concerned as to whether or not a finding in favor of the employee would have been supported by substantial evidence, but was only concerned with the sufficiency of the evidence to support the award made. Affirmed. Counts v. Bussman Manufacturing Co. Missouri, St. Louis Court of Appeals. No. 29,529. February 5, 1957.

-- CCH

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448 Injured While Descending From Truck—Fractures of Leg, Pelvis, and Hip—Death as a Result of Tuberculosis—Causal Relation Between Fall and Tuberculosis.

The employee, while getting off his employer's truck fell under a wheel and suffered injuries which totally disabled him, fracturing his leg, pelvis, and hip. He died almost two years later of tuberculosis. His widow filed a fatal claim petition. A doctor testified that the trauma to his chest when he was thrown to the ground weakened the lung so as to make it susceptible to tuberculosis. The court, in reversing the award, held that there was no evidence that the employee suffered any injury to his chest when he was run over by the truck. There is no testimony that the employee hurt his chest when he fell or that he made any complaint of pain in his chest until a year later. There is no direct evidence that the employee received a trauma to his chest, and there is nothing in the evidence from which it can be fairly inferred. Reversed. Dennis v. Jarka Corporation. Pennsylvania Superior Court. No. 146. December 28, 1956. -- CCH

449 Dermatitis—Effect on Verdict—Misconduct of Juror.

A railroad employee was improperly awarded benefits for contracting contact dermatitis where it was shown that the misconduct of a juror may have caused the rendition of an improper verdict. The juror when examined on his voir dire by counsel for the claimant, stated that he manufactured and sold chemical products and that just his son worked for him. He also stated that his company never had an employee who contracted dermatitis from using a chemical substance which had a chromate compound in it. After the verdict, it was discovered that the juror had a chemical dermatitis at the time of the trial and had had it for more than 20 years. The juror admitted that the fact that he had a skin disease might have affected his judgment. The court ruled that while the granting of a new trial on the ground of misconduct of a juror is ordinarily within the sound discretion of the trial judge, the denial of a new trial on this ground in the instant case comes perilously close to amounting to an abuse of judicial discretion; and when considered cumulatively with other errors requires that the cause be submitted to another and completely impartial jury. Reversed and remanded. Seaboard Air Line Railroad Co. v. Holt. Florida Supreme Court. No. 25,426. November 7, 1956. -- CCH

BOOKS, PAMPHLETS AND NOTICES

450 Third Technical Progress Report, Air Pollution Foundation, Report No. 17. W. L. Faith, N. A. Renzetti, and L. H. Rogers. Air Pollution Foundation, 704 S. Spring St., Los Angeles, Calif. 110 pp. (Mar. 1957). \$3.00.

Work sponsored by the Foundation during the past year was threefold: (1) a determination of the paths of winds that bring air pollutants to the business section of Los Angeles; (2) a determination of the chemical composition of the gaseous emissions from back-yard incinerators; and (3) a study of the processes by which motor vehicle exhaust contributes to smog. Results of these investigations are discussed fully. A definite relation was found between the hydrocarbon content of exhausts and the known effects of smog. A preliminary investigation of a method of reducing the nitric oxide content of auto exhaust was also carried out. Removal of the nitric oxide was found more effective than catalytic decomposition of the oxide. The other general field of research was the measurement of pollutants in the atmosphere throughout the district, with special attention to nitric oxide, ozone, oxidant, and eye irritants. Methods of measurement are described, and results are summarized in tables and charts. Studies on plant damage and on atmospheric carbon dioxide are also reported. Papers given at a conference on the chemistry of polluted atmospheres are reviewed. The report includes a list of other local studies on air pollution made by the Air Pollution District, universities, and State and Federal agencies. Close cooperation between the Foundation and these organizations is evident. -- FFR

- 451 Handbook of Biological Data. William S. Spector, editor. Prepared under the direction of the Committee on the Handbook on Biological Data, Division of Biology and Agriculture, National Academy of Sciences, National Research Council. W. B. Saunders Co., West Washington Square, Philadelphia 5, Pa. 584 pp. (Oct. 1956). \$7.50.

This publication has been in preparation by the above Committee for the past 7 years. The 445 tables in fine print represent the actual correlated contributions of more than 4,000 scientists who are listed, and the counsel of an additional 13,000. The tables contain authoritative data on numerous phases of plant and animal biology. A few of the subjects that may be of major interest in the fields of medicine and toxicology are: drugs affecting various systems; therapeutic agents and antibiotics; common poisons; toxic plants and animals; detoxication mechanisms; insecticides, fungicides, and herbicides; radio-isotopes; energy cost of work, blood vessels of man; theories of coagulation; and the various organs and tissues. Diagrams, concise summary statements, and structural formulas have been used when appropriate, although tabular data constitute the major portion of the handbook. Later editions will include additional tables, as users define deficient areas and adequate data become available.

-- FFR

INDUSTRIAL MEDICAL PRACTICE

- 452 Planning and Equipping a Large Medical Unit. D. J. O'Leary.
Am. Assn. Ind. Nurses J. 5, 5-8 (Feb. 1957).

Suggestions for the planning and equipment of a medical unit for a large organization are presented. The extent of layout and personnel will depend upon the extent of the service to be offered, the daily patient quota, classification of employees, growth expected, convenience of the site, and cost. The facilities of New York Life Insurance Company are described and illustrated, not as a model for every clinic, but as a working plan which has proved satisfactory and as a suggestion for similar departments.

- 453 Planning Medium Sized Medical Departments. Grace B. Bissonnette.
Am. Assn. Ind. Nurses J. 5, 11-20 (Feb. 1957).

The extent of medical facilities provided for a medium-size plant depends upon the same factors as in the large plant. It is absolutely necessary to fit the service and facilities to the exact needs of the business, or management will not derive adequate benefits to warrant the expenditure. The medical department should consist of at least three rooms: a small waiting room, a rest room which may serve as an examination room and a doctor's office, and a treatment room. Other essentials are toilet facilities, storage closets, and a small clothes closet. The floor area needed is approximately 250 to 350 square feet. Suggestions are given for location and size of the rooms and for the equipment for each room. Several suggested floor plans are illustrated.

- 454 Cost of a Small Industrial Medical Unit. Mary C. Barton.
Am. Assn. Ind. Nurses J. 5, 22-25 (Feb. 1957).

An adequate medical unit for any industry large enough to plan for one should be a three- to four-area unit, centrally located, and if possible, on the ground floor. It could be one large room partitioned into the space requirements, with a maximum of windows. Brief suggestions and a floor-plan for the layout are given. Costs are estimated for basic equipment, totaling \$875 for the treatment area, and \$500 for the rest area, plus office furniture and several optional items. The initial investment is the total investment since

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the dressings and medications used when the department is in operation pay for themselves. It is difficult to estimate the operating expenses, because they vary widely with the type of plant, extent of hazards, and other factors. Progressive management advocates the purchase of superior equipment and installation, but places careful control on the dispensation of medical supplies, wisely recognizing where cost pays its dividends.

- 455 What the Employee Thinks of His Medical Department. A Medical Department Survey—Detroit Area, Michigan Bell Telephone Company. W. Jend.
Ind. Med. & Surg. 26, 113-119 (Mar. 1957).

Results of a questionnaire directed to 1100 employees are reported. There is fairly widespread use of the department, but not to its fullest extent. A generally favorable attitude was noted, particularly among those who had visited the department recently and among supervisors. There is much misunderstanding and lack of information about the purposes and functions of the department. Many employees who expressed dissatisfaction with the medical diagnosis and help seemed to expect extensive treatment well beyond the generally recognized scope of an industrial medical service. Employees and supervisors alike commented favorably on the principle of periodic examinations. Many comments urged the expansion of this program. The majority were in favor of handling all visits, except emergencies, on an appointment basis as a means of reducing the waiting times of patients. Many participants seemed to feel that the visiting nurse program is maintained as an adjunct to supervision rather than to be helpful to employees. There were many comments calling for more friendly and sympathetic care of patients and a more effective system of reporting examinations and tests. Several proposed improvements are listed on the basis of the results of the questionnaire. -- Cond. from author's summary

- 456 Recruitment of Physicians for Industry. Editorial.
Ind. Med. & Surg. 26, 165, 166 (Mar. 1957).

At no foreseeable time may it be expected that educational agencies throughout the land will complete the training of industrial physicians in numbers anywhere near the demand. Therefore resort must be had to the recruitment of able physicians without formalized education in that specialty. Although this is not the optimal route into industrial medicine, serving in industry becomes an education in itself. Large numbers of skilled young physicians successful in private practice would transfer into the highly dramatic opportunities of occupational health should they know of such opportunities. Also, industry and the industrial physician do not know who these prospective recruits are and where they may reside. If County Medical Societies that maintain Committees on Occupational Health would call attention to the need for industrial physicians, they would be of great service.

- 457 Lactic Acid Accumulation During Work. A Suggested Standard of Work Classification.
J. G. Wells, B. Balke, and D. D. Van Fossan. J. Appl. Physiol. 10, 51-55 (Jan. 1957).

The correlation of blood lactate production in man with respiratory and circulatory adaptations resulting from physical exercise during an established work capacity test was studied. From physiologic criteria observed, an attempt was made to prepare a general classification of work intensity. Three distinctly different increments of lactic acid accumulation in the blood during gradually increased work indicates the following classification: (1) light work; pulse rate not exceeding 120 beats per minute, no lactic acid increase significantly above the resting level; (2) heavy work; pulse rate between 120 and 160 beats per minute, a lactic acid increase from approximately 20 to 40 mg. %; (3) severe work; pulse rate above 160 beats per minute, a lactic acid increase to 100 mg. % or more.

-- Editor's abstract

- 458 The Biology of Aging. Guest Editorial. G. E. Wakerlin.
J. Am. Med. Assn. 163, 950-952 (Mar. 16, 1957).

The concept that aging is an endogenous process inherent in all living things and not basically dependent on stress and disease is increasingly accepted, although we still do

not have sufficient data to choose finally between these alternatives or to conclude that a cell, organ, or organism placed in an optimal environment may not live indefinitely. The basic mechanisms of aging are discussed, and pertinent literature is reviewed. The principal changes with aging include: (1) decrease in pulmonary function; (2) reduction of the excretion of 17-ketosteroids; (3) impaired reactions to stress; (4) gradual decrease in cardiac output; (5) decrease in basal metabolic rate; (6) progressive decrease in renal functions; and (7) gradual decline in cerebral blood flow and oxygen consumption. However, the bicarbonate content and carbon dioxide tension of the plasma, the arterial blood sugar level, the blood volume, and the eosinophil response to corticotropin do not change. Recent studies are reviewed briefly. Biological research on aging is important not only for gerontology but for the geriatrics of tomorrow. Only through research can we achieve the prime goal of gerontology, which the Greeks indicated more than 2,000 years ago by pointing out that the art of living consists in dying young but as late as possible.

- 459 Tuberculosis—In and Out of Industry. R. C. Edson.
Ind. Med. & Surg. 26, 139, 140 (Mar. 1957).

Tuberculosis is still with us; the death rate has fallen remarkably; the incidence is slowly decreasing; treatment is a rapidly changing picture; adequate follow-up protects the patient and industry; and the patient who has had tuberculosis is a valuable asset to industry.
-- Author's summary

- 460 Construction and Use of a Low Cost 60 mm. Photo-Fluorographic Unit for Mass Chest Survey. E. W. Tihen and T. Freedman. World Med. J. 4, 110, 111, 116 (Mar. 1957).

The obstacle of expense for mass photo-fluorography has been overcome by the local construction of an effective 60 mm. photo-fluorographic unit which is described. Its cost was \$300, while a comparable standard supply item cost \$3490. It is adaptable to existing x-ray equipment in hospitals and dispensaries. It was used in a mass survey of air base employees, other servicemen, dependents, and civilians in Japan, and resulted in the detection of a number of cases of active or suspected tuberculosis. Continued use of this unit for routine hospital admissions and certain categories of physical examinations will result in the saving of a considerable amount of money to the government.

-- Cond. from authors' summary

- 461 Brucellosis as a Cause of Herniated Disk and Spondylitis. T. de V. Lastra and J. L. Griggs.
Ind. Med. & Surg. 26, 122-129 (Mar. 1957).

Lesions of the intervertebral disk are frequent in brucellosis, causing hernia intraspinal of the type of Schmorl's node, or herniation of the nucleus pulposus into the spinal canal. In the authors' studies, the attack upon the disk has always been associated with lesions of the neighboring vertebral bodies. Therefore, it may be presumed that the lesion spreads from the vertebral body to the disk, as shown by the anatomical specimens. Neurological manifestations may occur. The small intervertebral joints are also frequently attacked in brucellosis, appearing as osteoarthritis. Lesions of the arches, the spinous processes, the ligaments, and vertebral coverings may also be caused by brucellosis. Patients with disk disease should be thoroughly tested for brucellosis prior to surgery, especially if there is an inadequate history of trauma and if the results of previous surgery have been disappointing, or if the patient has chronic ill health. The salient points of the pathogenesis, diagnosis, and modern treatment of brucellosis are reviewed.
-- Cond. from authors' summary

- 462 Occupational Studies in the Investment Casting Industry. Environmental Aspects.
G. E. Tubich, F. T. McDermott, I. H. Davis, J. C. Barrett, and D. E. Van Farows.
Arch. Ind. Health 15, 223-244 (Mar. 1957).

The process of investment casting is described and its history is related. It is sometimes known as the lost-wax process, but there are a number of variations in which frozen mercury (IHF Abst. 347, Feb. 1956) and other materials are used for patterns. An evaluation of the environmental factors of dust, gases, and solvents and the physical conditions

of noise and ventilation was made over winter and summer periods. Two types of high-temperature investment were encountered. One consisted of a mixture of fire-clay grog, silica sand, and silica flour, with a binder of ethyl silicate and ethyl alcohol, and the other consisted of silica sand and silica flour, with phosphate compounds as a binder. It was found that 75% or more of the airborne dust was 3.5 microns or less in size. The amount of free silica in the airborne dust less than 5 microns varied from 25 to 63%, varying with the operation. Eighty per cent of all silica dust samples were greater than 4.9 million particles per cubic foot of air. Ethyl alcohol vapor concentrations in the investing area ranged from 500 to 5000 ppm, and trichloroethylene vapor in the pattern area ranged from 25 to more than 425 ppm. A major noise problem exists at several operations. A series of charts and drawings are presented to show how specific dust, solvent-vapor, and noise problems may be controlled. Calculations and data are given to illustrate dilution-ventilation techniques. -- Cond. from authors' summary

- 463 Occupational Health on Farms. H. N. Doyle. Public Health Repts. 72, 145-148 (Feb. 1957).

Little attention has been given to occupational health on farms. The hazards of injuries by animals, many bacterial and parasitic infections, and exposure to light and heat have always been present; but mechanization of farms has introduced new hazards, including mechanical injuries, noise, and welding hazards. The injury rate among farmers is higher than the national average. Another hazard is exposure to chemicals widely used as pesticides, fumigants, and weed killers. Control measures such as those employed in industry are absent. Environmental factors such as housing for migrant workers contribute to the health problem. Only a slight effort to recognize these hazards has been made, especially in South Dakota and Iowa. This is a new and complex field confronting the industrial hygienist. In every state where agriculture is a significant industry, an earnest beginning should be made to meet this public health responsibility.

- 464 Clinical Observations of an Analgesic Formulation in Industrial Practice. G. B. Meyers. Ind. Med. & Surg. 26, 120, 121 (Mar. 1957).

The analgesic formulation selected (Phenaphen) was found to be safe and satisfactory for use in an industrial medical practice. Prompt treatment with this analgesic-sedative preparation helped alleviate pain and anxiety satisfactorily in 123 of 137 cases, or 89.8%. -- Author's summary

SKIN DISEASES AND BURNS

- 465 Dermatology in Industrial Medicine, Industrial Medical Association, Committee on Dermatology. F. C. Combes and R. R. Suskind. Ind. Med. & Surg. 26, 145-148 (Mar. 1957).

This Committee has inaugurated a project in which questions of practical aspects of occupational dermatoses are posed by the Committee and answered by its members. The question discussed here is: "What is your concept of pre-employment examination insofar as it pertains to prevention of occupational dermatoses?" Dr. Combes emphasizes that the pre-employment examination can be intelligently done neither by the part-time industrial physician nor the part-time industrial dermatologist. The examiner should have had graduate training and experience in this phase of medicine, and should be well acquainted with the health hazards of industry in general, with those of the particular establishment, and especially with the work the applicant is to perform and the hazards connected with it. The dermatological examination should follow the general physical examination, and the dermatologist should have access to the results of this examination. Both authors discuss the essentials of the dermatological examination and the findings which may exclude the applicants from certain occupations.

- 466 Cutaneous Effects of Soaps and Synthetic Detergents. R. R. Suskind.
J. Am. Med. Assn. 163, 943-946 (Mar. 16, 1957).

The salutary effects of soaps and synthetic detergents on the skin and their modes of action are discussed. Their adverse effects on the skin, especially on the skin of persons with established dermatoses, are of concern to dermatologists. The effects of soap are largely due to alkali, but the effects of synthetic detergents are not so well understood. Several pathologic alterations are described. Allergic sensitization to these chemicals is apparently rare. The authors conducted experiments on persons with established dermatitis, some of whom were hospitalized. One hand of each patient was immersed in a solution of one of several soaps or synthetic detergents and the other in tap water for 30-minute periods twice daily for two weeks. The dorsum and palm of each were examined microscopically and graded, and a summary of the results in the first 45 patients studied is presented in a table. Surprisingly, in no instance did immersion in the cleansing agent result in the dermatitis of the test hand becoming significantly worse as compared with the control hand. In two cases dermatitis in the test hand became significantly worse during the first week, but the control hand also became worse. Both hands showed notable improvement during the second week. The exposures used were much more severe than those experienced by the average housewife. The authors therefore believe that the circumstances in which soaps and detergents have been indicated as causing or aggravating dermatitis are much more complex than have been anticipated.

The improvement in most of the patients tested may be attributed to the anti-inflammatory effect of soaking or to the hospitalization itself, which removes the patient from the milieu responsible for the eruption. The elevated temperature and the pH of the test solutions did not appear to interfere measurably with the therapeutic effect of these immersions. These results indicate that there is much to be learned about the effects of detergents, and the medical profession and the manufacturer should integrate their research efforts in a systematic and critical investigation of these unsolved problems.

- 467 The Value of Barrier Creams. L. Orris. Safety Maintenance 113, 58-61 (Mar. 1957).

Barrier creams are often low on the list of preventive measures for dermatitis, but in some instances they may be the only possible means of protection, from direct contact or from vapors. In general, protective ointments should be: (1) non-irritating; (2) formulated so as not to interfere with normal skin function; (3) protective against the specific irritant for which they are used; (4) difficult to rub off, and stable under working conditions; (5) easy to apply and pleasant to use; and (6) easy to remove by ordinary soap and water. The two general classes are water-repellents and oil-repellents. They may be further divided according to content and alleged action. Among the special classes are ointments containing light-screening compounds and detoxifying chemicals, powder ointments, and silicone-containing ointments. There is no one universal repellent. Several surveys on the comparative value of creams are reviewed. The only recent, adequately controlled study was made by the Public Health Service (IHF Abst. 1204, Oct. 1955). It was concluded that the best over-all protection is provided by white petrolatum and that silicone greases are the best water repellents; however, an adequate study of protection from organic solvents has not as yet been made. Although silicone ointments have a wide range of effectiveness, they have several drawbacks, including cost and lack of cosmetic acceptance, as the bases are often either too greasy or too tacky. It is expected that the latter defect will be corrected. Before any preparation is marketed and widely advertised it should be routinely subjected to critical, well-controlled laboratory and clinical tests to determine its areas of effectiveness.

- 468 The Danger of Dermatoses Due to Cold-Setting Ethoxyline Resins (Epoxide Resins).
E. Grandjean. Brit. J. Ind. Med. 14, 1-4 (Jan. 1957).

Synthetic resins of the ethoxyline group ("araldite" casting resin) have caused many dermatoses. In 11 factories making electrical equipment, the work benches and the workers using "araldite" casting resin D were investigated. Out of 328 workers, 164 showed dermatoses which could be classified as skin irritations (erythematous itching patches) and severe allergic eczemas caused by direct contact either with the liquid resin, or with triethylenetetramine used as a hardener, or with an unpolymerized mixture of both. Preventive measures are discussed in detail, including: (1) instruction of workers and foremen;

(2) action directed toward elimination of the contaminated work bench, cleaning rags, solvents, and containers; (3) removal of vapors by exhaust ventilation; (4) individual protection of the skin; (5) care of the skin; and (6) medical measures.

-- Cond. from author's summary

- 469 Dermatitis in the Fish Industry. A. V. Raison. *Occ. Health Rev. (Canada)* 8, 6-8 (Jan. 1957). Reprinted from *The Fisherman*.

Dermatitis is the chief occupational hazard among fishermen and fish handlers. The most common afflictions in these occupations are: (1) skin abrasions, lacerations, and cuts; (2) bites and stings; (3) redfeed dermatitis; (4) erysipeloid; (5) skin cancer; (6) allergy; (7) an unusual type of skin infection among Alaska fishermen; (8) Weil's disease; and (9) dermatitis from alkali and salt water. Their causes and symptoms are discussed. All infections should receive medical care as soon as possible. Pencillin and other antibiotics have proved very effective. The most important features in the prevention of fish poisoning are good personal hygiene and strict adherence to health and safety rules and regulations.

- 470 The Incidence of Skin Disorders in Hairdressers. S. Borelli. *Arch. Gewerbepathol. Gewerbehyg.* 14, 686-699 (1956). German.

It was found that skin trouble was present in 70% of about 1,000 hairdressers including 200 students learning the trade. The chief agent causing the dermatitis was the liquid used in the cold wave process. The first sign is hyperhidrosis of the hands, which then progresses to swelling of the fingers, which later become inflamed and take on a bluish red color. The systematic use of protective ointments containing fat has been found of value as a protective measure.

-- Cond. from Bull. Hyg.

- 471 Clinical Appraisal of Dermatoses Due to Cosmetics. C. T. Nelson. Report to the Committee on Cosmetics. *J. Am. Med. Assn.* 163, 740, 741 (Mar. 2, 1957).

A dermatitis from cosmetics may be caused in one of three ways: (1) by direct irritation of the nonsensitized skin; (2) by an otherwise harmless ingredient to which the skin becomes allergic; and (3) by an ingredient that renders the skin locally hypersensitive to light of certain wavelengths. A primary irritant may also be a sensitizer, or may cause dermatitis on first exposure if it acts in sufficient concentration for a sufficient period of time. The key to the diagnosis of a dermatitis caused by cosmetics is the history of the patient, and the key to its treatment is avoidance. In case of doubt it is better to advocate complete elimination of cosmetics for a time. The use of simple wet compresses and calamine liniment or a bland emollient ointment will usually suffice for local therapy. Then the cosmetics can be reintroduced one at a time until the cause is established and the responsible agent is eliminated.

CHEMICAL HAZARDS

- 472 Delayed Death Caused by Gassing in a Silo Containing Green Forage. F. M. Troisi. *Brit. J. Ind. Med.* 14, 56-58 (Jan. 1957).

Three fatal cases of carbon dioxide poisoning occurred in a half-underground silo nearly emptied of green forage. One case in which death occurred five days after the gassing incident, is described in detail. The toxicology of carbon dioxide and its estimation in working environments are discussed and preventive measures are described.

-- Author's summary

(Ed. note - Attention has been called to nitrogen oxides as another hazard in silo filling in the United States in several recent articles. See IHF Abst. 47, Jan. 1957).

- 473 Fluoride Poisoning and Cholinesterases in Rats. O. Dybing and L. V. Loe.
Acta Pharmacol. Toxicol. 12, 364-368 (1956).

Inhibition of cholinesterases in vitro by sodium fluoride was demonstrated with enzyme preparations from various rat tissues, even at very low fluoride concentrations. LD₅₀ values for sodium fluoride given orally were 250 mg. per kg. for adult male rats and 180 for females, and intraperitoneally 40 mg. per kg. for males. Quantities approaching the order of magnitude of these doses did not inhibit cholinesterase activity in the rats. It appears that the inhibitory effects of fluorides on cholinesterases has no relation to the symptoms of fluoride poisoning.

-- Cond. from Chem. Absts.

- 474 Evaluation of the Hazards of Ozone and Oxides of Nitrogen. Factors Modifying Toxicity.
H. E. Stokinger. Arch. Ind. Health 15, 181-190 (Mar. 1957).

Experimental evidence is presented that ozone in single acute exposure is a highly poisonous substance to laboratory animals. No experimental evidence was found that this toxicity is modified to a significant degree by the presence of nitrogen oxides that may accompany ozone production. Seven factors have been experimentally found that may modify the toxicity of ozone. Four of these, youth, physical exertion, alcohol, and respiratory infection, tend to augment the injurious response or act to the detriment of the host; the remainder, intermittent exposure, premedication, and preexposure, either reduce or eliminate the injurious effects of ozone. Consideration has been given these factors in the evaluation of possible hazards to populations from ozone-containing smogs.

-- Author's summary

- 475 Toxicity of Ozone. 3. Chronic Toxicity. S. Mittler, M. King, and Betty Burkhardt.
Arch. Ind. Health 15, 191-197 (Mar. 1957).

Repeated exposures to 2.4 ppm of ozone induced some hemorrhage and edema in lungs of rats. Adaptation to ozone was noted after 32 hours of accumulative exposure. Twenty per cent of 102 mice died after a continual exposure to 2.4 ppm of ozone for 241 hours. Chronic exposure to ozone decreased the weight gain by young rats, and concentrations greater than 1.2 ppm and longer than 7 hours per day significantly affected the growth of young rats. The 0.1 ppm value as the maximum allowable concentration of ozone for an 8-hour workday appears to be reasonable. Ozone did not reach or react with the blood of chronically exposed animals. There was no change in hematocrit or hemoglobin values.

-- Authors' summary

- 476 Occupational Disease in a Chromate Plant. C. Sassi. Med. lavoro 47, 314-327 (May 1956).
Italian with English summary.

Clinical examinations were conducted in a poorly ventilated plant producing dichromates and chromic acid. On two occasions atmospheric determinations of chromate were made; maxima of 1.55 mg. chromium per cu. m. in the chromic acid plant, and 0.28 to 0.59 in various processes of chromate manufacture. The following conditions were found in 65 workers: perforation of the nasal septum in 49.2%; liver enlargement in 23.1%; bronchitis in 24.4%; gastro-duodenal ulceration in 15.4%; and cutaneous ulcers, atrophy and ulcer of the septum, sinusitis, and colitis in from 6 to 9% of the workers. Chest radiography, blood, urine, and liver conditions were practically normal, but urinary elimination varied from 18 to 260 micrograms per liter. The quantities eliminated did not seem to be related to atmospheric concentrations, but general reduction in concentration in the air of the whole plant has been followed by reduction in urinary elimination. Of 85 men who worked in the plant for 15 years, 2 died of cancer, probably caused by the exposure. The author recommends a maximum permissible concentration of 0.05 mg. per cu. m. (evidently as Cr; this corresponds closely to the American standard of 0.1 mg. per cu. m. as CrO₃); barrier creams are useful, and careful treatment of all wounds of the skin considerably reduces the incidence of ulcers.

-- Cond. from Bull. Hyg.

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- 477 The Therapy of Chronic Lead Poisoning by Calcium Disodium Ethylenediamine Tetraacetate. J. Teisinger and J. Srbova. Arch. Gewerbepathol. Gewerbehyg. 14, 579-593 (1956). German.

The literature on EDTA therapy for lead poisoning is reviewed. Three groups of patients were treated with this drug, one by intravenous infusion, one by intravenous injection, and the other by aerosol inhalation, followed by an infusion. Details of amounts used and periods of administration are given. The progress of the patients was gauged by examinations of the blood for punctate basophilia, hemoglobin level, and lead content, and of the urine for prophyrin determination and lead excretion. The results confirm the great therapeutic value of CaNa_2EDTA . Intravenous injection is at present the best method of administration as it is the most convenient and only slightly less efficacious than intravenous infusion. Aerosol inhalation is proposed as a prophylactic method but requires more study.

-- Cond. from Bull. Hyg.

- 478 The Treatment of Tetraethyl Lead Poisoning. P. R. Boyd, G. Walker, and I. N. Henderson. Lancet 272, 181-185 (Jan. 26, 1957).

Four non-fatal cases of tetraethyl lead poisoning are described. The urinary lead excretion of the three studied in detail was increased sevenfold by edathamil calcium disodium given intravenously, but little affected by that drug or by penicillamine by mouth. One patient who was maniacal, hallucinated, and deluded responded dramatically to electroconvulsion therapy.

-- Authors' summary

- 479 Isolation from Liver of Tetraethyl Lead after Its Inhalation. C. D. Stevens, C. J. Feldhake, and R. A. Kehoe. J. Pharmacol. Exptl. Therap. 117, 420-424 (Aug. 1956).

There are certain potential defects in the techniques used in the isolation and detection of tetraethyl lead in tissue. A qualitative method more specific for tetraethyl lead was developed and applied to analysis of liver tissue from exposed rats. The paper gives a full technical description of the methods used for exposure of rats to the vapor, the extraction of tetraethyl lead from the liver tissue by pentane, the concentration of the extract by low temperature vacuum distillation, and the identification of the compound in the extract by infrared spectra and lead analyses.

-- Cond. from Bull. Hyg.

- 480 Hygienic and Medical Investigations in Industries in Which Mercury is Used. H. Turrian, E. Grandjean, and V. Turrian. Schweiz. med. Wochschr. 86, 1091-1096 (Sept. 22, 1956). German.

The number of reported cases of mercury poisoning in Switzerland has been greatly reduced in the last 10 years. A large number of air analyses were conducted in three factories: (1) an electrical apparatus factory which uses about 800 kg. of mercury per month; (2) a thermometer factory; and (3) a chemical works where very large amounts of mercury, used as a catalyst, go to waste. Concentrations of mercury in the air of these factories, in micrograms per cubic meter, were 10-320 in the electrical factory, 300-600 in the thermometer factory, and 300-1000 in the chemical plant, as compared with the standard of 100. The results of physical and psychological examinations of 58 workers, with urine and blood analyses, are reported. In no case was a complete picture of mercury poisoning observed, but 15 out of the 58 workers had some of the symptoms of chronic mercury intoxication, such as tremor, defective memory, erethism, and subjective nervous complaints. The frequency of these symptoms showed a significant correlation with the degree of exposure to mercury.

-- Cond. from Bull. Hyg.

- 481 Urinary Nickel Excretion in Nickel Carbonyl Workers. L. Ghiringhelli and I. Dakli. Med. lavoro 47, 340-345 (May 1956). Italian with English summary.

This is a clinical review of 15 workers at an establishment dealing with the synthesis of nickel carbonyl and its use in the production of acrylic esters. One of the men had headache, asthenia, insomnia, and subsequently nausea and attacks of vomiting. None of the others complained, but all were examined and particular attention was given

to the estimation of urinary excretion of nickel. Tests were carried out at the time of examination, 2 months later, and after 20 days' absence from the plant. Twelve of the operatives showed a high nickel excretion rate at the first test but subsequent testing gave much lower figures. The author considers that: (1) the high excretion levels were due to absorption; (2) the symptoms in the one worker were due to nickel carbonyl; and (3) there are great differences in susceptibility between individuals. Gas masks should be ready for use in case of leaks in the apparatus. The gas is 5 times as poisonous as carbon monoxide.

-- Cond. from Bull. Hyg.

- 482 Medical Insurance in Relation to Occupational Argyria. F. Koelsch.
Arch. Gewerbepathol. Gewerbehyg. 14, 594-606 (1956). German.

The literature on argyria is reviewed and the author's experiences are presented. The word argyria is understood to mean a local or general impregnation of the body tissues with silver which may be caused by medical treatment with silver salts or by the handling of silver or its salts in industries, such as polishing, silver plating, photographic processes, and mirror manufacture. Argyria may also be caused by the inhalation of silver-containing sprays used in the manufacture of ceramics. Cases of argyria combined with siderosis occurred in 4 workmen polishing silver with red iron oxide. Postmortem examination of one of these workers showed a general staining of the elastic tissues with silver, and the ash of the dried lungs contained 6% of the metal. Clinical pictures of the skin and of the eyes are described. Many treatments have been tried but none of these is of definite value. No impairment of physical activity has been established, but psychological disturbance caused by disfigurement has occurred. Argyria is not accepted as a compensable disease, and the problem of compensation is difficult.

-- Cond. from Bull. Hyg.

- ✕ 483 Chemical Toxicity of Salts of Lanthanum, Yttrium, and Some Other Rare Metals to Animals. K. P. DuBois. U. S. Atomic Energy Comm. ORINS-12, 91-101 (1956).

The results of this study indicate that salts of lanthanum and yttrium exhibit relatively low chemical toxicity to mammals. The possibility of acute poisoning during the industrial use of these metals, therefore, seems unlikely. The LD₅₀ for 5 lanthanum salts, given intraperitoneally to rats, ranges from 275 to 625 mg. per kg. The tolerance to oral administration exceeds 3 g. per kg., indicating poor absorption from the gastrointestinal tract. Furthermore, the toxicity varies more markedly with the anions in the latter case. The effect of yttrium salts (only intraperitoneal route) resembles that of lanthanum; cesium is about one-third as poisonous as yttrium. Columbium trichloride seems quite toxic (40 mg. per kg.). Chronic exposure to salts of these metals might produce detrimental effects which are not observed in acute cases.

-- Chem. Absts.

- 484 Modification of Distribution and Excretion of Rare Earths by Chelating Agents. H. Hart. U. S. Atomic Energy Comm. ORINS-12, 118-135 (1956).

Data on urinary excretion of the lanthanum-140-ethylenediaminetetraacetic acid complex indicated the presence of agents or processes in the body which are capable of dissociating metal chelates of very high stability. The experiments were expanded to comprise various chelating agents and yttrium-90 as metal atom. A definite correlation could be established between the amount of yttrium excreted in the urine and the log of the metal chelate injected intravenously.

-- Chem. Absts.

- 485 Chelation in Physiological Systems. H. Foreman and Camille Finnegan. U. S. Atomic Energy Comm. ORINS-12, 136-142 (1956).

A relation is illustrated between the effect of a chelating agent (ethylenediamine-tetracetic acid) introduced into the body and stability constants of its metal chelate as found in vitro. CaEDTA was administered intravenously after intravenous injection of cerium-144, promethium-147, terbium-160, yttrium-91, and thulium-170 in rats. An index to the relative binding affinities of the chelating agent for the rare earths under physiological conditions, as manifested by the change in distribution and excretion of the injected elements, is obtained by calculating the ratios of the amount of rare earth in tissue and excrements of control to

treated animals. It appears that in the ratio of cerium to promethium the binding affinity of EDTA is strongly inferior to the natural binding affinities of the tissue. Between promethium and thulium the effect of EDTA becomes the greater factor in influencing the distribution and a direct relation between the EDTA-metal complex stability constant and chelating effect in the body is apparent.

-- Chem. Absts.

- 486 The Localization of Yttrium in Bone. Jenifer Jowsey.
U. S. Atomic Energy Comm. ORINS-12, 311-322 (1956).

Extensive experiments indicate that yttrium appears to be associated with bone surfaces rather than to be taken up by the mineral or organic matrix of the bone. This affinity for surfaces probably partly accounts for the ease with which the metal is removed by chelating agents.

-- Chem. Absts.

- 487 Cations and the Cornea. Toxicity of Metals to the Stroma. W. M. Grant and H. L. Kern.
Am. J. Ophthalmol. 42, Pt. 2, 167-181 (1956).

Systematic examination of salts of the metallic elements have shown that toxicity to the corneal stroma as measured by corneal opacification in rabbits can in most instances be correlated with the tendency of the metal to bind to the tissue and with the denaturing influence of the metal on the cornea as measured by decrease in capacity to absorb water and by loss of solubility of corneal mucoproteins in water. The cornea exhibits a wide range of selectivity in its reaction with different metals, quite analogous to the selectivity of a cation-exchange resin. The metals which compete most effectively for attachment to the tissue are in general the most toxic. The majority of toxic metals bind to the same reactive sites in the tissue as do innocuous metals such as calcium, though with stronger affinity; certain toxic metals, however, react with the cornea at other sites. Most effective reversals of the influence of toxic metals on corneal hydration and mucoprotein extractability have been obtained by using EDTA (sodium, pH 8.0) following exposure of the denuded corneas to salts of copper and lead and by treatment with sodium sulfosalicylate following exposure to beryllium sulfate.

-- Chem. Absts.

- 488 Dithiocarbamine Carbonic Acid as a Decomposition Product of Carbon Disulfide. B. Soucek and Z. Madlo. Arch. Gewerbepath. Gewerbehyg. 14, 511-521 (1956). German.

In vitro, carbon disulfide has been found to react with amino acids and probably with proteins of the blood with formation of dithiocarbamine carbonic acid (DTS). The authors investigated this reaction in vivo in animals and human beings with acute carbon disulfide poisoning. The rise in sulfhydryl group concentrations in the plasma and serum of animals and workers exposed to CS₂ is evidently due to the formation of DTS. It is formed chiefly in the liver, fat, and blood, and to a small extent in the kidneys, brain, and muscle. Its decomposition, with liberation of free CS₂, takes place in the liver, probably by the action of an enzyme as yet unidentified. Some DTS is excreted in the urine.

-- Cond. from Bull. Hyg.

- 489 Clinical Studies on the Pathological Effects of Carbon Disulfide with Special Reference to the Heart and Circulation. W. Nesswetha. Arch. Gewerbepath. Gewerbehyg. 14, 522-553 (1956). German.

This is a lengthy and highly complex account of the physiological, pathological, and clinical reactions of a group of 134 persons exposed to varying and intermittent concentrations of 10 to 100 mg. carbon disulfide per cu. m. of air during active work involving an expenditure of 3,800 calories per day. Comparison with a control group showed a higher incidence in the exposed group of subjective symptoms, disturbance of stereoscopic vision, and variations in the speed of ventricular systole; these are attributed to the selective affinity of CS₂ for the nervous system and cardiac muscle. The amount of CS₂ in the blood was found to be a function of the atmospheric concentration and length of exposure. During the first 4 hours there was a linear rise until saturation was approached, representing the amount of CS₂ absorbed by the tissues. An increase in blood beta-globulin was associated

with inhibition of lipid metabolism by CS₂. These findings were present exclusively in persons exposed to a concentration of more than 20 mg. of CS₂ per cu. m. of air; it is therefore recommended that this should be regarded as the maximum concentration (the accepted American standard is 60 mg. per cu. m.). This is a brief summary of the essentials of this extensive paper.

-- Cond. from Bull. Hyg.

- 490 Reaction of Carbon Disulfide with Proteins. Z. Madlo and B. Soucek. Arch. Gewerbepathol. Gewerbehyg. 14, 554-557 (1956). German.

The authors examined the reaction of carbon disulfide with albumin and beta-globulin. Differences in the reaction with the two proteins are noted, but it is concluded that CS₂ can combine with the amino groups of either free amino acids, higher peptides, or proteins, forming compounds containing SH groups. The toxicity of CS₂ is associated with their reactions and their variations with regard to different proteins, and with the inhibition of the normal metabolic functions of certain enzymes in the organism.

-- Cond. from Bull. Hyg.

- 491 Protein Metabolism in Chronic Carbon Disulfide Poisoning. 1. Changes in the Serum Proteins. A. Granati, D. Scavo, and C. Montervino. Folia Med. 39, 763, 764 (1956). Italian.

Fifteen workers subjected chronically to the effect of carbon disulfide poisoning showed a slight increase in total plasma proteins, an absolute increase in globulins, and a relative reduction in albumin. The sharpest increase was shown in the alpha-2- and the beta-globulins. The beta-lipoprotein, the alpha-2-, and beta-glycoproteins were also augmented.

-- Chem. Absts.

- 492 Occupational Hazard to Photoengravers; Chronic Poisoning by Aromatic Hydrocarbons of the Benzene Series. M. Lob. Z. Praventivmed. 1, 255-270; 296-310; 368-387 (June, July, Aug. 1956). German.

The main risk to which photoengravers are exposed arises from inhaling fumes of benzene, toluene, and xylene, which are components of inks. The properties and toxicities of these compounds are reviewed. Since benzene is the most toxic, the risk is greater as the solvents contain more benzene. Symptoms characteristic of benzene poisoning failed to disappear when ventilation was improved in the establishment under charge of the author. The explanation was that the toluene and xylene used contained large quantities of benzene. If benzene is used it must be controlled by suitable down-draft local exhaust ventilation as it evaporates. Toluene and xylene should also be controlled and recovered for re-use. The workplace should be thoroughly ventilated after work and the air should be sampled periodically. The legal control of the use of benzene in various countries is discussed. The author stresses the importance of medical findings as the only certain way to determine the existence of a hazard.

-- Cond. from Bull. Hyg.

- 493 Industrial Hygiene in Production and Use of Benzanthrone. V. G. Piskunova and others. Gigiena i Sanit. 21, No. 7, 22-26 (1956). Russian.

Clinical symptoms and toxic effects of contact with benzanthrone and its vapors are described in detail. Dermatitis, dark skin coloration, disturbances of nervous system, and apparent disruption of vitamin metabolism are the results of such intoxication, which occurs predominantly through the lungs.

-- Chem. Absts.

- 494 Schradan Content of Fruits and Vegetables. P. J. Clark and H. Jacks. New Zealand J. Sci. Technol. 38B, 58-65 (1956).

The schradan content of crops treated with insecticides containing schradan was determined. The amount present varied with the period between final treatment and harvest. Storage after harvest did not reduce the amount of schradan. Concentrations are given in various fruits and vegetables. It is concluded that until toxicity standards are available schradan should not be used on edible crops.

-- Cond. from Chem. Absts.

- 495 Toxicology of O, O-Dimethyl-2, 2-dichlorovinyl Phosphate. C. Klotzsche.
Z. angew. Zool. No. 1, 87-93 (1956). German.

The author reports an investigation of the toxicity of a new insecticide, O, O-dimethyl-2, 2-dichlorovinyl phosphate (DDVP) relative to that of some other widely used phosphoric ester compounds, especially parathion. DDVP is a highly volatile, colorless, viscous liquid, miscible with most organic solvents, and slightly soluble in water and glycerin. Though not yet commercially available in the United States, it has been found effective against house flies, mosquitoes, moths, and DDT-resistant insects and larvae. Acute oral administration to white rats showed the LD₅₀ to be 73 mg. per kg., as compared with 6.4 mg. per kg. for parathion. Toxic symptoms were similar to those from other organic phosphorus compounds. However, in the rapid onset and short duration of these effects DDVP was similar to parathion, indicating rapid absorption and excretion. By percutaneous application the LD₅₀ was 900 mg. per kg.; the first slight symptoms appeared at 375 mg. per kg. By daily oral administration over a period of 6 weeks the amount tolerated without toxic reaction was less than 10 mg. per kg. Serum cholinesterase was inhibited by a 0.001 molar concentration of DDVP emulsion. The blood picture showed a stress reaction similar to that from other phosphoric acid esters. It is concluded that although DDVP represents a certain advance on the older organic phosphorus insecticides, further investigation of its practical possibilities from a health viewpoint is necessary.

-- Cond. from Bull. Hyg.

INDUSTRIAL DUSTS

- 496 The Ultrastructure of the Fibrous-Hyaline Tissue of Silicosis. B. Pernis, A. Bairati, and G. Frigerio. Med. lavoro 47, 439-459 (Aug. - Sept. 1956).

The first series of investigations on the submicroscopic structure and macromolecular architecture of the fibrous hyaline tissue of silicosis is reported. The following investigations have been performed: (1) Chemical analysis: The hyalin is a polyphasic mixture of collagen, non-collagenous proteins (alpha and beta globulins), polysaccharides, and lipids. (2) X-ray analysis: besides quartz and possibly other minerals a considerable amount of organic paracrystalline material has been demonstrated, such as collagen, lipid molecular oriented with collagen, and non-collagenous proteins showing a uniform diffraction ring at 4.65A. (3) Electron microscope studies: silicotic fibrous hyaline tissue, after ultrasonic treatment, shows a fairly high amount of an apparently amorphous material around the collagen fibrils. This material can be removed by tryptic digestion; collagen fibers are then revealed showing a diameter of 300-700A with a normal period. (4) Polarized light microscopy: the fibrous hyaline tissue is a composite body of the Wiener type, with a fibrous component embedded in an amorphous substance. The results of these different investigations demonstrate the architectural complexity of the hyalin of silicosis, which is formed of collagen fibrils embedded in a mass of material composed of at least partly denatured globins.

-- Cond. from English summary (Bull. Hyg.)

- 497 Biochemical Investigation of the Hyaline Tissue of Silicosis. 3. Identification of a Beta-Globulin Protein Fraction. B. Pernis and E. Ghislandi. Med. lavoro 47, 460-464 (Aug. - Sept. 1956). Italian.

By means of a previously published procedure a non-collagenous protein fraction has been isolated from silicotic hyaline tissue. The total protein content of this fraction varies from 25-40%. The amino acid composition of this fraction, as determined by paper chromatography corresponds to those of serum beta-globulins. This finding is a confirmation of the assumption by Pernis and Pecchiai that silicotic hyaline tissue contains about 30% beta-globulin, and moreover brings further evidence of similarities between silicotic hyaline and amyloid. As a matter of fact, recent investigations have shown that amyloid contains a fairly high amount of beta-globulins -- Cond. from English summary (Bull. Hyg.)

- 498 Ethnological and Ecological Factors in the Clinical and Radiological Forms of Pneumoconiosis. M. Stojadinovic. Arhiv. Hig. Rada 7, 5-12 (1956). Croatian with German summary.

Silicosis in stone workers in two widely separated areas in central Serbia—Bela Voda and Popina-Dublje—shows differences in clinical and radiological characteristics which cannot be due to mineralogical or chemical differences in the sandstone. The people of Popina-Dublje are leptosome in type (slender) whereas those of Bela Voda are pyknic (stout). They are also of different racial origin. Traditions and psychosomatic characteristics have in the course of many generations produced different housing conditions and food habits, and these factors influence the amount of tuberculous infection and are probably responsible for the clinical and radiological differences in the silicosis observed in the two areas. Tabulation of the results of examinations of over 200 stone workers in each region shows: in Bela Voda, silicosis in 54.7%, silicotuberculosis in 7.2%, and tuberculosis in 8.4% while 29.7% were healthy; in Popina Dublje, silicosis in 51.7%, silicotuberculosis in 19.6%, and no cases of simple tuberculosis, and 23.3% were healthy.

-- Cond. from translation of German summary (Bull. Hyg.)

- 499 An Experimental Study of the Pathogenesis of Silicotic Granuloma in the Anterior Eye Chamber in Rabbits and Changes in Its Development Induced by the Action of ACTH, Insulin, Combinations of Both, and Salicylates. J. Vyskocil. Brit. J. Ind. Med. 12, 30-38 (Jan. 1957).

Massive lamellar fibrosis after quartz inoculation was produced in rabbits only in the free space of the irido-corneal angle and mainly by organization of the plasma exudate. The development of silicotic granuloma was reduced by salicylates, by ACTH alone, and by ACTH simultaneously given with insulin, in that order.

-- Author's summary

- 500 Mechanism of Silica Toxicity. Dinah M. James and J. Marks. J. Hyg. 54, 342-350 (1956).

Silicic acid in the polymerized form is toxic to leucocytes in tissue culture and depresses leucocyte respiration, effects which appear to be paralleled by its inhibition of the cytochrome oxidase enzyme system. There is evidence that silicic acid acts on this system by combining with and inactivating cytochrome c, and its effect in vivo may have a similar basis. The inhibitory effect of silicic acid on succinoxidase and succinic dehydrogenase is much less intense and probably non-specific.

-- Chem. Absts.

- 501 Studies on the Pathogenesis of Silicosis. 3. Effect of Polysilicic Acid on the Action of Testicular Hyaluronidase. H. Sakabe and K. Koshi. Bull. Inst. Public Health (Tokyo) 5, 18-20 (Mar. 1956).

The typical fibrotic response to silica has been attributed to the action of colloidal silicic acid in precipitating some of the protein of engulfing cells. An analogy has been drawn between the role of silicic acid and that of mucopolysaccharides, which are abundant in healing wounds and other sites where collagen forms and in developing quartz foci. An experiment was devised which showed that polysilicic acid inhibited testicular hyaluronidase, and that after digestion the viscosity of a mixture of hyaluronic acid or chondroitin sulfuric, testicular hyaluronidase and polysilicic acid increased significantly. The action of polysilicic acid may play a role in the formation of silicotic nodules. A new complex may be formed between the degraded polysaccharides and polysilicic acid.

-- Bull. Hyg.

- 502 Substitution of Silica-Containing Materials by Silica-Free Materials in the Combat against Silicosis. K. Schurmann. Zentr. Arbeitsmed. u. Arbeitsschutz 6, 167-171 (July 1956). German.

In Germany three-fourths of all compensation claims are for pneumoconiosis. The substitution of materials free from silica in sandblasting and grinding operations gives the best prospect of reducing the danger. Among the materials used are: steel shot and proprietary materials in cleaning and polishing; bentonite in molding sand; artificial grinding wheels containing emery or carborundum for grinding glass and jewels; emery and

carborundum for sanding in the shoe industry; and slate or chalk for stone-dusting in coal mines. Quartz sands have been prohibited since 1938 in grinding of glass, and exposure has been regulated. The higher cost of artificial abrasives in the glass and ceramic industries is offset by higher working speed.

-- Cond. from Bull. Hyg.

- 503 Respiratory Symptoms and Pulmonary Disability in an Industrial Town. Survey of a Random Sample of the Population. I. T. T. Higgins, P. D. Oldham, A. L. Cochrane, and J. C. Gilson. *Brit. Med. J.* 2, 904-910 (Oct. 20, 1956).

In 1954 the Pneumoconiosis Research Unit of the Medical Research Council carried out a survey of the male population aged 55-64 of Leigh in Lancashire, in order to compare the prevalence of respiratory symptoms and disability in miners with that found in men who had worked only in other occupations. The random sample consisted of 135 miners and ex-miners and 85 non-miners. Pneumoconiosis was found in 23% of the miners and ex-miners. Chronic bronchitis was found in 10.7% of the non-miners, in 26.7% of the miners without pneumoconiosis, and in 12.9% of the miners with evidence of pneumoconiosis. Some of the conclusions are: (1) miners and ex-miners had significantly more chronic bronchitis, a lower ventilatory capacity, and more respiratory symptoms than men who had never worked in mines; (2) miners without pneumoconiosis were on the average more disabled than those with early simple pneumoconiosis; and (3) the differences between miners and non-miners could not be ascribed to differences in social class or smoking habits, and in the miners there was no obvious relationship between length of exposure to dust and bronchitis.

-- Cond. from Bull. Hyg.

- 504 The Influence of the Shape of Dust Particles on the Rate of Phagocytosis in Vitro. A. Lengerova, V. J. Lenger, M. Esslova, R. Tuscany, and M. Volfova. *Brit. J. Ind. Med.* 14, 43-46 (Jan. 1957).

The rate of phagocytosis of two shapes of dust particles—"long" and "round"—was studied in an investigation in vitro in cultures of macrophages from the spleen of chicken embryos. The round particles were phagocytosed preferentially. This result is discussed from the standpoint of existing theories of phagocytosis as well as from that of the relation of the rate of phagocytosis and the harmfulness of different kinds of dusts.

-- Authors' summary

- 505 The Prevalence of Tuberculosis at Necropsy in Progressive Massive Fibrosis of Coalworkers. D. Rivers, W. R. L. James, D. G. Davies, and S. Thomson. *Brit. J. Ind. Med.* 14, 39-42 (Jan. 1957).

One hundred fifty-three cases of coalworkers' pneumoconiosis were examined at necropsy for the presence of tubercle bacilli both by culture and by animal inoculation. The series contained 118 cases of progressive massive fibrosis which were the special object of this study. Tubercle bacilli were isolated from 41 cases (35%) of massive fibrosis, and in 31 (28%) of these naked-eye or histological evidence of tuberculosis was recognized pathologically. The pathological observations, therefore, correlated well with the bacteriological results. There is a marked difference between the prevalence of tuberculous infection found in a post-mortem series and that found in life in cases of progressive massive fibrosis. During life the observed prevalence is only 1.1%. The authors found tubercle bacilli in the bronchi at necropsy in 28%. Thus open tuberculosis is, in most cases, a late complication of massive fibrosis. Whether tuberculous infection occurs early or late cannot be deduced from this study.

-- Authors' summary

- 506 Pulmonary Tumors in Mice Exposed to Asbestos Dust. K. M. Lynch, F. A. McIver, and J. R. Cain. *Arch. Ind. Health* 15, 207-214 (Mar. 1957).

Mice of a selected strain (AC F₁) were exposed to a dusty atmosphere containing asbestos floats of a type used by others experimentally, at 150 to 500 million particles per cubic foot. The largest single experimental group consisted of 127 animals killed at 19 months after exposure for 17 months. This group was compared with 222 control animals. Primary lung tumors were demonstrated microscopically in 46% of the dusted mice and in

36% of the controls. Multiple pulmonary tumors were demonstrated in 18% of the dusted animals and in 8% of the control animals. No significant histologic or cytologic difference was observed between tumors in the two groups. No clear-cut proof of malignancy was found in any of the lung tumors studied. The authors have been unable to demonstrate any proof of the carcinogenicity of asbestos under the conditions of the experiment, but the increased incidence of multiple lung tumors in dusted animals must be regarded as a possible accentuation by the inhalation of asbestos dust of an existing tendency to develop lung tumors. Future experiments with asbestos should include the use of larger animals, probably monkeys. The equivocal nature of this report does not answer the questions raised by accumulating clinical evidence that asbestosis is strongly associated with, and therefore is a possible cause of, pulmonary carcinoma in man. -- Adapted from authors' summary

- 507 Calcification of the Pericardium Caused by a Hitherto Unrecognized Etiological Factor. M. Kleinfeld and C. P. Giel. *Am. Heart J.* 52, 899-904 (Dec. 1956).

In a clinicoroentgenologic study of workers employed in talc mills and mines, calcification of the pericardium was observed in 3 of 37 workers. In one patient the condition had existed for 15 years. The advanced age of these patients (79, 68, and 64 years) is in contrast to that found in chronic constrictive pericarditis, where the age range reported has varied from 10 to 59 years. Cardiac enlargement was absent, and the electrocardiographic patterns were essentially normal. The clinical picture revealed a chronic, slowly progressive course, with the predominant symptoms of pulmonary insufficiency consistent with the average course of talc pneumoconiosis. The normal electrocardiograms, lack of evidence of failure of either side of the heart, lack of response to nitroglycerin, and the absence of any intensifying effect of effort would tend to exclude angina pectoris. The exact mechanism responsible for the calcification of the pericardium in exposure to talc is not known. It can best be explained by a mechanical effect of the talc fibers resulting in a chronic inflammatory response and increased capillary hemorrhage with subsequent calcium deposition.

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

- 508 Dust Exposures During Ash Removal from Incinerators. W. H. Megonnell, J. H. Ludwig, and L. Silverman. *Arch. Ind. Health* 15, 215-222 (Mar. 1957).

Dust exposures to the operator during ash removal are not excessive for the average institutional-type incinerator, as the stack draft through the open furnace doors draws most of the dust produced by the operation back into the incinerator. Installations with small stacks, or when reverse flow is created by wind action, produce higher and more persistent dust concentrations. Incinerator operation is poorer during rainy weather. Only minor dust exposures are produced when water quenching of the ash is used, and wetting is advisable when it can be accomplished. Airborne dust in incinerator rooms is of the same general composition as the ash. It is composed of a high percentage of small particles (50% less than 0.5 micron), with larger particles which are predominantly aggregates. Exposure period for operators removing ash is a function of the degree of cleaning accomplished and the quantity of ash removed. Stack draft and room ventilation appear to be the most important factors in limiting the concentration of airborne dust in the incinerator room. A large proportion of the dust exposure incidental to ash removal could be eliminated by careful disposal cans to take advantage of the effect of stack draft and by care in depositing ashes from the shovel into containers. Obviously the furnace door and grate opening should be kept open throughout all cleaning in the incinerator room.

-- Cond. from authors' summary

- 509 Changes in Lungs of Experimental Animals after Intratracheal Introduction of Mineral-Wool Dust. V. A. Grimaïlovskaya and others. *Gigiena i Sanit.* 21, No. 8, 24-29 (1956). Russian.

Mineral-wool dust with relatively low free silica and moderate contents of bound silica produces in rats after 2-3 months a moderate sclerosis of diffuse and nodular types; after 5 months a peribronchial sclerosis starts. This is caused by solubility of dust particles in the lymph.

-- Chem. Absts.

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- 510 Thresher's Lung. J. Frost and J. Georg. *Ugeskrift Laeger* 118, 1383-1387 (Nov. 22, 1956). Danish.

Eight cases of thresher's lung occurred in the threshing, during the first 5 months of 1955, of grain (mostly barley) harvested in the wet summer of 1954. The grain was moldy and dusty. In the milder cases there was dyspnea of brief duration, with cough and a few days of fever. In the more severe cases the course was protracted, with persisting dyspnea and extensive roentgenologic changes that led to confusion with miliary tuberculosis and Boeck's sarcoid. In all cases complete or nearly complete restitution was seen within a year.

-- J. Am. Med. Assn.

- 511 Pneumoconiosis Due to Aluminum Dust. G. Barth, W. Frik, and H. Scheidemandel. *Deut. med. Wochschr.* 81, 1115-1119 (July 13, 1956). German.

During the second world war pneumoconiosis due to aluminum dust was common and because of its bad prognosis was regarded as a serious industrial hazard. Several new cases have been found in the last few years. Aluminum dust is manufactured in two forms: stearin-coated polished particles used in paints and for other purposes, and uncoated pyro-dust used for making torpedo fuses, signal flares, and fireworks. Pneumoconiosis due to the stearin-coated dust appears to be slower in its onset and course. Workers in the industry are exposed to heavy clouds of dust since adequate protection by artificial ventilation methods has not been possible. Some records are included of 18 workers who had been exposed for various periods of time before, during, and after the war. There were 10 deaths in this group. Case histories of 3 of these workers are presented in detail. Pathological changes were seen chiefly in the upper lobes of the lungs, and these are described. In only one case was there evidence of tuberculous infection.

-- Cond. from Bull. Hyg.

PHYSICAL ASPECTS OF THE ENVIRONMENT

- 512 Revised Criteria for Noise in Buildings. L. L. Beranek. *Noise Control* 3, 19-27 (Jan. 1957).

Noise criteria recommended for use in specifications, especially for offices, are presented in a number of tables and graphs, and directions are given for applying the criteria. The architect or consultant will have to use his own judgment in selecting a curve for a particular specification because of the wide range of attitudes toward noise and because of local customs and expectations in different locations.

-- Cond. from author's summary

- 513 A New Theory for the Evaluation of Noise Components in Air Distribution Systems. R. D. Tutt and C. J. Hemond, Jr. *Noise Control* 3, 10-18 (Jan. 1957).

It is evident that a re-evaluation of the problems of noise in air distribution systems is mandatory if the heating, ventilating, and air-conditioning industry is to keep pace with modern trends in building construction designed to provide controlled environmental conditions for human comfort. A number of research problems dealing with various components of air-conditioning systems are suggested, and some methods of noise attenuation are described.

- 514 Noise from Air-Conditioning Fans. C. H. Allen. *Noise Control* 3, 28-34 (Jan. 1957).

The methods of measurement of fan noise and specifications for performance are complex and vary among users. Various specifications are reviewed and their principles are discussed. Some suggestions for further study are presented.

- 515 Determination of Sound-Power Level of Air-Conditioning Units. P. B. Ostergaard.
Noise Control 3, 35-39, 56 (Jan. 1957)

To be completely effective, air conditioning must be unobtrusive; it should be obvious to neither the eye nor the ear. It is the latter that can present the greatest problem. The design of an air-conditioning unit with an attractive cover that fits into the surroundings is relatively easy, but it is difficult to move air without creating noise. This paper presents a discussion of an approach used to evaluate noise generated by one type of air-conditioning unit.

-- Editor's summary

- 516 Some Considerations Involved in the Silencing of Air-Conditioning and Ventilating Air Intakes, Roof Exhausters, and Cooling Towers. M. Hirschorn.
Noise Control 3, 40-46, 54 (Jan. 1957).

Noise from any of these components of a ventilating and air-conditioning system can create a nuisance problem. Typical examples of the solution of the noise problem from the three sources are given. Intake and noise problems of almost any description lend themselves to successful engineering solutions provided that all the pertinent factors are taken into account, including: (1) acoustics, (2) air flow, (3) space limitations, (4) maintenance, (5) accessibility, (6) durability, and (7) cost. All these considerations are of equal importance. The cases described involved designs for each application; sometimes standard equipment can be used, and could be used more extensively if architects and engineers were to plan for noise control equipment on their drawing boards. This is being done at an increasing rate, and perhaps in the near future will be standard procedure.

- 517 Air-Conditioning and Ventilating Noise Reduction. R. D. Lemmerman.
Noise Control 3, 47-51, 62 (Jan. 1957).

A summary of the basic engineering data presented in this and other papers can be used to provide a step-by-step analysis of the noise sources in ventilation and air-conditioning systems comparing them with acceptable room criteria for the spaces under consideration. Careful consideration must be given to natural or free attenuation as well as radiation from the grille to the listener's location. From these data, the net insertion noise reduction requirement can be determined octave band by octave band and adequate noise reduction can be provided by the various mechanisms described.

-- Cond. from author's summary

- 518 Measurement of the Noise of Ducted Fans. C. G. Van Niekirk.
J. Acoust. Soc. Am. 28, 681-687 (July 1956).

A proposed technique for measuring the noise of a ducted fan by means of a microphone placed within the fan duct was evaluated by comparing the results so obtained with those obtained by measuring the total sound energy radiated from the duct into a reverberation chamber. A suitable microphone windscreen was developed and was used to reduce the aerodynamic self-noise generated by the microphone to a negligible minimum. Good correlation was obtained, and by studying transverse resonance conditions in a duct it was attempted to show how suitable microphone stations could be found to eliminate measuring errors caused by the existence of standing waves.

-- Editor's summary

- 519 Auto Air Conditioner Noise Cut by Redesigned Parts. I. J. Roy.
Refrig. Eng. 65, 61 (Feb. 1957).

Objectionable sound levels at several frequencies in an automobile air conditioning unit were eliminated by redesigning parts of the system to reduce air velocity. This reduced the air turbulence which caused structural resonance.

-- Editor's summary

- 520 Speech Reception and Temporary Hearing Loss as a Function of Exposure to High-Level Noise. G. C. Tolhurst. *J. Acoust. Soc. Am.* 28, 557-560 (July 1956).

Two studies were made to assess the effects of high-level noise: (1) upon efficiency in speech reception and (2) in causing temporary hearing losses. Over 1400 observers made responses under various sound-pressure levels for each of 13 different noise spectra. It was found that: (1) increases in noise levels always adversely affected speech reception, while changes in spectra did not always have an effect; time-in-noise did not progressively decrease scores; and (2) hearing threshold shifts of 4 to 5 db were found after a 2-hour noise exposure; certain spectra caused greater threshold shifts than others.

-- Editor's summary

- 521 Temporary Threshold Shift as an Index of Noise Susceptibility. J. F. Jerger and R. Carhart. *J. Acoust. Soc. Am.* 28, 611-613 (July 1956).

Temporary threshold shift after auditory fatigue was measured in 178 subjects with normal hearing prior to their placement in an environment of high-level noise. In addition, two audiograms were made: one, prior to the noise exposure period; the second, 8 weeks after its termination. Results indicated that ears showing hearing losses at 3000 and 4000 cps 8 weeks after the noise exposure tended to show longer recovery times on the pre-noise exposure fatigue test than ears with no change. These findings are discussed in relation to noise susceptibility.

-- Editor's summary

- 522 Noise Bands versus Pure Tones as Stimuli in Measuring the Acoustic Attenuation of Ear Protective Devices. J. C. Webster, P. O. Thompson, and H. R. Beitscher. *J. Acoust. Soc. Am.* 28, 631-638 (July 1956).

The sound-exclusion properties (acoustic attenuation) of various earphones and ear defenders and combinations thereof were determined by the binaural, free-field, absolute-threshold-shift technique with the psychophysical method of adjustment. The earphones included dynamic earphones in two different sockets and hearing-aid-type receivers with individually molded inserts. The ear defenders included certain conventional and newly developed earplugs and muffs, and a hard-shelled noise-exclusion helmet. In a preliminary evaluation of a limited number of devices, both tones and noise bands were used as stimuli, and comparative results are shown. In evaluating the effectiveness of some of the newer devices, noise bands alone were used. For the exclusion of external sound, particularly that below 1200 cps, the order of merit for earphone combinations was: (1) large volume muffs with insert phones; (2) helmet with insert phones; (3) semiplastic sockets with dynamic phones; and (4) helmet with dynamic phones.

-- Cond. from editor's summary

- 523 Electronic Control of Noise, Vibration, and Reverberation. H. F. Olson. *J. Acoust. Soc. Am.* 28, 966-972 (Sept. 1956).

Electronic systems for the control of noise, vibration, and reverberation have been developed. The apparatus described and illustrated has been used in the laboratory to demonstrate the use of electronic systems for the control and reduction of noise and vibration. More research and development work will be required to evolve systems which are practical from the standpoints of cost and size. Nevertheless, the performance of the systems described in this paper show the tremendous potentialities of electronic systems for the control of sound, noise, reverberation, and vibration.

-- Author's conclusion

- 524 Heat and Moisture Extraction from Deep Mines. W. J. Morris. *Mine & Quarry Eng.* 22, 376-382 (Sept. 1956).

The author gives a short discussion of the heat balance equation in the analysis of mine ventilation problems. Practical examples are given of the use of this method in the study of the heat gained by air as it travels through a mine. The amounts of heat and moisture extracted are not constant but depend on the state of the air as it enters the mine. In a summary table it is shown that the amount of water removed by the ventilating air was twice as much in December as in July, and the total heat removed was 4 times as much. The extraction of heat is also affected by the amount of air circulated.

-- Cond. from Bull. Hyg.

- 525 The Effects of the Temperatures of the Floor Surface and of the Air on Thermal Sensations and the Skin Temperature of the Feet. F. A. Chrenko.
Brit. J. Ind. Med. 14, 13-21 (Jan. 1957).

Experiments were made on three women and five men who wore their normal shoes and clothing. For one hour they sat with their feet on a heated floor or walked slowly to and fro. Altogether, 379 experiments were made on sitting subjects and 476 on walking subjects. The air temperature varied from 58 to 76° F. Discomfort arising from overheating of the floor was due to excessive warming of the feet, as shown by high temperatures, especially on the soles. A skin temperature of 93.6° F on the sole was associated with 50% incidence of discomfort. No discomfort occurred at floor temperatures below 77° F. A higher floor temperature can be tolerated as the air temperature is lowered. The temperature of the sole at which the incidence of discomfort began to rise rapidly was about the same as that at which a rapid increase of blood flow might be expected. No definite changes in the girths of the instep and ankle were detected. Swelling occurred in one case when the floor was not heated. Regression equations relating skin temperatures and warmth sensations to floor temperatures are given. -- Cond. from author's summary

- 526 Decompression Sickness During the Sinking of a Caisson. A Study of Some Factors in the Pathogenesis of Caisson Disease. H. E. Lewis and W. D. M. Paton.
Brit. J. Ind. Med. 14, 5-12 (Jan. 1957).

This paper describes some of the factors in the pathogenesis of decompression sickness during the sinking of a caisson. Over a period of 3 months, there were 89 cases of bends in a total of about 2,100 decompressions. Among the contributory factors were: (1) inaccuracy in following the decompression procedure; (2) accumulation of carbon dioxide in the blister lock in which decompression took place; (3) vigorous muscular exercise immediately before the decompression, due to the ascent of a 70-foot ladder; (4) chilling because of the considerable temperature difference between the hot working face and the cold decompression chamber. It is recommended: (1) that lock keepers should be properly trained and given sufficient authority; (2) that a recording barograph should be attached to any decompression chamber; (3) that the blister lock should be ventilated during decompression; (4) that men should wait for 10 minutes after climbing the ladder before entering; (5) that if possible, dry clothes should be provided before entering the decompression lock; and (6) that the lock should be kept warm during decompression. -- Cond. from authors' summary

- 527 Respiratory Adaptation to Chronic High Altitude Hypoxia. H. Chiodi.
J. Appl. Physiol. 10, 81-87 (Jan. 1957).

Respiration, arterial acid-base equilibrium, and blood hemoglobin dissociation curves were studied in subjects residing continuously for many years at 3990 and 4515 meters above sea level and in a group of lowlanders within 8 weeks of their arrival at those altitudes. The results, which are given in detail, indicate that hyperventilation was greater in the newcomers than in the long-term residents at high altitude. Oxygen breathing at 3990 and 4515 m. depressed average pulmonary ventilation more in the newcomers than in the long-term residents but not to sea level values. Respiratory response to inhaled carbon dioxide was greater in newcomers at 3990 m. than that found in normal subjects at sea level, while in the long-term residents at 3990 and 4515 m. the response was equal or somewhat less than in the subjects at sea level. Hemoglobin oxygen affinity and arterial pH of long-term residents at high altitude were found to be within the normal sea-level ranges.

-- Cond. from editor's abstract

03120323

RADIOACTIVITY AND X-RADIATION

- 528 The Responsibilities of the Medical Profession in the Use of X-Rays and Other Ionizing Radiation. United Nations Scientific Committee on the Effects of Atomic Radiation. Ind. Med. & Surg. 26, 132-134 (Mar. 1957).

The Committee accepts the view that the irradiation of human beings, and especially of their germinal tissue, has certain undesirable effects. Information received so far indicates that in certain countries, including the United States, by far the most important artificial source of such irradiation is the use of radiological methods of diagnosis and that this may be equal in importance to radiation from all natural sources. It is possible that such radiation may be having a significant genetic effect on the population as a whole. The Committee is fully aware of the importance and value of the medical use of radiations but wishes to draw the attention of the medical profession to these facts and to the need for a more accurate estimate of the amount of exposure from this source. The help of the medical profession would be most valuable to make it possible to obtain further information on this subject. The Committee would be particularly grateful for information through which appropriate governmental channels on ways in which the medical irradiation of the population can be reduced without diminishing the true value of radiology in diagnosis or treatment.

-- Cond. from Committee's summary

- 529 Medical Aspects of Radiological Health. S. E. Miller. Ind. Med. & Surg. 26, 130, 131 (Mar. 1957).

Medical uses of radiation should be subjected to the same control as industrial or research uses. Although at times large amounts of radiation are justified (for serious or fatal diseases), the potential exists today for damage to other individuals because of the cumulative effects and incomplete tissue repair. In this situation, the total exposure of these individuals must be kept below the point where damage will become manifest during their individual expected lifetimes. In the past, there has been too liberal use of x-ray in medical and dental diagnostic work. This does not mean that valuable x-ray chest surveys should be discontinued; rather that discretion be used in repeating medical diagnostic x-rays. Physicians in industry having employees exposed to any type of ionizing radiation from x-ray to radioactive isotopes should keep accurate records on all employees as to total accumulated exposure. Such records are apt to become exceedingly valuable to the company, the individual, and for research on cumulative long-range effects of small amounts of ionizing radiation.

-- Author's conclusions

- 530 Medical Problems in the Use of Atomic Energy in Industry. R. E. Albert. N. Y. State J. Med. 56, 3315-3318 (Nov. 1, 1956).

This report is concerned with the medical aspects of radiation hazards, particularly ionizing radiation, most of which are emitted from isotopes. The discussion includes kinds of radiation, depth of penetration, method of entry, fate of the isotope within the body, and acute and chronic effects of deposited isotopes on various organs. The number of cases of serious overexposure to highly penetrating radiation in the atomic energy industry has been small. Contamination of body surfaces with small amounts of radioisotopes can usually be treated simply by washing; however, when the extent of contamination is great, a special decontamination facility is necessary. The most common medical problem with respect to internal deposition of isotopes is the exposure to airborne radioactivity of sufficient extent to cause a measurable urinary excretion. This situation does not call for medical treatment but serves as a guide for industrial hygiene control. The internal deposition of radioisotopes in large amounts presents a difficult therapeutic problem. The objective is to increase the excretory rates as much as possible. The approach is obvious with such isotopes as radio-sodium and tritium. Antithyroid drugs are indicated in the case of radioiodine. Specific nontoxic chelating agents are useful for some isotopes.

-- Cond. J. Am. Med. Assn.

- 531 Dressed for Protection from Radioactive Materials. E. A. Sadowski.
Safety Maintenance 113, 16-19 (Apr. 1957).

The degree of protection required in work involving exposure to radioactive material varies with: (1) the type, quantity, and physical state of the material to be encountered; (2) the work to be performed, the techniques to be employed, and the facilities available; (3) the condition of the work area with respect to surface contamination; and (4) hazardous conditions, not expected but which may be encountered during the course of the work. Protective clothing for low, high, and maximum concentration is described and illustrated. A number of safety procedures are suggested for removing protective clothing worn in an area of high contamination, with illustrations.

- 532 Exposure of Foods and Foodstuffs to Nuclear Explosions. E. P. Laug.
U. S. Atomic Energy Report, Project 32, Operation Teapot. 19 pp. (May 1956).
Obtainable from Office of Technical Services, Dept. of Commerce, Washington 25, D. C.
20 cents.

Over 100 different foods frequently used in the American diet were exposed to the effects of an atomic explosion. In addition 19 elements known to occur in food were exposed as pure salts, dry and in aqueous solutions. Exposure stations represented a variety of storage conditions and ranged from 1050 to 15,000 ft. from Ground Zero. All foods and their containers became more or less radioactive when exposed within one-fourth mile of Ground Zero. At distances greater than this little or no radioactivity was noted. No significant toxic by-products were formed in any of the exposed foods. It was concluded that if residual radioactivity in an area has declined sufficiently to make personnel access possible, consumption of food from such an area would be justified, but only under disaster conditions and for periods of only 2 to 3 weeks duration. Application of findings to conditions following a thermonuclear explosion is discussed.

-- Nuclear Sci. Absts.

- 533 The Radiotoxicity of Cerium and Yttrium. W. P. Norris, H. Lisco, and A. M. Brues.
U. S. Atomic Energy Comm. ORINS-12, 102-117 (1956).

The distribution of the radiation damage in the body by the radioactive isotopes of cerium and yttrium is discussed.

-- Cond. from Chem. Absts.

- 534 Physiology and Toxicology of Tritium in Man. E. A. Pinson and W. H. Langham.
J. Appl. Physiol. 10, 108-126 (Jan. 1957).

Experiments are reported on: (1) water absorption from the gastrointestinal tract, using tritium as tracer, (2) absorption of HTO (water in which part of the hydrogen is in the form of tritium) by inhalation, and (3) absorption through the skin. When exposed to HTO vapor by inhalation, man absorbed through the respiratory system 98-99% of the activity inspired, and equilibrium in venous blood was reached in a half-time of about 12 minutes. At equal vapor pressures man absorbed HTO inward through the skin at a rate comparable to the rate of insensible perspiration. When man was exposed to an atmosphere containing HTO, the HTO entering the body through the total skin area was approximately equal to that entering through the lungs. The radiation hazard from exchange of tritium with hydrogen of the tissues after chronic or acute exposure to HTO was small compared to the hazard from the amount of HTO necessary to induce the activity into tissue components. On the basis of human data, the maximum possible body burden of tritium was calculated to be 3.7 millicuries, and the maximum permissible concentrations of tritium oxide in air and water for continuous 24-hour exposure was estimated at 5×10^{-6} and 0.1 microcurie per ml. respectively. Adoption of the 1956 recommendations of the International Commission on Radiological Protection will result in the division of the above values by three.

-- Cond. from editor's abstract

03120325

- 535 Strontium-90 in Man. J. L. Kulp, W. R. Eckelman, and A. R. Schulert.
Science 125, 219-225 (Feb. 8, 1957).

The world-wide average strontium-90 content of man was about 0.12 micro-microcurie per gram of calcium (1/10,000 of the maximum permissible concentration) in the fall of 1955. A few values as high as 10 times the average have been obtained. This value is in accord with the predicted value based on fallout measurements and fractionation through the soil-plant-milk-human chain. With the present burden of strontium-90, this average level should rise to 1 to 2 micromicrocuries of strontium-90 per gram of calcium by 1970.

-- Authors' summary

- 536 The Safe Disposal of Radioactive Wastes. A. W. Kenny.
Bull. World Health Organization 14, 1007-1060 (1956).

Disposal of reactor, hospital, and industrial radioactive wastes is discussed extensively. The methods of treating and disposing of radioactive wastes, are described fully, with constant reference to the maximum permissible limits of radiation. The two main methods are dumping in the sea and long-term storage; one objection to the latter is the difficulty of guaranteeing leak-free conditions. There are limits to the quantities that may be safely dumped into the sea; the author predicts that by 2,000 A.D., about 5% of the volume of the oceans would be needed to dilute the total production of the most dangerous fission products, strontium-90, to drinking water tolerance. The isotopes of gold, iodine, and phosphorus in hospital wastes in sewage would be 10,000 times lower than the maximum permissible drinking water tolerances. The general picture emerges that at present the operations of the atomic energy industry are conducted without hazard to the general public. It will be the duty of sanitary engineers to maintain this position as the industry expands and reaches out into new fields.

-- Cond. from Bull. Hyg.

- 537 Civil Defense. Can. Med. Assn. J. 76, 347-409 (Mar. 1, 1957).

The entire technical paper section of this issue is devoted to articles on the medical aspects of civil defense by a number of authorities. Among the subjects treated are: primary treatment services; hospital preparedness; the role of organized medicine in civil defense; early medical management of mass trauma; treatment of burns in mass casualties; ocular disease and injury; psychological and social aspects of civil defense; radiation injuries in atomic warfare with stress on fallout; levels of accepted radiation exposure for a war emergency; medical control of epidemics, including biological warfare; and progress in civil defense services.

03120326

ENVIRONMENTAL MEASUREMENTS

- 538 The Operation and Use of the Titrilog and the Autometer. Janet E. Dickinson.
J. Air Poll. Control Assn. 6, 224-227 (Feb. 1957).

The Titrilog and the Autometer are the most commonly used instruments now available for the determination of sulfur dioxide. They are described and compared critically. Either principle is adaptable to the measurement of sulfur dioxide, but careful selection is necessary to insure using the best instrument for each sampling situation. Each has advantages and limitations which must be understood. Either instrument will be satisfactory for a permanent or semi-permanent installation where sulfur dioxide measurement is the principal or only purpose. The Autometer, however, will be simpler, less expensive, and subject to fewer interferences than the Titrilog if properly installed and maintained. In situations which require determinations of other sulfur compounds, or where portability is desirable, the Titrilog should be selected. Other sampling instruments or methods are not considered in this discussion.

-- Adapted from author's conclusions

- 539 Use of Radioactive Tracers for the Solution of Dust Problems. D. Hasenclever.
 Staub No. 44, 159-173 (May 1, 1956). German.

If a radioactive gas is added to a dust aerosol, the radioactive atoms of the decay products are adsorbed by the dust particles. The resultant radioactivity of the aerosol may be used to characterize finest suspended matter. According to Wilkening (IHF Abst. 524, May 1953) the size of dust particles "activated" in this way lies between 0.001 and 0.04 micron. The author describes an experimental procedure for determination of filter value of dust filters, by following the radioactivity of the air-dust mixture before and after passing the filter. Such "radiographic" methods permit conclusions about the structure of filter media. Radiographic experiments on the thermal precipitator (using thorium emanation and its decay products to label the dust) show that the instrument precipitates completely all the labeled dust particles, that the deposition of the dust begins before it reaches the heating wire, and that the size maximum of these particles lies below 0.2 micron. It can be shown that the konimeter HS (a new type) is able to retain a considerable proportion of these fine particles.

-- Atm. Poll. Bull.

- 540 Comparative Dust Sizing Yields Unexpected Results. H. E. Ayer and D. A. Fraser.
 Occ. Health News Section, Arch. Ind. Health 15, 247-249 (Mar. 1957).

Discrepancies between particle size measurements made with the electron microscope and with light microscope during a resurvey of the granite industry in Vermont were found to be caused by a general atmospheric dust, probably carbonaceous smoke particles, which were counted and measured as granite dust when examined with the light microscope.

PREVENTIVE ENGINEERING

- 541 A Study of a Multiple Venturi Wet Collector. E. Kristal, R. Dennis, and L. Silverman.
 J. Air Poll. Control Assn. 6, 204-213 (Feb. 1957).

An experimental model of a new type wet collector is described. The unit consists of single or multiple collection stages, each containing a Venturi tube and two spray generators. Test and sampling methods are described. The effects of a number of variables on the efficiency of the unit are discussed, including dust loading, water rate, air velocity, particle size, multi-stage operation of washer, droplet eliminators, and number of spray generators. Theoretical discussions are presented, and the results of a comparison of the experimental washer with several wet collectors are reported.

- 542 Venturi Scrubbers for Cleaning Cupola Gases. B. Basse.
 J. Air Poll. Control Assn. 6, 218-220 (Feb. 1957).

The Venturi scrubber can clean cupola gases so that dust loadings are far below most local ordinance requirements. The optimum design is for a scrubber which will consume just enough power to conform to the requirement. A wide variety of requirements can be met in a single scrubber by varying the size and speed of the fan wheel and motor. Even when operated at relatively low pressure drops, the Venturi can meet most code requirements. Where the water supply is short, recycling can be used with little or no extra maintenance. If necessary, by the use of a filter press, the collected dust can be disposed of in the form of a readily handled mud.

-- Cond. from author's summary

- 543 Ventilation for Spray Painting. B. D. Bloomfield.
Air Cond. Heat. & Vent. 54, 57-61 (Mar. 1957).

The author discusses the various phases of ventilation design to be considered in protecting workers engaged in spray painting. The points discussed include volume of air to be exhausted, control velocity, shape of enclosure, air distribution, air cleaning, fan selection, personal protective equipment, and wiring. Some basic booth designs are illustrated.

COMMUNITY AIR HYGIENE

- 544 Gaseous Contaminants in the Atmosphere. J. Cholak, L. J. Schafer, D. Yeager, and W. J. Younker. Arch. Ind. Health 15, 198-206 (Mar. 1957).

The concentration of sulfur dioxide in Cincinnati varied with the season. It was lowest during the summer when the combustion of solid fuel was at a minimum. The level of concentration of oxidant as recorded by the potassium iodide recorder varied inversely with the concentration of sulfur dioxide; it was highest in the summer. The oxidant was usually highest during the afternoon and lowest during the night. The pattern was different from that observed in downtown Los Angeles where the maximum concentration was generally reached near the middle of the day. The concentration of the oxidant in Cincinnati ranged between 0.2 and 6 pphm. The concentration of nitrogen dioxide ranged between 0.2 and 9.5 pphm, and was generally highest at night. The lowest concentrations were found when the oxidant was highest. The concentration of carbon monoxide at all periods was very near the limit of detection of the method employed, generally below 1 ppm. The effects of meteorological factors on the fluctuation in the four contaminants should be determined by an extended program of monitoring with continuous recording equipment. More information is needed to establish the relationship between the fluctuations in the concentrations of oxidant and nitrogen dioxide in the air. Continuous records for total nitrate and nitric oxide would be of value in establishing the fate of the nitrogen dioxide in the atmosphere.

-- Cond. from authors' summary

- 545 Carcinogenicity of Atmospheric Pollutants. S. Mittler and S. Nicholson.
Ind. Med. & Surg. 26, 135-138 (Mar. 1957).

Mice of a selected hybrid strain (36 in each group) were treated with diesel exhaust extract, gasoline engine exhaust extract, coal burner soot extract, oil burner soot extract, and the recognized carcinogen, benzo (a) pyrene. All but one of the animals exposed to benzo (a) pyrene developed cancer after three months, and all were dead after seven months. Of the mice painted with the extract of gasoline engine exhaust, tumors were induced in 76%. Only one tumor was induced in the group of mice treated with the coal soot extract and none in the groups in which benzene, oil soot extract, and diesel exhaust extract were used; all after a period of 11 months. Of those treated with oil soot, 40% of the animals died within 11 months, although no tumors developed. The significance of this result should be investigated further. The total amount of gasoline engine exhaust would correspond to the exhaust of an engine idling for three and one-half minutes, or running for three-fourths of a minute at 1500 rpm, for each of 80 treatments. The question of the escape of possible carcinogenic gaseous constituents from other sources than gasoline engine exhausts is discussed, and further research is indicated.

03120328

- 546 The Toxicity of Fumes from a Diesel Engine under Four Different Running Conditions. R. E. Pattle, H. Stretch, F. Burgess, K. Sinclair, and J. A. G. Edington. Brit. J. Ind. Med. 14, 47-55 (Jan. 1957).

Experiments were conducted to ascertain the main toxic constituents of diesel fumes. A single cylinder diesel engine was run under four different conditions: light load, moderate load, moderate load with a worn injector, and light load with the air intake restricted. The results of the analyses of the fumes were in broad agreement with those of other workers, except that the sulfur dioxide content was unexpectedly low. With the engine and fuel used it appears that the chief toxic substances are: (1) under light load, irritants of the type of acrolein and, to a less extent, nitrogen dioxide; (2) under moderate load, nitrogen dioxide; and (3) under light load with restricted air intake, carbon monoxide and to a less extent irritants. Mice, guinea pigs, and rabbits were exposed to the undiluted fumes, and pathological investigations were carried out on the exposed animals. Animals were also exposed to acrolein vapor to assess its toxicity and mode of action. In all experiments all or many of the animals died after five to seven hours' exposure. The main toxic agent was nitrogen dioxide, organic irritants, or carbon monoxide, depending upon the conditions of the experiment. Very little black smoke was present in the exhaust. The procedure to be followed in future research is discussed.

-- Cond. from authors' summary

- 547 Investigations of the Lead Content of Exhaust Gases from Gasoline Engines. L. Jecklin. Arch. Gewerbepathol. Gewerbehyg. 14, 626-630 (1956). German.

In Germany and Switzerland the motor fuel to which tetraethyl lead has been added contains 425 to 640 mg. lead per liter. In order to determine the lead content of exhaust gases, a filter was fitted to the exhaust of a motor car which was then driven for a series of trips of 18 km. in length at a speed of 50 km. per hour. A liter of fuel was used for each trip. After each trip the amount of lead retained by the filter was determined. Between 52 and 76% of the lead in the gasoline was recovered. It is estimated that in Switzerland at least 200,000 kg. of lead was voided into the air. Examination of the air of some cities of Switzerland showed that the lead content at some points was 5 - 7 micrograms per cu. m. Such figures are not high when compared with some of those found in large cities in the United States, but it is considered that the addition of lead tetraethyl to gasoline should be discontinued since it has been shown in investigations in the Ruhr that the lead content of the blood of about 3,000 individuals tested is increasing year by year.

-- Cond. from Bull. Hyg.

- 548 Properties and Control of Electric-Arc Steel Furnace Fumes. R. S. Brief, A. H. Rose, Jr., and D. G. Stephan. J. Air Poll. Control Assn. 6, 220-224 (Feb. 1957).

The purpose of this paper is to assess the properties and quantities of emission from the electric-arc steel melting furnaces and to evaluate control systems in terms of these emission characteristics. The data used are largely from previously unpublished sources. Electrical precipitators and baghouse collectors are considered with reference to efficiency, and examples are reported. Future studies are recommended, especially on process type, charge composition, melt-down rate, pouring temperature, and other variables associated with furnace operation. These studies should be made in as minute detail as possible. In order to treat electric-arc steel furnace fume theoretically, accurate particle-size distributions for each phase of the melting cycle must be known, especially in the sizes below 5 microns.

- 549 Techniques of Testing for Air Contaminants from Combustion Sources. C. V. Kanter, R. G. Lunche, and A. P. Fudurich. J. Air Poll. Control Assn. 6, 191-199 (Feb. 1957).

In most air pollution control studies of combustion sources, attention has been largely focused on the amount of particulate matter discharged. In the testing of the Air Pollution Control District (Los Angeles) methods for measuring other contaminants in the gaseous state have been established. These methods are described. The gaseous contaminants determined include sulfur dioxide and trioxide, nitrogen oxides, organic acids, aldehydes, hydrocarbons, acetylene, and ammonia. The testing techniques include velocity

determination, prescribed sampling procedure, measuring the sample, and alternate sampling trains for particulate matter. The results are presented in a number of tables. The APCD has a development program to improve methods and apparatus for field testing. Simplification and standardization of methods is needed in order to accelerate testing programs and to secure a uniform basis for statistics from different communities.

- 550 Instrumentation for Air Pollution. R. J. Byran and J. C. Romanovsky.
Instruments and Automation 29, 2432-2438 (Dec. 1956).

The authors describe the Los Angeles air monitoring program, including principles, calibration, and operation of monitoring and recording instruments for sulfur dioxide, oxidants, carbon monoxide, nitric oxide, nitrogen dioxide, particulates, and ozone.

-- Battelle Tech. Rev.

- 551 Odor Abatement in an Alkaline Pulp Mill. C. L. Tomlinson and J. M. Ferguson.
Pulp & Paper Mag. Can. 57, 119-122 (Dec. 1956).

The principal measures employed are condensation and cooling of the blow and relief steam in a two-stage system. Correct proportioning of the alkali used for cooking is important.

-- Battelle Tech. Rev.

- 552 Incinerator Testing and Test Results. F. R. Rehm.
J. Air Poll. Control Assn. 6, 199-204 (Feb. 1957).

Little quantitative evaluation of incinerator effluents has been made, in spite of its importance in the field of air pollution. The available codes for dust testing are not fully applicable to incinerators. The principles and methods of sampling are discussed critically. Typical test results for domestic, industrial, and municipal incinerators are given and discussed in the light of experience in Milwaukee County, Wisconsin. A high efficiency wet fly ash control system has been found generally acceptable.

MANAGEMENT ASPECTS

- 553 Hiring Handicapped People. National Association of Manufacturers, Employee Relations Division, 2 East 48th St., New York 17, N. Y. 16 pp. (Nov. 1955).

This pamphlet has been prepared in response to the express desire of employers for guidance in employing and placing the handicapped individual in productive work. Employers have attempted to take care of the man injured on the job, but the real problem is most likely to occur with individuals who are seeking employment, and it is with this group that this guide is concerned. A number of ideas are presented in the form of a sample policy of possible value to the company in formulating a statement fitted to its own special needs. They include: applicants and job requirements; recruiting handicapped applicants; the interview; placement; introduction to the job; training; and follow-up. Answers are given to several questions commonly asked. This guide is offered in the firm conviction that more employers will hire more handicapped employees when they know how to go about doing it.

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ACCIDENTS AND PREVENTION

- 554 Too Many Injuries Don't Follow the Rules. Anon.
Occ. Hazards 20, 42-48, 84-86 (Mar. 1957).

This paper calls attention to the difficulties in compiling accurate nation-wide accident statistics. States have different laws and different standards for preparing their statistics. Official definitions of types of injuries vary considerably. Physicians differ in assessment of injuries and in the time allowed for return to work. Both severity rates and the accident rates are effected by these factors. A number of questions are to be answered before an adequate uniform record of accident statistics and safety records can be prepared. Safety statistics in their present form are only one indication of what a safety program is doing; they must be supplemented by unending study of accident causes; they are by no means an accurate measure either of on-the-job injuries or of the comparative value of one safety program over another.

- 555 Accidents—An Index of Efficiency. C. B. Boulet. Safety Maintenance 113, 15-17 (Mar. 1957).

Occupational accident costs to United States industry are estimated at more than 3 billion dollars, which must be borne by the consumers of products or the purchasers of services. Accidents are not really an index of efficiency but rather an index of inefficiency. The reduction of the accident rate is perhaps a better index of efficiency. Indirect costs of accidents include: (1) wages paid other workers who lose productive time because of the accident; (2) cost of damage to materials or equipment; (3) interruption of normal process of production; (4) supervisor's time in making out reports, investigating the accident, seeking replacement for the injured employee, etc.; (5) time of other employees and safety department involved in accident investigation; (6) lowered morale; and (7) reduction of efficiency because of a new worker. Several methods for interesting a top executive in a safety program are: (1) suggesting that he write personal letters to supervisors or department heads when a good job has been done; (2) suggesting bulletin board material with the executive's picture and a statement from him regarding accident prevention; (3) suggesting a story in the company magazine including statements from the executive relating to the safety record and management's desire to improve that record; and (4) suggesting recordings made by the executive to be played to employee groups.

- 556 Personal Protection Stands Guard when Human Failure Comes In. M. Pratt.
Safety Maintenance 113, 18-20, 22 (Mar. 1957).

The best form of body protection is elimination of possibilities for injury; but since that goal has not been attained, personal protective equipment begins where plant equipment leaves off. Items of protective clothing used in an oil refinery are described. Hard hats are required of all employees, either full-brimmed or cap type. They are supplied in colors for specific groups, and are made of aluminum except for electricians and welders, for whom plastic hats are necessary. Other items include rain-proof coveralls, slush boots, spectacle-type safety goggles, flameproof clothing, gloves and safety shoes. The only successful method of selling the safety clothing program to foremen and employees is to point out that they may be injured if they do not use the equipment. Unnecessary rules must be avoided. When a choice between equally good types of clothing is to be made, it is helpful to consult employees on the choice. The cleaning and checking program which is described assures the worker that he has clean clothing and avoids waste.

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- 557 How to Work without Straining. Anon. Safety Maintenance 113, 23, 24 (Mar. 1957).

Observance of four general rules will ensure working without strain: (1) use your strong leg and arm muscles when you lift, not your back; (2) gear your activity to your age and physical condition; (3) build up your muscles, but in easy stages; and (4) change your working position as often as you can. The first of these rules is amplified into 12 directions for safe lifting, and 7 lifting don'ts. Six tips for the typist are also suggested.

- 558 An Evaluation of the Zirconium Hazard. W. R. DeHollander. Atomic Energy Comm. Publication HW-44989, 22 pp. (Aug. 1956). Obtainable from Office of Technical Services, Dept. of Commerce, Washington 25, D. C. 20 cents.

The principal sources of hazardous material are: discarded reduction residues from the Kroll process, poor grade sponge from the Kroll process, incompletely reacted sponge in the iodide process, and dirty, oily fine scrap. -- Battelle Tech. Rev.

- 559 Zirconium Fire and Explosion Hazard Evaluation. Anon. U. S. Atomic Energy Comm. Rept. TID-5365, 30 pp. (1956). Available from Office of Technical Services, Dept. of Commerce, Washington 25, D. C. 25 cents.

This paper includes reports of unusual zirconium fires and explosions and presents general theoretical mechanisms to explain these incidents. It includes suggestions for preventing such incidents, as well as safety rules for disposing of zirconium scrap, especially zirconium powder, which should be destroyed by the burning of small quantities.

-- Chem. Absts.

MISCELLANEOUS

- 560 Foot Ringworm in Coal Miners. J. C. Gentles and J. G. Holmes. Brit. J. Ind. Med. 14, 22-29 (Jan. 1957).

An epidemiological survey of foot ringworm was conducted in different parts of Great Britain and in communities some of which did and some of which did not have communal baths. It is concluded: (1) that fungus infections of the feet are not universal; (2) that a specific exposure and a breakdown in personal immunity are necessary for infection to occur; (3) that in Great Britain these conditions occur together most commonly in those who use communal baths; and (4) that other factors such as age, seasonal variation, and conditions of employment are of minor importance. -- Cond. from authors' summary

- 561 Production of Bacterial Aerosols in a Rendering Plant Process. J. C. Spendlove. Public Health Repts. 72, 176-180 (Feb. 1957).

From the study of aerosol production in an animal rendering plant, the following conclusions have been drawn: (1) the rendering plant produces aerosols; (2) the heaviest concentration of aerosols appears to be in the vicinity of the grinder and gut hasher; (3) vegetative organisms persist in these machines after they have been initially inoculated; (4) both vegetative and spore-forming organisms survive the blowing operation and are released into the atmosphere; and (5) these organisms can be recovered 100 feet downwind from the exhaust stack. It is recommended that: (1) all animal products other than hides be heated prior to processing; and (2) plant machinery be redesigned to minimize aerosol production. -- Cond. from author's summary

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