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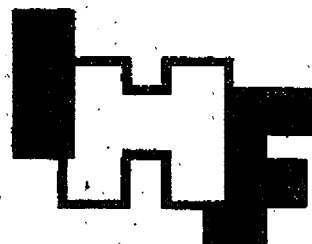
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January 1978
Volume 42, No. 1

INDUSTRIAL HYGIENE DIGEST

LITERATURE
ABSTRACTS

ENVIRONMENTAL
AND
OCCUPATIONAL
HEALTH AND
SAFETY NEWS



INDUSTRIAL HEALTH FOUNDATION, INC.
5231 CENTRE AVENUE PITTSBURGH, PA. 15232

INDUSTRIAL HYGIENE DIGEST

Editor: Jane F. Brislin, M.L.S.
Abstractors: Cynthia S. Bryan, B.A.,
Jean L. Collins, B.A.

January 1978
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concentrations of nitrogen dioxide that were approximately 10 times higher than could be attributed to the high exhaust stacks, and two to three times higher than could be attributed to the low exhaust outlets. Moreover, the in-cab levels of exhaust gas were approximately 10 times higher for the idling mode than for the on-the-road mode for all three exhaust release locations (low outlet pipe, leak, and high stack). Total levels exceeded the proposed NIOSH action level of 0.5 ppm in 50 percent of the idling tests.

9/78 Asbestos: Excess of Lung Cancer, Deaths Found in NIOSH Study of Talc Workers. Occup. Safety & Health Reporter 7: 951-952, Dec. 8, 1977.

The results were presented by NIOSH epidemiologist Sherry Selevan at the Society of Occupational and Environmental Health Conference on Fibrous and Particulate Dust, held December 6-7, 1977 in Washington, D.C. Millers in the study showed an excess of nonmalignant respiratory disease, while miners had an excess of lung cancer, Selevan told the conference. Five deaths from lung cancer were observed where 1.5 were expected among the 90 workers in the study who had died. Overall, the 90 deaths of workers at four companies in three locations in Vermont compared to an expected 77 deaths according to the NIOSH researcher. Of the nonmalignant respiratory disease cases, excluding influenza and pneumonia, seven deaths were found among the millers where 0.89 were expected. NIOSH personnel also reported on environmental and medical studies of industrial talc operations where asbestos is present in New York state. Among the presentations was a finding reported by David Brown of a threefold increase in lung cancer among workers at the Gouverneur Talc Company Mine in New York. In an environmental study on the Vermont talc operations performed for NIOSH and presented by Maryanne Boundy, Harvard School of Public Health, researchers found that the talc had only trace amounts of quartz in 15 percent of the samples. No asbestos could be detected by electron microscopy, X-ray diffraction or other methods. In a paper prepared for delivery by David H. Wegman, also of Harvard, it was concluded that there was an inter-action between smoking and talc exposure. Wegman reported that the cross-sectional measurement of lung function in the talc workers was different from the normal population in FEV₁ but not FVC testing. William E. Smith, Fairleigh Dickinson University, described to the conference tests on hamsters aimed at discovering the carcinogenic and fibrogenic potential of minerals. Smith said that his researchers were able to produce tumors by injection of chrysotile asbestos fibers, provided the doses were large enough. Tremolite such as that found in industrial talc produced no tumors, however, Smith reported. He added that samples which induced no tumors showed a lack of long thin particles evident in other samples which did cause tumors. Smith noted that the fibrinogenicity of samples paralleled their carcinogenicity.

10/78 Increased Coal Production Will Lead to Increased Injuries and Disease, NIOSH Says. Job Safety & Health Rep. 7: 188, Nov. 29, 1977.

"Increasing coal production to 1-billion tons per year cannot be achieved without incurring additional costs in occupationally induced disease, job-related disabling injuries and deaths," The National Institute for Occupational Safety and Health reported. NIOSH's report was made to the Committee on Health and Ecological Effects of Increased Coal Utilization, which was established in response to the President's National energy plan. NIOSH concluded in its report that occupational injuries and illnesses would be minimized if the additional 380-million tons of coal required were primarily obtained from surface mines. The Agency explained that if 90% of the additional coal came from surface mines, there would be 30% fewer cases of pneumoconiosis (black lung) than if 50% of the additional tonnage--the current proportion obtained--came from surface mines. Similar decreases would be felt in other respiratory ailments associated with coal mining, NIOSH said. If 90% of the additional coal is mined at the surface--as current trends suggest--NIOSH projects that the incremental increase in disease compared to 1976 will be 3,845 cases of pneumoconiosis; 21,900 cases of chronic bronchitis; 5,800 cases of dyspnea; and 15,950 cases of

constructive airway diseases. In addition, there would be 39 additional fatalities and 3,336 additional disabling injuries. Noise exposure would also be at unacceptable levels in surface mines, NIOSH noted, but indicated that the hazard would still be less severe than it would be in underground mines. Heat and cold stress would be areas of increased risk in surface mines, NIOSH said, adding that they are hazards which can be easily controlled.

11/78 Practical Noise Reduction in Machinery Related Operations. Ind. Hyg. News Rep. 20: 3-4, Dec. 1977.

Some practical approaches to the control of noise in the industrial environment that are available to the industrial hygienist or plant engineer were enumerated by Howard Routson of HRA, Inc. (2600 Needmore Rd., Dayton, OH 45414) who spoke at the 6th International Pollution Engineering Exposition and Congress in Atlanta, November 1-3, 1977. A brief rundown follows: 1. The first step to reduce plant noise is simple housekeeping and maintenance: keep machine inlets and outlets free of debris; keep components such as chains, gears and pulleys properly lubricated; and replace worn bits, blades and gears. 2. Properly designed and selected blow-off silencers can reduce the noise output of high pressure equipment; one specific silencer utilizes a design which spreads the exhaust gas uniformly over the silencer to produce a quieter operation. 3. To reduce sound levels of compressors, noise silencers can be installed at air intakes and/or outlets. Silencers can be combined with filters at the intakes to provide a unit that not only cuts the noise of pressurized gases, but cleans them as well. Smaller air powered equipment can produce lower noise levels with the aid of spun fibrous glass or plastic encased mufflers. 4. Baffle type air filters installed behind air return grills or behind lower velocity air supply grills will decrease the amount of noise in an air circulating system. 5. Air valve noise suppressors used in conjunction with pressure reducing valves act as in-line suppressors and usually, with relief valves, act also as vent silencers. Deflector assembly walls produce directional changes in the flow causing it to come in contact with absorbing walls. The acoustic energy is converted into heat as it passes through the sound absorbing materials. Though this process reduces noise by as much as 30 dBA, it does not decrease line pressure appreciably.

12/78 EPA Investigates Potential Asbestos Hazards from Crushed Stone Quarries. Environ. Control News 7: 6, Dec. 1977.

EPA announced on November 20, 1977 that it will study the crushed stone industry to determine the asbestos content of serpentinite rock at quarrying operations. If EPA determines from the results of this survey that the production and use of asbestos-containing serpentinite rock is causing asbestos emissions in a number of locations, regulations protecting public health from this danger would be proposed. Serpentinite rock may break up and release its asbestos contents into the air. Exposure to airborne asbestos fibers has been directly linked to the development of cancers lining the chest and abdomen, according to EPA. On April 6, 1973, EPA set national emission standards for asbestos which among other things, specifically prohibit the surfacing of roadways with asbestos-containing waste material from asbestos manufacturing plants. The standards, however, do not forbid surfacing with asbestos-containing stone. Earlier this year, results of EPA air samples taken in Montgomery County (near Washington, D.C.) near gravel roads where unbound crushed stone was in use revealed a wide range of concentrations of asbestos. While some readings were extremely low, other readings were as high as 17 million fibers per cubic meter and 5400 nanograms per cubic meter (nanogram is a weight measure, one billionth of a gram). The highest concentrations measured were as much as 1000 times higher than those usually found in urban areas. ("Bound" stone is that on which a coating such as oil or asphalt has been applied to stop dust material from being released into the air).

- 13/78 Asbestos: Talc Exposure May Explain Stomach Cancer Among Rubber Workers, SOEH Told. Occup. Safety & Health Reporter 7: 1162, Dec. 22, 1977.

Possible exposure to asbestos in talc used in a rubber manufacturing plant may explain an excess of stomach cancer among rubber workers according to a study by the Occupational Health Studies Group at the University of North Carolina. Talc containing asbestos is sometimes used as an antisticking agent in rubber manufacturing, Steve Blum, author of the study, said. In an earlier report Blum was incorrectly quoted as saying the stomach cancer was caused by exposure to asbestos in talc. Rather, Blum concluded that "while the present investigation revealed a suggestive association between possible talc (and presumed asbestos) exposure and stomach cancer, definitive conclusions must await further analysis." The study was described at the Society for Occupational and Environmental Health Conference held December 5-7, 1977.

- 14/78 New EPA Data Shows Progress in Cleaning up America's Air. Environ. News p. 1-4, Dec. 21, 1977.

Environmental Protection Agency Administrator Douglas M. Costle released data showing that America has made significant progress in cleaning up its air from 1970-1976, but also has experienced some setbacks. Citing figures from a new EPA study, National Air Quality and Emissions Trends Report, 1976, Costle pointed out that from 1970 to 1976: -- Sulfur dioxide levels dropped 27 percent -- Carbon monoxide levels were cut 20 percent -- Particulates (smoke and dust) decreased 12 percent. In the short term however, some reversals have taken place. From 1975 to 1976, for example, many areas experienced increases in particulates. Slight increases in photochemical oxidants were also noted in many parts of the country. It should be noted that short term variations can be much more sensitive to meteorological variations than long term trends. Copies of the report are available free from the Monitoring and Data Analysis Division, Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, or phone (919) 541-5351.

- 15/78 Effects of Arsenic Exposure on Industrial Workers Studied. Ind. Hyg. News Rep. 20: 1, Dec. 1977.

To correlate specific effects of arsenic exposure on the nervous system with industrial exposure, a double-blind study of 111 men was undertaken recently at Boston University School of Medicine (80 E. Concord, Boston, MA 02118). Some details were presented by Clyde Niles, M.D., of the Department of Neurology, at the 105th Annual Meeting of the American Public Health Association held in Washington, D.C., November 1-3, 1977. The parameters studied included: (1) clinical exam (history and neurological evaluation); (2) electrophysiological tests of the sensory and motor nerves in the upper and lower extremities; and (3) laboratory studies of arsenic trioxide in blood, hair, urine and nail specimens. Screening of blood for other heavy metals, diabetes and anemia was performed. A scheme to classify the neurological status of the men was based on both clinical judgment of the neurologist and the objective measurements of the electrophysiological exam. The men were categorized as normal, sub-clinical or clinical neuropathy. Using this system, a significant association was shown between arsenic content in urine, hair, and nails and an increase in neuropathological symptoms ($P < 0.05$). Differences in average nerve conduction velocities and amplitudes were detected among workers classified by place of employment. It was concluded that chronic arsenic exposure in an industrial setting affects the peripheral nervous system and that the neurological parameters involving both clinical and quantitative measurements must be considered in developing an industrial screening profile for arsenic related neuropathies.

- 16/78 Consumer Patching Compounds and Artificial Emberizing Materials (Embers and Ash) Containing Respirable Free Form Asbestos: Establishment as Banned Hazardous Products. Consumer Product Safety Commission. Fed. Reg. 42: 63334-63365, Dec. 15, 1977.

In this document the Commission declares that the following products containing respirable free-form asbestos are banned hazardous products under the Consumer Product Safety Act: (1) Consumer patching compounds used to join or repair interior walls and ceilings (mixing of the product before it is applied, sanding of the product after it is dried, and cleanup after completion of the process, release asbestos fibers that can be inhaled); and (2) Artificial emberizing materials (embers and ash) used in fireplaces to simulate live embers and ash (ordinary air currents in the household move asbestos fibers that can be inhaled). The Commission issues this ban in order to reduce or eliminate the unreasonable risk of injury from certain types of cancer that may result from inhaling asbestos fibers released during the use of these products. (1) For consumer patching compounds containing respirable free-form asbestos, the regulation issued at section 1304, applies to products manufactured or initially introduced into commerce on January 16, 1978, or after that date. For all other consumer patching compounds containing respirable free-form asbestos, no matter when manufactured or initially introduced into commerce, the regulation at section 1304 applies on June 12, 1978, and after that date. (2) For artificial emberizing materials containing respirable free-form asbestos, the regulation issued at section 1305 applies to products in commerce on December 15, 1977, or after that date.

COMING EVENTS

- March
1-2 Noise Control in the Process Industries, Sheraton-Atlanta Hotel, Atlanta. Write: AICHE, 345 E. 47th St., New York, N.Y. 10017.
- March
6-8 4th Annual Symposium on Disposal of Hazardous Wastes. St. Anthony Hotel, San Antonio, Texas. Write: David W. Shultz, Southwest Research Institute, P.O. Drawer 28510, San Antonio, Texas 78284.
- March
8-10 Biomedical Statistics, Short Course No. 396, George Washington University, Washington, D.C. Write: Martha Augustin, Continuing Engineering Education, George Washington University, Washington, D.C. 20052.
- March
10-12 55th Annual Meeting of American Institute of Chemists, Anaheim, Calif. Write: Dave Roethel, AIC, 7315 Wisconsin Ave., Washington, D.C. 20014.
- March
12-16 Society of Toxicology, Hyatt Regency Hotel, San Francisco. Write: G. C. Boxill, Ph.D., Wyeth Laboratories, Inc., Paoli, Pa. 19301.
- March
12-17 175th ACS National Meeting, Anaheim, Calif. Write: A. T. Winstead, ACS, 1155-16th St., N.W. Washington, D.C. 20036.

18-78 When is Asbestos Monitoring Necessary? Occup. Hazards 39: 189-190, 192, 194, Oct. 1977.

During his inspection of the Goodyear petrochemical and latex rubber plant in Houston, Texas, an OSHA compliance officer caught sight of a group of pipefitters removing the metal jacketing from some pipe and replacing asbestos insulation with non-asbestos insulation. Moving closer, he saw that whereas a small portion of the old asbestos insulation was dry when it was removed, most of it had been saturated with water before it was removed from the pipe. He also noted that, though all the employees working on the job were wearing respirators, no monitoring for asbestos fibers in the air was taking place. OSHA cited Goodyear for alleged nonserious violations of the monitoring and recordkeeping requirements of the asbestos standard contained in the OSH Act and proposed a \$50 penalty. Goodyear contested the citation. Their foreman admitted before Judge J. Paul Brenton that not all the old asbestos insulation was saturated before being replaced, and therefore, some fibers were released. At the same time, he pointed out that most of the insulation was saturated before removal, and, therefore, the number of fibers actually getting into the air was very small. The foreman also testified that all the asbestos insulation, whether wet or dry, was jacketed, that the pipefitters replacing it always wore respirators, and that 90 percent of their work was performed outdoors. All of these factors made the chances of exposure to asbestos fibers minuscule, he concluded, and thereby negated the need for monitoring. While admitting that he had not sampled for asbestos fibers on the inspection, the OSHA compliance officer testified that, based on his 21 years' experience in the petrochemical industry, he was of the opinion that some release of asbestos fibers had occurred, and that contrary to the requirements of the cited standard, had not been monitored. The OSHA area director and industrial hygienist corroborated his testimony. Judge Brenton ruled in Goodyear's favor, stating that the cited standard requires monitoring only where asbestos fibers are released into the air, not every place where asbestos is used. The mere presence of asbestos insulation, be it wet or dry, does not prove release. OSHA appealed Brenton's decision to the Review Commission, arguing that the cited standard does not require proof of exposure for monitoring purposes but rather, only requires proof that asbestos fibers were released. In a majority opinion by Chairman Frank Barnako, the Review Commission upheld Brenton's decision.

19-78 Weyerhaeuser Charges Harassment by OSHA in Workplace Noise Citations. Occup. Safety & Health Reporter 7: 1159, Dec. 22, 1977.

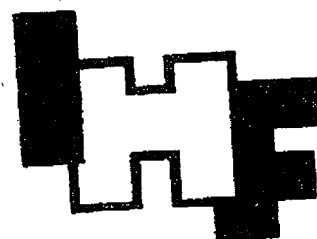
The Occupational Safety and Health Administration has engaged in a nationwide program to harass the Weyerhaeuser Company by charging the company repeatedly with violation of workplace noise standards. Weyerhaeuser charged in a suit filed in the U.S. District Court for the Eastern District of Wisconsin. The suit, Weyerhaeuser Co. vs. Ray Marshall et al., asserted that inspections at Weyerhaeuser corrugated box plants in Michigan, Hawaii, California, New Jersey, Mississippi, and Wisconsin all "resulted in the same type of corrugator noise citations which have been withdrawn or dismissed for lack of evidence of any violation." All inspections have been "followed further by a reinspection, reinstituted litigation, and then a second dismissal or withdrawal of all charges by the agency," the suit added. Weyerhaeuser further maintained that during an inspection at plant in Manitowoc, Wis., last summer, an OSHA inspector commented that repeated inspections were a good idea because "after a while one of the judges will see it in our favor." In the suit, the company requested a court order prohibiting continuation of the alleged harassment, and dismissal of citations against the firm. Weyerhaeuser also maintained that the OSHA inspections were illegal because inspectors had improper search warrants.

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Exposure of Animals and Man to Toluene	—	Abst.	156/78
Mortality Among Employees Chronically Exposed to	—		
Caustic Dust	—	Abst.	170/78

- 164/78 Acute Pulmonary Toxicity of Manganese Dioxide. R. Bergstrom. Scand. J. Work. Environ. Health 3: 7-41. Supplement 1, 1977. 77 refs.

Industrial exposures to manganese occur primarily by inhalation. Exposure to airborne dust containing manganese may cause a chronic disorder of the central nervous system with symptoms similar to Parkinsonism. The first cases of manganese poisoning were reported in 1837 by Couper in Glasgow, who observed the symptoms in five manganese ore crushers. Since then, manganese poisoning has been reported by several authors. Exposure to airborne manganese dust may also affect the lungs. The pulmonary effects of manganese are not as well documented as the neurological effects, and there are discrepancies concerning the interpretation of the pulmonary toxicity of manganese. The aim of the present work was to investigate the pulmonary toxicity of manganese with special reference to the mechanisms behind the acute cellular reactions in the lung. As a background, a review of the literature on epidemiologic and experimental studies is presented. The methods, measurements, and results of experimental studies on the effects of acute MnO_2 exposure in guinea pigs is then described, followed by a general discussion of the methods and results.

--Cond. from Introduction

INDUSTRIAL DUSTS AND INHALANTS

- 165/78 Pathogenic Effects of Asbestos. M. Kannerstein, et al. Arch. Pathol. Lab. Med. 101: 623-628, Dec. 1977. 65 refs.

The enormous increase in the use of asbestos during this century has necessitated the intensive study of its pathogenic effects. The occurrence of pulmonary parenchymal and pleural fibrosis and an increased prevalence of pulmonary and gastrointestinal carcinoma and of pleural and peritoneal mesothelioma have been established. A relationship, also, to laryngeal carcinoma is probable. Mesothelioma has been associated with indirect occupational, domestic, and neighborhood exposure, and the possibility of a similar correlation of pulmonary carcinoma with low exposure has been suggested. Pulmonary fibrosis and pleural plaques have been demonstrated under these circumstances. The physical characteristics of the asbestos fiber appear to be the principal factors in its carcinogenic action. The ability of fine, short fibers, especially fragmented chrysotile, to reach the pleura would appear to account for many of the pathogenetic and anatomical features of asbestos-related disease.

--Authors' abst.

- 166/78 Some New Perspectives on the Biological Effects of Asbestos. Q. Rahman, et al. Environ. Res. 14: 487-498, Dec. 1977. 95 refs.

A brief review of recent biochemical investigations conducted on the biological effects of asbestos is presented along with a critical appraisal of the likely mechanisms involved. Involvement of intracellular organelles such as lysosomes and mitochondria, along with changes in various tissue constituents, helps us to understand the biochemical basis of asbestosis. The central role for α -ketoglutarate metabolism and related biochemical aspects are pointed out, and a few areas where further work is needed are suggested.

--Authors' abst.

- 167/78 Penetration of the Small Intestinal Mucosa by Asbestos Fibers. A. R. Storeygard and A. L. Brown, Jr. Mayo Clin. Proc. 52: 809-812, Dec. 1977. 8 refs.

Amosite asbestos fibers suspended in saline were placed in an isolated segment of rat jejunum in vivo. One hour later, segments of jejunal mucosa were taken for examination by scanning electron microscopy. Fibers were seen penetrating the epithelial surface in three of the five rats exposed to the amosite suspension. Fibers also were present in the lamina propria.

--Authors' abst.

- 168/78 Correlation of Quantitative Asbestos Body Counts and Occupation in Urban Patients. A. Churg and M. L. Warnock. Arch. Pathol. Lab. Med. 101: 629-634, Dec. 1977. 28 refs.

Asbestos bodies were quantified in digests of lung from 252 urban patients who were over 40 years of age. Patients were assigned to six occupational categories that had been determined without knowledge of asbestos body counts. Asbestos bodies were present in the lungs of 96% of the total population. Fewer than 12% of the white-collar men and the blue- and white-collar women had more than 100 asbestos bodies per gram of lung, whereas 32% of the blue-collar men not working in steel mills or construction, 45% of steelworkers, and 65% of construction workers had more than 100 asbestos bodies per gram lung. This distribution suggests that almost everyone in our population has some exposure to asbestos, and certain persons are subject to an additional occupational exposure. Whether asbestos bodies in low concentration are related to disease remains to be determined.

--Authors' summary

- 169/78 Asbestos. Anon. Lancet 2: 1211-1212, Dec. 10, 1977. 17 refs.

Public anxiety about asbestos has descended from its zenith a few months ago, but community-health and health-and-safety workers are still much exercised by control of the hazards in industry and the implications of environmental contamination. The major biological effects are asbestosis, carcinoma of lung, and mesothelial tumours. Research effort is now directed towards establishing the carcinogenicity of the different types of fibre and determining dose-response relationships on which a national standard for asbestos dust in air can be based. This article reports on the most recent research on asbestos.

Cond. from text

- 70/78 Mortality among Employees Chronically Exposed to Caustic Dust. M. G. Ott, et al. J. Occup. Med. 19: 813-816, Dec. 1977. 5 refs.

Previous studies have reported on individuals acutely, but not chronically, exposed to caustic (sodium hydroxide). The present investigation examines mortality in a limited population chronically exposed to caustic dust for periods of up to 30 years or more. There were no findings of significantly increased mortality in relation to duration or intensity of caustic dust exposure. Because of the small size of the present population and the lack of information in the literature, there is need for additional mortality surveillance; however, it is recommended that careful monitoring of acute exposure episodes be continued as the most productive means of assessing the health hazards of caustic exposure in occupational settings.

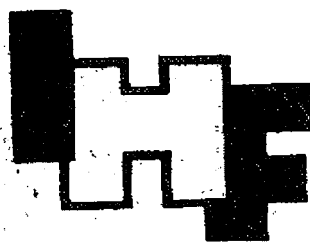
--Authors' abst.

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Styrene Exposure. An Experimental Study of Pulmonary Absorption and Excretion	—	Abst. 267/78
Sound Level Meters: The State of the Art	—	Absl. 294/78

- 280/78 Comparative Toxicity of Polychlorinated Biphenyls and Dibenzofurans in Rats. S. Oishi, et al.
Toxicol. Appl. Pharmacol. 43: 13-22, Jan. 1978. 33 refs.

The toxic effects of polychlorinated biphenyl (PCB) mixtures and polychlorinated dibenzofurans (PCDFs) were compared on male SD-derived rats fed diets containing 100 ppm of PCB and 1 or 10 ppm of PCDF for 4 weeks. Rats fed 10-ppm diets of PCDF developed chloracne-like lesions on the ears within 3 weeks. PCDF markedly and PCB slightly depressed body weight gain. In rats fed diets containing 10 ppm of PCDF, significantly decreased thymus, ventral prostate, and seminal vesicle weights were found. Hemoglobin and hematocrit values were decreased in rats fed either diet containing PCDF. PCBs produced very minimal effects on thymus and accessory sex organ weights and hematologic values. Both PCB and PCDF increased serum cholesterol concentrations and cholinesterase activity and decreased triglyceride concentrations and leucine aminopeptidase activity. PCDF decreased serum glutamic-pyruvic transaminase activity and testosterone concentration in testis, and increased serum glutamic-oxaloacetic transaminase activity. These results suggest that, in the rat, PCDFs are more toxic substances than PCBs when administered in the diet.

-- Authors' summary

- 281/78 Features Specific for the Skin-Resorptive Action of New Pesticides Belonging to Different Chemical Groups.
L. M. Susinovich, et al. Gig. Trud. Prof. Zabol. (7): 34-36, 1977. 3 refs. (Russian).

In experiments on rats, rabbits and guinea pigs the skin-resorptive action of 36 new pesticides belonging to different chemical groups was studied. Investigations involved a single (2000 mg/kg) and repeated (20-fold application to the skin of 100mg/kg every time) action. The criteria for evaluation were the death of the animals, as well as a change in the number of physiological, biochemical and pathologic-histological tests. The organophosphorus pesticides were most toxic, viz. phosvel, acaricide 228F, cyanox, bromophos. The nature of changes in the state of the organism following their action bore evidence to a lesion of the central nervous system and to the presence (chiefly in the liver) of an acute inflammatory process. The action of organo-chlorine pesticides manifested itself by significantly disturbed functions and structure of the kidneys and liver. Renal localization of the inflammatory process was characteristic of the action produced by carbamic and dithiocarbamic acids. Skin applications of compounds containing the nitrogroup were followed by signs of affection of the hemopoietic system.

-- Authors' summary in English

INDUSTRIAL DUSTS AND INHALANTS

- 282/78 On the Justifiability of the Existing Maximum Permissible Concentration for Asbestos-Containing Dust.
F. M. Kogan, et al. Gig. Trud. Prof. Zabol. (7): 37-40, 1977. 9 refs. (Russian).

Among workers with a service record of 17 years in basic departments of the asbestos-textile industry, where the dust concentration level stood continually below the MPC, not a single case of asbestosis or suspected asbestosis was registered. This confirms the justifiability of the MPC for the asbestos-containing dust of 2 mg/m^3 , adopted in the USSR. Concentrations exceeding 5 to 10-fold of this MPC cannot be considered safe.

-- Authors' abst. in English

- 283/78 Mesothelioma Possibly Due to Environmental Exposure to Asbestos in Childhood. K. J. Arul and P. F. Holt.
Int'l. Arch. Occup. Environ. Health 40 (2): 141-143, 1977. 6 refs.

A case of diffuse pleural mesothelioma with widespread metastases is described. At first the tumor was thought to be a spontaneous mesothelioma. Later, while watching a television program on asbestos exposure, the patient remembered living near to an asbestos factory for two years during childhood. — Authors' summary

- 284/78 A Further Contribution to the Study of Respiratory Physiopathology of Asbestosis. T. Sessa, et al.
Med. Lavoro 68: 364-373, Sept./Oct. 1977. 22 refs. (Italian).

The study considered 46 asbestosis patients undergoing radiological control and 42 subjects who were exposed to the risk of asbestos cement dust. In addition to clinical and radiological examination, the following tests were also carried out: spirometry flow (FEF 200-1200; FMF 25-75%), CO transfer with ventilatory output index, membrane diffusion and pulmonary capillary volume, hemo gas analysis (PaO_2 , Ph, PaCO_2 , Hb gr%, $\text{HbO}_2\%$, acid-base balance). (1) By registration of the forced expiratory flow curve and calculation of the mean forced expiratory flow on the points of the expiratory curve corresponding to 25% and 75%, the presence of an obstructive component in the small bronchia can be observed; (2) With membrane diffusion determination and pulmonary capillary volume, there is no localization of diffusion at the membrane level; (3) By determination of HbCO_2 , there is evidence of higher rates than the normal mean of non-smokers with consequent negative influence on cellular hypoxemia. The same functional behavior, but less evident, in subjects at risk, confirms the presence of functional alterations, which are typical of respiratory impairment caused by fibrosis due to asbestos, even in the absence of radiological signs; these functional alterations are, however, useful for a pre-radiological diagnosis of the disease and, of course, for prevention purposes. — Authors' summary in English

- 285/78 Magnesium and Cytotoxic Effects of Asbestos Fibers. A. F. Pelfrene.
Med. Lavoro 68: 349-354, Sept./Oct. 1977. 14 refs.

The effect of leaching magnesium and calcium ions from three different types of asbestos fibers (chrysotile, crocidolite and amosite) was studied *in vivo*, using a transparent chamber inserted in the Syrian Golden hamster cheek pouch. *In vitro* studies employed suspensions of asbestos fibers in normal saline. No pH variations were observed in fluids and biological membranes of the hamster cheek pouches, whereas a significant shifting of the pH values was noted in the *in vitro* suspensions, accompanied by an important increase in magnesium in the suspension medium after 24 and 72 hours. — Author's abst.

- 286/78 Review of Early Results of Comparative Tests with the Konimeter and the Thermal Precipitator in Asbestos Mines.
R. S. J. Du Toit. Ann. Occup. Hyg. 20: 279-281, Dec. 1977.

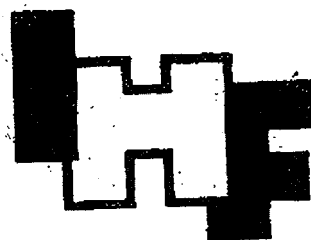
Four sets of simultaneous samples were taken by konimeter and thermal precipitator in South African asbestos mines and/or fiberizing plants between 1940 and 1967. The results suggest that for practical application the instruments are comparable for fibers down to the limit of detectability. — Author's abst.

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INDUSTRIAL HYGIENE DIGEST

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INDUSTRIAL HEALTH FOUNDATION, INC.
5231 CENTRE AVENUE
PITTSBURGH, PA 15232

INDUSTRIAL HYGIENE DIGEST

Editor: Jane F. Brislin, M.L.S.
Abstractors: Cynthia S. Bryan, B.A.,
Jean L. Collins, B.A.

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NEWS ITEMS

- 327/78 A Lab's Troubles Raise Doubts About Quality of Drug Tests in U.S.
J. S. Lublin. Wall Street Journal 191: 1, 35 Feb. 21, 1978.

Two years ago Industrial Bio-Test Laboratories, Inc. (IBT) was a giant in its little industry. Every major manufacturer in the U.S. relies to some extent on independent labs like IBT to test the safety of new drugs, cosmetics, pesticides, plastics and food additives. These labs can run tests cheaper than the manufacturers can, and until very recently their findings had an aura of impartiality important to federal regulators who are responsible for keeping unsafe products off the market. IBT's 1976 sales of \$7 million made it one of the biggest of some 200 independent labs in the business. Its reputation for top-quality testing had clients waiting in line. But the line has disappeared. IBT, a subsidiary of Nalco Chemical Co., stands accused by federal investigators of doctoring data and doing haphazard research on scores of animal tests over the past decade. The accusations have been made in testimony by the Food and Drug Administration and in an announcement by the Environmental Protection Agency. No charges have been filed, but the EPA has asked the Justice Department to consider criminal indictments of IBT and a former client for fraud and gross negligence. The FDA is also expected to seek indictment of IBT.

- 328/78 Asbestos: Internal Panel at OSHA Examining Policy on Medical Exam Requirements.
Occup. Safety & Health Reporter 7: 1641-1642, March 30, 1978.

The Occupational Safety and Health Administration has been examining its policy on medical examination requirements for employees exposed to asbestos fibers to decide if the policy should be continued in present form or changed. According to William D'Emery, OSHA office of field coordination, the agency's policy during the past year has been not to cite employers for failure to provide medical examinations to employees when exposures remained below 0.1 fibers of asbestos per cubic centimeter of air. D'Emery said the three-member panel at OSHA reviewing the policy, which includes himself, Charles McClure of the compliance programming office and John Martonik, also of field coordination, should be making recommendations to OSHA Administrator Eula Bingham in about two weeks. D'Emery declined to say what the recommendations might be. He said one question being studied is what to do about an employer which controls the release of asbestos fibers to the point where no fibers are added to the "background level" of asbestos already present. McClure added that "theoretically any office or space has a few fibers" of asbestos. OSHA has received a number of requests from employers asking for clarification of the policy on medical examination requirements, he added. McClure suggested the review and recommendation could result in issuance of a program directive by OSHA but he added, "a program directive can't change the way a standard is written."

- 329/78 U.S., Citing Health Risks, May Restrict A Gas Used to Sterilize Medical Devices.
Wall Street Journal 191: 5, Jan. 30, 1978.

A gas used to kill germs on medical instruments and bandages may itself be a danger to human health, and several federal agencies are considering restricting or banning its use. The Environmental Protection Agency said the widely used gas, ethylene oxide, has been found in laboratory experiments to damage the testicles of test animals.

- 349/78 An Investigation of the Use of Asbestos Cement Pipe for Public Water Supply and the Incidence of Gastrointestinal Cancer in Connecticut, 1935-1973. J. M. Harrington, et al. Am. J. Epidemiol. 107: 96-103, Feb. 1978. 26 refs.

The age adjusted sex specific incidence data for stomach, colon, and rectal cancer for Connecticut townships for the period 1935 to 1973 were used to investigate whether asbestos cement pipe usage for domestic drinking water is associated with gastrointestinal cancer. The townships were grouped according to the Assessment of Exposure (AOE) and Risk Factor (RF) for asbestos. These are composite indices of asbestos exposure including factors relating to the age of the pipe, the ability of water to leach asbestos from the pipe, and the length of pipes used by the population. No association was noted between these asbestos risk scores and gastrointestinal tumor incidence.

-- Authors' abst.

- 350/78 Effect of Irritants in Working Atmosphere and Smoking on Absenteeism. A. Vorko. Arhiv. Hig. Rada Toks. 28 (2): 175-179, 1977. (Yugoslavian).

A retrospective study on the effect of harmful environmental factors and smoking on workers' absences was conducted in a Zagreb chemical works. The study covered all workers employed in the factory in the course of 1972 that remained working in the factory until the beginning of the study in 1973. Out of 1004 workers surveyed, 4 were pipe smokers, 613 cigarette smokers, 144 former smokers, and 244 nonsmokers. The 1972 records were used to analyze absences, while smoking habits were investigated by means of a questionnaire. The results have shown that the number of absences and days lost in workers exposed to irritants was higher than in those who were not exposed to these harmful environmental factors. Among the workers exposed to irritants, most absences were recorded in smokers and least in nonsmokers. Among the nonexposed workers the highest number of absences was recorded in smokers and the lowest in nonsmokers. On the basis of these results it may be concluded that: (1) Exposure to irritants in the working atmosphere increases the number of absences and days lost due to illness. (2) Smoking increases a harmful effect of irritants, possibly because of a synergistic effect of either group of harmful agents, those in the working atmosphere and those in the cigarette smoke.

-- Author's summary in English

- 351/78 Family Nurse Practitioner in Health Services Center for Employees in Industry. R. R. Bauer, et al. Occup. Health Nursing 26: 11-14, Feb. 1978. 36 refs.

This article demonstrates how a corporation utilized nurse practitioners in an industrial setting. -- CB

CHEMICAL HAZARDS

- 352/78 Mortality Among Individuals Occupationally Exposed to Benzene. M. G. Ott, et al. Arch. Environ. Health 33: 3-10, Jan./Feb. 1978. 11 refs.

The mortality experience of 594 individuals occupationally exposed to benzene was investigated using a retrospective cohort design. Three hundred thirty-five of the employees began working in benzene areas prior to 1950, which provided a sound data base from which to examine latency. Data derived from work histories and industrial hygiene records permitted estimation of exposure intensities and cumulative dosages for each employee. No mortalities directly attributable to benzene exposure were observed. Several cases of leukemia and other blood disorders were noted and discussed.

-- Authors' abst.

- 399/78 Mesothelioma and Asbestos in the Province of Quebec, 1969-1972. G. P. Theriault and L. Grand-Bois.
Arch. Environ. Health 33: 15-19, Jan./Feb. 1978. 17 refs.

All records of patients who died of mesothelioma in the Province of Quebec during the period 1969-1972 were collected and reviewed. Asbestos exposure in this group was compared with that in two control groups, one of persons dying of accidental causes and the other of those dying of cardiovascular disease. The mortality rate for mesothelioma was estimated at between 2.3 and 2.8 per million per year. Men were affected twice as frequently as women, this difference being related exclusively to pleural mesothelioma. The incidence in urban regions was much higher than in rural areas, and areas involved in mining showed an incidence in the expected range. Thirty-four percent of the patients with mesothelioma and only 2% of controls had histories of direct exposure to asbestos. This exposure was related to asbestos processing and not its production. No woman gave a history of occupational exposure to asbestos. It appeared that chrysotile may be less related to the production of mesothelioma than other types of asbestos fibers.

-- Author's abst.

- 400/78 Simultaneous Airborne Dust Samples with Konimeter, Thermal Precipitator and Dosimeter in Asbestos Mines.
R. S. J. Du Toit and T. C. Gilfillan. Ann. Occup. Hyg. 20: 333-340, Dec. 1977. 16 refs.

Simultaneous airborne dust samples were taken with three types of instruments: konimeter, thermal precipitator and dosimeter (personal sampler with membrane filter) in eight asbestos mines producing four types of asbestos (Cape crocidolite, Transvaal crocidolite, amosite and chrysotile). Additional tests were carried out in a dust duct with a specific type of asbestos fibre at a steady dust concentration. The filtering efficiencies of 8 and 0.8 µm pore size membrane filters used in the dosimeter were compared. The statistical analyses of the results have been summarised and formulae are given to convert the fibre concentrations recorded by the konimeter and the thermal precipitator into that expected with the membrane filter method of sampling.

-- Authors' abst.

- 401/78 A Summary of Asbestos Fibre Counting Experience in Seven Countries. G. W. Gibbs, et al.
Ann. Occup. Hyg. 20: 321-332, Dec. 1977. 9 refs.

The membrane filter method for the evaluation of airborne concentrations of asbestos in the work place is now used in many countries. In order to ensure uniform protection for the worker and internationally comparable exposure data it is important that different laboratories can reproduce fibre counts with reasonable accuracy. The results of an international counting trial of fibre by centres in nine countries were published recently in this journal. This current report summarizes the results of internal exchanges of membrane filters for asbestos counting in seven of these countries. Observations from these several countries indicate the need for regular comparisons of counts between laboratories, regular contact with experienced observers, proper training in the use of the phase contrast microscope, standardisation of the methods of counting agglomerates, attention to the types of samples used for internal and external comparisons, choice of microscope, and separate training for counting chrysotile and amphibole fibres. An improved method of producing standard asbestos samples for counting purposes is required.

-- Authors' abst.

- 402/78 The Effect of Different Mineral Dusts on the Mechanism of Phagocytosis: A Scanning Electron Microscope Study. K. Miller, et al. Environ. Res. 15: 139-154, Feb. 1978. 11 refs.

Alveolar macrophages from normal rats were incubated with crocidolite asbestos fibers and quartz particles in vitro. The early events in phagocytosis were studied sequentially. Differences were found in the way in which macrophages recognized, attached, and phagocytosed the two dusts. Phagocytosis of quartz was extremely rapid: the macrophages typically developed long tenuous filopodia. Crocidolite was phagocytosed more slowly: many macrophages developed large flattened pseudopodia. These different phagocytic mechanisms may reflect the different biochemical and cytotoxic properties of the dusts. — Authors' abst.

- 103/78 Variation of Properties of Chrysotile Asbestos Subjected to Milling. A. M. Langer, et al. J. Toxicol. Environ. Health 4: 173-188, Jan. 1978. 46 refs.

Mechanical milling is commonly used to produce short chrysotile asbestos for experimental purposes. Such manipulation also decreases fiber crystallinity, alters Si-O and Mg-O interlayer bonding, induces coordination changes in the brucite layer, diminishes the ability of fiber to reduce specific free radicals and physisorb organic molecules, and decreases hemolytic potency and antagonist sorption capabilities. The degree of alteration is related to the time of milling. Results of biological experimentation with these materials must be interpreted with caution. Interaction mechanisms in the biological setting are suggested for chrysotile fiber. — Authors' abst.

- 04/78 Occupational Exposures to Cyanide in Baltimore Fire Fighters. M. S. Levine and E. P. Radford. J. Occup. Med. 20: 53-56, Jan. 1978. 11 refs.

A group of 479 fire fighters were investigated for routine exposure to hydrogen cyanide in the fire atmosphere using measurements of serum thiocyanate (SCN^-). The authors' findings indicate that fire fighters were exposed to levels of hydrogen cyanide sufficient to raise their mean serum thiocyanate (SCN^-) levels above that of controls. This elevation of serum SCN^- occurred independently of smoking habits. Exposures to cyanide occurred much less frequently than previously studied exposures to carbon monoxide. Difficulties of correlating acute symptoms and the effectiveness of mask use with serum thiocyanate are discussed. — Authors' abst.

- 05/78 Occupational Poisoning with Nitrogen Cyanide in the Process of Ferrosilicium Briquetting. P. Cremosnik-Pajic and M. I. Milov. Arhiv. Hig. Rada Toks. 28 (2): 187-194, 1977. 10 refs. (Yugoslavian).

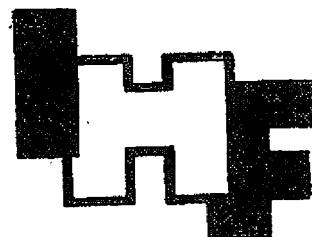
Twelve cases of nitrogen cyanide poisoning in a ferrosilicium and ferromanganese briquetting works are described. The poisoning happened in such conditions of the technological process in which the occurrence of nitrogen cyanide could not have been expected. Symptoms of poisoning indicated a possible existence of nitrogen cyanide in the working atmosphere. Nitrogen cyanide poisoning was a consequence of unfavorable factors in the process of production and pointed to a possible presence of nitrogen cyanide in the technological process of ferrosilicium briquetting which had not been known before. The authors emphasize the need for thorough knowledge of the technological process, and point out that a cooperation of technologists and occupational health experts as well as a follow-up of working conditions and workers' morbidity are essential. Team investigations of possible harmful noxae in the working atmosphere, particularly when new substances are introduced into the technological process, are recommended. — Authors' summary in English

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NEWS ITEMS

- 445/78x EPA, Commenting on OSHA Proposal, Notes Differences Over Animal Tests.
Occup. Safety & Health Reporter 7: 1726-1727, April 27, 1978.

The Environmental Protection Agency "concurs with and strongly endorses" the Occupational Safety and Health Administration's approach to identifying carcinogens, but differs with OSHA's proposed regulation over the value of animal test results, according to EPA comments and testimony prepared for a May 16 hearing on the OSHA proposed regulations. A statement prepared for presentation by Steven D. Jellinek, EPA assistant administrator for toxic substances, says EPA is "seriously concerned" with the fact that OSHA proposed regulations state that animal tests "generally cannot be relied upon as a sufficient basis for stringent regulatory action unless replicated or supported by short term studies." Even though the OSHA proposal would allow use of unreplicated animal tests if "exceptionally well conducted," EPA feels this is too great a qualification, the statement said. EPA policy is that an unreplicated test can be "an entirely adequate basis" for concluding that a chemical must be regulated as a carcinogen, the statement explained. Jellinek's statement noted that other differences between EPA and OSHA carcinogen policies are in approaches to regulatory decision making, not questions of science. These differences are: (1) OSHA's proposed categorical classification scheme would require regulation on the basis of evidence of carcinogenicity. According to the statement, OSHA will find that the proposed process by which a scientific judgment that a substance is a carcinogen leads automatically to a predetermined regulatory response will pose a problem. (2) OSHA's proposal does not estimate explicitly the magnitude of risk in the regulatory process. According to the EPA statement, although cancer risk estimation is an "imprecise endeavor involving many uncertainties," the estimation provides some measure of the magnitude of risk posed by a substance and such estimation should be used to determine whether to regulate. If a substance is believed to be a weak carcinogen to which few persons are exposed, the best regulatory course might be to defer any regulation in "favor of concentrating resources on higher toxicity, higher exposure substances," the statement recommended. "OSHA's proposal does not appear to permit the agency to adopt this course," it asserted. OSHA should use estimation of risk to help establish priorities and help determine "feasibility" of various levels of control, the statement noted, adding that "the greater the degree of risk posed by a substance, the tighter the control should be of that substance." OSHA's proposal includes no mechanism for setting priorities for substances within categories. Without a priority-setting system, OSHA may find itself allocating resources to the regulation of substances which pose relatively little risk to workers while substances which pose greater risk await regulation, the statement concluded. Because OSHA will be setting priorities, "whether explicitly or implicitly," it would be preferable to establish in advance the priority-setting criteria that will be used, the statement added.

- 446/78x HEW is Warning Workers, Doctors of Asbestos Risks. Anon. Wall Street J. 191: 19, April 27, 1978.

The Department of Health, Education and Welfare said it is warning former and current asbestos workers and their doctors about the lethal effects of the substance. Joseph Califano, HEW Secretary, said the U.S. Surgeon General is sending letters to all 400,000 of the nation's doctors alerting them to signs of asbestos poisoning in their patients.

It's estimated that between 8.5 million and 11 million workers have been exposed to asbestos since the beginning of World War II. According to a very rough HEW estimate, Mr. Califano said, 1.5 million to two million of the workers have already died, though he couldn't say how many of the deaths were asbestos-related. It's thought the largest group of asbestos-exposed workers are the approximately 4.5 million who worked in shipyards during World War II. Mr. Califano said HEW's notification effort is important because asbestos-related diseases can take from 15 to 35 years or longer to develop. So, he said, "workers exposed in the past, especially those from the war years, may just now be facing immediate, serious health threats." The Secretary said that besides its letters to physicians, HEW is also planning a public-information campaign aimed at workers and will work with the Defense Department and other agencies to spread the word. He said asbestos workers will be urged to have regular physical checkups and to tell their doctors about their exposure in hopes of detecting any asbestos-related disease in its early stages.

447/78x HEW, Goaded by TV and Nader, Working up Asbestos Notification Plan.
Occupational Health & Safety Letter 8: 2, April 22, 1978.

At the moment, both ABC and CBS are planning documentaries in the near future on the problem of asbestos exposure among past and some present workers in shipyards and elsewhere. Health Research Group, the Ralph Nader affiliate headed by Dr. Sidney Wolfe, is also exerting pressure on the subject and could easily have prodded the networks into action. HRG is very persuasive with the media. With all this as a goad, it is not surprising that HEW is currently working up a notification and education program for asbestos-exposed workers. It's not quite sure how to go about it, however, or even what good it would do to notify a World War II shipyard worker that he may or may not have cancer as a result of exposure to asbestos, or maybe it was smoking, or maybe radiation. The Armed Forces Epidemiological Board heard a report from a subcommittee urging that HEW, not the Department of Defense, be the lead agency in announcing a stepped-up research program but that the Navy should make initial contacts with former shipyard workers. The subcommittee recommended that notification of the former workers be accomplished in several ways: general dissemination through private health insurance programs, the VA hospitals, Social Security Administration, HEW's Medicare programs, state health officers and state health plans and union rosters. It said that a return address card should be prepared by the Navy and enclosed with all mailings from these agencies. The card would inquire as to whether the recipient ever worked in a shipyard and if so, where, when and what his current mailing address is. It is estimated that about 4,500,000 persons may have been exposed to asbestos in shipyards during World War II. Of that number, about 2 million have died, leaving a population of 2,500,000. There are currently about 200,000 shipyard workers. Without sacrificing the importance of the notification program, the subcommittee urged that research be undertaken to develop an index of risk, to conduct a pilot study at selected facilities to determine any changes in classifiable morbidity and diagnosable causes of death; an epidemiological study of current shipyard workers, an epidemiological study of past workers and bioanalysis and mineralogical analysis. Sites suggested for the studies included Groton, Conn., Bethlehem yards in Boston, Bremerton yards in Washington State, shipyards in Long Beach, Hawaii and New York State. The subcommittee also urged development of an asbestos-related disease registry be developed in consultation with existing disease registries. X-ray diagnostic capabilities should be developed in conjunction with the American College of Radiology and pathology capabilities in conjunction with the existing U.S. Mesothelioma Panel, the subcommittee said. The group was composed of Drs. Paul Kotin of Johns-Manville, Irving Selikoff of Mt. Sinai Medical Center, New York, and Marvin Kuschner of State U. of New York, Stony Brook.

MMF was rapidly eliminated from the body with urine values peaking within a few hours following the end of each exposure period. Very little was found in the 24-hour postexposure sample and none was found in a 48-hour post-exposure sample. There was no increased excretion of MMF in the urine following repetitive exposure. The mean for the seven-hour (end of exposure) sample was 4.74 $\mu\text{g}/\text{ml}$ or 736.8 μg . Lower and upper one-sided 95% tolerance limits for 95% of the population were 1.2 $\mu\text{g}/\text{ml}$ (367 μg) and 13.9 $\mu\text{g}/\text{ml}$ (1625 μg). The coefficient of variation (CV) for μg MMF/ml was approximately 25 times more variable than the CV for total μg . —Authors' abstract

- 506/78 Neurohumoral Interrelations in Patients with Chronic Vinylchloride Poisoning. L. A. Goryacheva and E.A. Stulova. Gig. Trud. Prof. Zabol. (1): 23-27, 1978. 9 refs. (Russian).

In 52 patients with chronic vinylchloride poisoning the sympathetic (catecholamines, calcium ions) and parasympathetic (acetylcholine, cholinesterase, serotonin and potassium ions) blood activity, the histamine, histaminopeptic index and the adrenal cortex function were studied. The indicators of the parasympathetic division mediators of the autonomous nervous system were found to be upset, while those of sympathetic mediation remained unchanged. Most characteristic of chronic vinylchloride poisoning was a fall of the cholinergic activity of the blood, i.e., a relative prevalence of the nervous system sympathetic division tonicity was in evidence. A drop of the histaminopeptic blood index and a decreased reserve capacity of the adrenal cortex were noted. The effect on the sympathetic and parasympathetic mediation of the central cholinolytic amisyl and central adrenolytic chlorpromazine was studied. — Authors' summary in English

INDUSTRIAL DUSTS AND INHALANTS

- 507/78 Dust Exposures in the Canadian Grain Industry. J-P. Faurant and C. F. Moore. Am. Ind. Hyg. Assn. J. 39: 177-194, March 1978. 20 refs.

Total dust concentrations measured in 8 terminal, 9 transfer and 14 country grain elevators ranged from 0.18 to 781 mg/m^3 . Results indicate that elevatormen performing housekeeping and maintenance chores or working in transfer galleries are more likely to be exposed to high concentrations. Dust exposures can be related to the amount of grain handled and the extent of dust control measures in effect at a worksite. The respirable mass fraction of grain dust varies according to the type of grain handled. The quartz, inorganic material and fungal spore content and particle size of the dust from specific grains were also studied. — Authors' abstract

- 508/78 Respiratory Function and Symptoms in Workers Exposed Simultaneously to Jute and Hemp. S. H. El Ghawabi. Brit. J. Ind. Med. 35: 16-20, Feb. 1978. 19 refs.

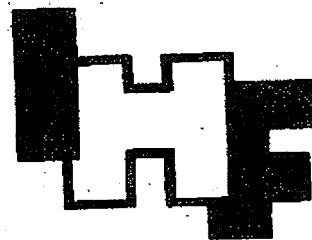
The environment and health of a working population exposed simultaneously to jute and hemp were studied. Classical symptoms of byssinosis were not present but 21 workers (7%) complained of atypical tightness of the chest. The prevalence of chronic bronchitis among the exposed workers was statistically significant in comparison with controls. Effects of dust concentrations, age and duration of exposure on the prevalence of chronic bronchitis were studied. A statistically significant reduction in $\text{FEV}_{1.0}$ at the end of a work shift occurred in all the exposed workers. Bronchodilators given after the shift showed that acute reductions in forced expiratory volumes were nearly fully reversible in all exposed workers. Smokers and those with chronic bronchitis had greater reductions in $\text{FEV}_{1.0}$ values at the end of the work shift. — Author's abstract

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pulmonary edema (apparently without benefit of a pulmonary irritation warning), immunological sensitization, and irritation of the pulmonary tract, eyes, nose, and skin. There is no current Occupational Safety and Health Administration (OSHA) exposure standard for trimellitic anhydride. The Amoco Chemicals Corporation, the sole domestic producer, suggests a limit of "0.05 mg/m³ or less for susceptible individuals. NIOSH has prepared this current Intelligence Bulletin to advise of recent findings of toxic effects of trimellitic anhydride and to provide some precautions for handling trimellitic anhydride in the workplace. 'Suggested Procedures for Minimizing Employees' Exposure to Trimellitic Anhydride' are given."

—Cond. from text

- 618/78 Flame Retardants. H. J. Sanders. Chem. & Eng. News 56: 22-36, April 24, 1978.

This article discusses the effects of the Tris ban in relationship to manufacturers, textile companies and the public. The Flammable Fabrics Act is reviewed, and an outline of how flame retardants work is given.

—CB

INDUSTRIAL DUSTS AND INHALANTS

- 619/78 Winning a Battle to Control Workplace Asbestos. J. Weidman. Job Safety & Health 6: 15-19, April 1978.

This article is a case report of a particular industry's program to control asbestos.

—CB

- 620/78 Pleuropulmonary Disease Among Asbestos Workers in Relation to Smoking and Type of Exposure. W. Weiss and P. A. Theodos. J. Occup. Med. 20: 341-345, May 1978. 11 refs.

The chest roentgenograms of employees aged 40 and over in two asbestos manufacturing plants were read by consensus without knowledge of the plant or smoking habits. Plant A used only chrysotile asbestos throughout its history and Plant B used amosite as well as chrysotile, the amosite being limited to the period 1950-64. The prevalence of pulmonary disease was 25% in Plant A and 33% in Plant B. The prevalence of pleural thickening was 18% in Plant A and 35% in Plant B. Neither age nor work duration were factors in these differences. In Plant A there was no obvious relationship between smoking and pleuropulmonary disease. In Plant B there was a definite relationship of smoking to pulmonary disease and perhaps to pleural thickening. Both type of asbestos and smoking habits appear to be determinants of pleuropulmonary disease in asbestos workers.

—Authors' abstract reprinted by permission

- 621/78 Immunoglobulin "E" (IgE) in Occupational Bronchial Asthma of Chemical Etiology. E. S. Brusilovsky and G. P. Rachkovskaya. Gig. Trud. Prof. Zabol. (2): 15-18, 1978. 14 refs. (Russian).

In the blood serum of patients with occupational bronchial asthma of chemical etiology the IgE and nonspecific IgE levels were determined in the period between the paroxysms. The data obtained bear evidence to an appreciable rise in the level of nonspecific serumal IgE (6-fold) and to the prevalence of a chemergic type of allergic reaction occurring in cases of occupational bronchial asthma of chemical etiology. This may be of great importance in choosing the method of treatment and, above all, of specific immunotherapy.

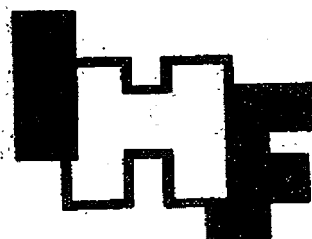
—Authors' summary in English

July 1978
Volume 42, No. 7

INDUSTRIAL HYGIENE DIGEST

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AND
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HEALTH AND
SAFETY NEWS



INDUSTRIAL HEALTH FOUNDATION, INC.
5231 CENTRE AVENUE PITTSBURGH, PA. 15232

INDUSTRIAL HYGIENE DIGEST

Editor: Jane F. Brislin, M.L.S.
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Quick Procedure for Determining Effectiveness of Hearing Protectors.	—	Abst.	744/78

- 733/78 A Respiratory Survey of Cedar Mill Workers. I. Prevalence of Symptoms and Pulmonary Function Abnormalities. M. Chan-Yeung, et al. J. Occup. Med. 20: 323-327, May 1978. 24 refs.

A respiratory-occupational questionnaire and spirometry were used to compare the prevalence of symptoms and pulmonary function abnormalities in 405 workers exposed to red cedar dust and 252 control workers exposed to other wood dusts. Compared with controls, the cedar workers were found to have a significantly higher prevalence of respiratory symptoms, cough, phlegm, wheeze and breathlessness, as well as more rhinitis and conjunctivitis. While, as expected, there was a clear relationship between respiratory symptoms and cigarette smoking, there was also evidence to suggest a synergistic effect between exposure to cedar dust and smoking. There was no difference in the lung function between cedar workers and controls. Sixty-five workers in the control group previously had worked in red cedar mills; they had a higher prevalence of respiratory symptoms than other workers in this group. Red cedar asthma was found in only 1.1% of the cedar workers. This condition usually develops in the early months of exposure, and workers who are affected tend to leave the industry. The probable incidence of red cedar asthma was estimated to be higher, around 4-5%.
—Authors' abstract reprinted by permission

- 734/78 A Respiratory Survey of Cedar Mill Workers. II. Influence of Work-Related and Host Factors on the Prevalence of Symptoms and Pulmonary Function Abnormalities. M. J. Ashley, et al. J. Occup. Med. 20: 328-332, May 1978. 15 refs.

The influence of certain work-related and host factors on the prevalence of respiratory symptoms and pulmonary function abnormalities in 405 red cedar workers and 187 control workers was examined. In cedar workers, but not in controls, the prevalence of chest symptoms increased with duration of exposure. The decline in pulmonary function with increasing duration of exposure was also more marked in cedar workers, but in both groups smoking was a more important determinant. Substantial proportions of cedar workers and, to a lesser extent, controls noted improvement of cough and wheeze, and particularly of conjunctivitis and rhinitis, when away from work. No deterioration, however, was found in pulmonary function during the work week in either exposure group. Atopic status was unrelated to the prevalence of chest symptoms or pulmonary function abnormalities; it was more common in workers with conjunctivitis and rhinitis, particularly in the cedar group. Similarly, P₁ phenotype did not appear to influence the occurrence of either symptoms or lung function abnormalities.
—Authors' abstract reprinted by permission

- 735/78 Automobile Brake Linings May Be a Health Hazard . . . Anonymous. Am. Ind. Hyg. Assn. J. 39: A 24-A 26, April 1978.

This article describes how automobile brake drum linings produce fine filaments of chrysotile asbestos. It is stated that the hazard lies with the brake repairmen who "use compressed air to blow asbestos fibers from brakes daily and may breathe as much as a million particles of asbestos in each cubic meter of air."
—CB

- 736/78 Non-Occupational Exposure to Asbestos and Malignant Mesothelioma in Females. N. J. Vianna and A. K. Polan. Lancet 1: 1061-1063, May 20, 1978. 25 refs.

A study of the occupational histories of 52 females with malignant mesothelioma and certain of their relatives, carried out to measure the risk of this disorder attributable to indirect asbestos exposure, showed that a significantly greater number of husbands and fathers of cases than of controls worked in asbestos-related

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A study of the occupational histories of 52 females with malignant mesothelioma and certain of their relatives, carried out to measure the risk of this disorder attributable to indirect asbestos exposure, showed that a significantly greater number of husbands and fathers of cases than of controls worked in asbestos-related

industries, and the relative risk for this factor was 10. The frequency of parental cancer, especially gastrointestinal malignancy, was also significantly greater for cases than for their controls. This raises the possibility of a genetic predisposition to malignant mesothelioma. --Authors' summary reprinted by permission

- 737/78 The Effect of Asbestos-Associated Metal Ions on the Binding of Benzo(a)pyrene to Macromolecules in Vitro.
R. Thomson, et al. Environ. Res. 15: 309-319, April 1978. 42 refs.

In seeking an explanation for the high risk of malignancy in workers exposed to both asbestos and benzo(a)pyrene inhaled in cigarette smoke, experiments have been carried out to test the effect of asbestos-associated trace metals on the covalent binding of benzo(a)pyrene in vitro. Most of the metals tested -- nickel, cadmium, chromium, zinc, manganese, and copper -- caused an overall decrease in the binding of benzo(a)pyrene in microsomal incubations containing exogenous DNA. That this represented a reduction in the binding to DNA was confirmed in the cases of zinc, nickel, and chromium. Magnesium caused a very slight increase in binding, and ferrous and ferric ions, while reducing the binding to DNA, caused an increase in binding to some component of high molecular weight in the incubation mixtures, over a narrow concentration range. The significance of these findings is discussed in relation to the development of malignant disease associated with asbestos exposure.

--Authors' abstract reprinted by permission

- 738/78 The Inertial Behavior of Fibers. W. A. Burke and N. Esmen.
Am. Ind. Hyg. Assn. J. 39: 400-405, May 1978. 10 refs.

The inertial deposition is given considerable credit in the deposition of inhaled particulate matter in the upper respiratory tract. A determination of the parameters governing the impaction of fibers must be the basis of evaluating the role of impaction in the respirability of fibrous dusts. The study reported here describes an experimental method of defining the inertial behavior of fibers. The results of the experiments show that the aspect ratio of the fibers plays a much more important role than hitherto considered. The results of the experimental work gave an empirical mathematical model for the prediction of the impaction of fibers from the physical properties of fibers such as density, fiber diameters and aspect ratio. In addition an equivalent diameter based on inertial properties of the fiber is developed.

--Authors' abstract reprinted by permission

- 739/78 Effects of Short-Term Exposures to Sulfuric Acid and Ammonium Sulfate Aerosols Upon Bronchial Airway Function in the Donkey. R. B. Schlesinger, et al. Am. Ind. Hyg. Assn. J. 39: 275-286, April 1978. 42 refs.

The effects of one-hour inhalation exposures to 0.3-0.6 μm H_2SO_4 and $(\text{NH}_4)_2\text{SO}_4$ aerosols in the donkey were studied in terms of alterations in pulmonary flow resistance and dynamic compliance, and changes in the regional deposition and tracheobronchial mucociliary clearance of an inert test aerosol. Short-term slowing of clearance followed certain single exposures to H_2SO_4 at 194-1364 $\mu\text{g}/\text{m}^3$ in three of four animals, while two of the four demonstrated a more persistent slowing of their clearance. These exposure levels produced no measurable change in resistance, compliance or regional deposition. Exposures to $(\text{NH}_4)_2\text{SO}_4$ up to $\sim 2000 \mu\text{g}/\text{m}^3$ had no measurable effect upon resistance, compliance, regional deposition or mucociliary clearance.

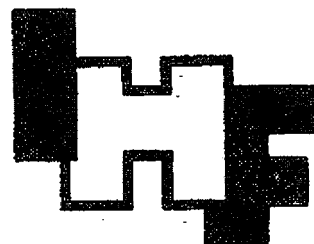
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Experimental Asbestosis: An Investigation of Functional and Pathological Disturbances. I. Methods, Control Animals and Exposure Conditions.	--	Abst.	835/78

morphological structure of the ovaries, hypophysis, adrenal and thyroid glands. The results of the described investigations were used in elaborating measures aimed at preventing the adverse effects of carbon bisulphide on the female organism.

—Author's summary in English

- 833/78 Comparative Toxicological Assessment of Products Subsequent to Thermal Decomposition of Film Materials.
V. S. Ilchkin, et al. Gig. Trud. Prof. Zabol. (4): 40-44, 1978. 6 refs. (Russian).

The composition and toxic action of gaseous products subsequent to thermal decomposition of polyethylene-terephthalate, polyimide and PTGM-609 films were studied. The toxic effect of the volatile fraction was found to be largely determined by the content of CO therein. A higher toxicity of the polyimide film decomposition products is probably conditioned by the combined action of CO and HCN on the organism. The part played by HCl in the toxic effect of the PTGM-609 decomposition products remains obscure.

—Authors' summary in English

- 834/78 On Hygienic Assessment of Technological Cooling Lubricants in Connection with Their Prospective Use in Industry.
V. N. Koshenkov and L. A. Serebryany. Gig. Trud. Prof. Zabol. (3): 4-7, 1978. 1 ref. (Russian).

This paper deals with issues concerned with tentative hygienic prognosing on the utilization in industry of technological cooling lubricants in hot deformation of metals. The dependence of oxidative processes in cooling lubricants (CL) both in the thermal technological conditions and the processing tools themselves is pointed out. The paper carries information on the pollution of the air within the shop area depending upon the ground substances (water, oil) of the CL employed in the industry. Thermal zones with the minimum and maximum oxidation of the CL were ascertained. Areas (conditionally hazardous and conditionally safe) as concerns the intensity of the CL oxidation and possible pollution of the air with the products of their thermoxidative destruction were determined.

—Author's summary in English

INDUSTRIAL DUSTS AND INHALANTS

- 835/78 Experimental Asbestosis: An Investigation of Functional and Pathological Disturbances. I. Methods, Control Animals and Exposure Conditions. D. M. Hiatt. Brit. J. Ind. Med. 35: 129-134, May 1978. 13 refs.

The measurement of respiratory function and quantitative assessment of changes in lung morphology are described in a long-term study of asbestos-exposed guinea pigs. Resistance and dynamic compliance of the guinea pig respiratory system were measured non-destructively, and the tidal volume and rate of spontaneous breathing were also determined. A point counting technique was used with histological preparations to quantify morphological changes. In one group of control animals, investigated between 3 and 28 months of age, dynamic compliance and tidal volume tended to increase, but resistance and breathing rate tended to decrease, as the animals matured. In contrast the percentage by volume of various lung components remained constant throughout this period. The animals were exposed to chrysotile and amosite aerosols, both aerosols containing high concentrations of short fibres ($< 5 \mu\text{m}$) and at least 1000 fibres/ml longer than $5 \mu\text{m}$. The total fibre concentration during chrysotile exposure was probably at least double that during amosite exposure. A gradient of fibre concentration ($< 5 \mu\text{m}$) was detected along the exposure chamber, but this gradient was not reflected in the respiratory function of animals exposed at different positions along the chamber. These findings are discussed in relation to possible dose-dependence of the response.

—Author's abstract reprinted by permission

- 836/78 Experimental Asbestosis: An Investigation of Functional and Pathological Disturbances. II. Results for Chrysotile and Amosite Exposures. D. M. Hiatt. Brit. J. Ind. Med. 35: 135-145. May 1978. 30 refs.

Long-term studies of respiratory function and lung morphology were carried out on control groups of guinea pigs and matched groups exposed by inhalation to asbestos dust. Animals were exposed to aerosols of chrysotile or amosite asbestos containing large numbers of short fibres, for either 9 or 18 days. Resistance and dynamic compliance of the guinea pig respiratory system were measured non-destructively, while the point counting technique was applied to the histological preparations. Under these exposure conditions the extent of pathological and functional changes were not related to differences in duration of exposure. Such changes were more marked, however, in animals exposed at eight rather than three months of age. The measurement of dynamic compliance provided the most sensitive assessment of the functional disturbances, which were more extensive following chrysotile exposure. Progressive peribronchiolar fibrosis developed about 40 weeks after chrysotile exposure at eight months of age, but not until about 70 weeks for animals exposed when three months old. No fibrotic reaction was seen during the 70 weeks of the amosite experiments. The relationships between pathological and functional changes throughout these experiments are discussed, and explanations for the apparent differences in fibrogenicity between chrysotile and amosite are suggested. Early detection of asbestosis may be aided by use of lung function tests known to be sensitive to small airways disease. --Author's abstract reprinted by permission

- 837/78 Significance of Fibre Length in the Clearance of Asbestos Fibres from the Lung. A. Morgan, et al. Brit. J. Ind. Med. 35: 146-153. May 1978. 17 refs.

Rats were exposed by inhalation to radioactive anthophyllite asbestos. Animals were then killed serially over a period of 205 days and the fibre content of the lungs measured radiometrically. The lungs were subjected to selective bronchopulmonary lavage and the mean fibre content determined of free cells recovered from the alveolar spaces. The length distributions of fibre recovered from the lungs by lavage, and of those remaining in the lungs following lavage, were measured. Short (less than 5 μ m) fibres are cleared from the lung via the conducting airways more efficiently than longer fibres and fibres exceeding 50 μ m in length are not removed from the lungs by this route. Although fibres of about 200 μ m in length were present in all the lungs examined, the longest which could be recovered by lavage, once fibre deposited in the airways had been cleared, was only about 100 μ m, decreasing to 60-70 μ m after 205 days. It is suggested that long fibres are more liable than short to penetrate the alveolar wall as they tend to bridge the alveolar ducts and alveoli.

--Authors' abstract reprinted by permission

- 838/78 The Formation of Asbestos Bodies. R. M. Das, et al. Med. Lavoro 68: 431-436. November-December 1977. 11 refs.

Histological studies of the lungs of guinea pigs that inhaled anthophyllite asbestos suggest that asbestos bodies are formed on fibres that are first coated with a thin film of ferroprotein and hyaluronic acid. Further ferroprotein is added by the adherence of Perls-positive globules that may be submicron or several microns in diameter, some of which are easily visible by optical microscopy. While in the formative stages, the asbestos bodies are stained by the Gomori technique, showing acid phosphatase. The mature asbestos body is not so stained.

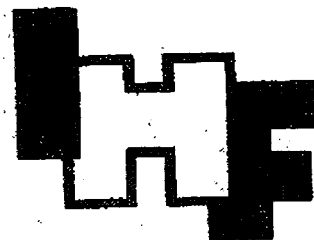
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NEWS ITEMS

- 879/78x Navy to Examine Up to 220,000 Workers for Asbestos Exposure.
Occupational Health and Safety Letter 8: 6-7, August 8, 1978.

The Navy plans to give medical exams and X-rays to up to 220,000 civilian and military personnel in shipyards and elsewhere who may have been exposed to asbestos. Because of the "unique high risk relationship" of smoking and cancer in persons who have been exposed to airborne asbestos fibers, the Navy said that all smokers who were exposed will be reexamined once a year, whether or not they show any clinical evidence of disease. About 14,000 Navy personnel exposed to asbestos fibers as part of their jobs were examined last year. In an extension of the program, the Navy says that as many as 70,000 civilians and 150,000 active duty sailors who either have been exposed in the past or present will be examined. They will also be given questionnaires to determine those who have been exposed, and they will be given physical exams, respiratory tests and x-rays. All who show lung changes, as well as the smokers, will continue to receive yearly exams as long as they remain in government service, the Navy said.

- 880/78x Mortality Experience of Asbestos Workers and Dust Level Estimates.
Industrial Hygiene News Report 21: 2, August 1978.

Pneumoconiosis-pulmonary fibrosis death rates of retired asbestos workers were shown to be clearly related to cumulative dust exposure at time of retirement in an analysis of data on a cohort of 1,075 men who completed their working lifetime with an asbestos company, worked at a facility in the U.S., and retired with a company pension during the period 1941-1967. The first report on this cohort, followed through 1969, has been updated through 1973. A summary of results was given by Vivian L. Henderson, M.S., and Philip E. Enterline, Ph.D. of the University of Pittsburgh Graduate School of Public Health (Pittsburgh, PA 15261) at the New York Academy of Science's Science Week held June 25-30 in New York City. The average duration of employment in the asbestos industry was 25 years with a range from 3 to 51 years. By combining personnel records with asbestos dust level estimates for each job and time period, it was possible to reconstruct the asbestos dust exposure history for each man, assign a measure of his cumulative dust exposure at the time of retirement, and relate this to his mortality experience following retirement. To compute cumulative dust exposure for each man, the dust level at each job and time period was multiplied by years at that job and summed across all jobs during his working life-time. This total cumulative exposure was expressed as mppcf-years. Respiratory cancer and pneumoconiosis-pulmonary fibrosis mortality was examined in relation to cumulative dust exposures, and to other factors after taking into account cumulative dust exposure. Men who worked in the production of asbestos cement pipe and those who had some crocidolite asbestos exposure showed a higher risk of respiratory cancer than others who were exposed to amosite or chrysotile alone or in combination. Since these groups overlapped, it could not be certain that crocidolite asbestos was responsible for the increased risk.

Health and Safety Guides:

"Textile Machinery Manufacturers." 108 p. (1978). DHEW (NIOSH) Pub. No. 78-146.

"Manufacturers of Industrial Trucks and Tractors." 83 p. (1978). DHEW (NIOSH) Pub. No. 78-147.

"Hospitals." 95 p. (1978). DHEW (NIOSH) Pub. No. 78-150.

"Safety and Health in Arc Welding and Gas Welding and Cutting." 50 p. (1978).
DHEW (NIOSH) Pub. No. 78-133.

- 903/78x CAOHC Course Directors Listing. Council for Accreditation in Occupational Hearing Conservation.
Available at no charge from: CAOHC, Ms. Sittner, 1619 Chestnut Avenue, Haddon Heights, NJ 08035.
27 p. (1978).

Names and addresses of CAOHC certified instructors compiled March, 1978.

--JFB

INDUSTRIAL MEDICINE

- 904/78 Geographic Patterns of Industry in the United States: An Aid to the Study of Occupational Disease.
B. J. Stone, et al. *J. Occup. Med.* 20: 472-477. July 1978. 14 refs.

The geographic location of 18 major manufacturing industries within the United States is illustrated by a series of computer-generated county maps. The metal and machinery industries, the two largest employers, and the transportation and rubber industries are concentrated in the northeastern quadrant of the United States, while most countries with textile, apparel, tobacco, and furniture manufacturing are in the South. Other industries had different patterns. The counties where industry was concentrated tended to be more urban and to have higher levels of income and education. The maps and associated demographic data on industrial counties may prove a useful adjunct to county maps illustrating mortality patterns for cancer and other diseases. Despite obvious limitations, the visual patterns and correlation analyses may help to generate and formulate hypotheses concerning occupationally induced disease.

--Authors' abstract reprinted by permission

- 905/78 Mesothelioma in the United States. Incidence in the 1970's. M. W. Hinds.
J. Occup. Med. 20: 469-471. July 1978. 13 refs.

Mesothelioma is a rare neoplasm, the occurrence of which has been clearly related to asbestos exposure. Data recently collected by population based cancer registries in Washington, Hawaii, New Mexico, Connecticut, Michigan, Utah, Louisiana and Iowa were obtained for the determination of mesothelioma incidence rates. These registries represent a total population of over 16 million persons. Crude incidence rates were found to range from 3.0 to 7.1 per million per year. Age specific incidence rates showed a steady increase from the third through the eighth decade, with a more rapid increase for males than females. Sex specific incidence rates, age adjusted to the 1970 U.S. population, were found to range from 4.4 to 11.1 per million per year for males and from 1.2 to 3.5 per million per year for females. The highest rates for both males and females were found in the New Orleans area, Louisiana and the Puget Sound area of Washington state, both with significant shipbuilding activity.

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INDUSTRIAL DUSTS AND INHALANTS

- 952/78 Asbestosis: Evaluation of Non-Radiological Indicators. G. Chiappino, et al.
Med. Lavoro 69: 281-297, June 1978. 9 refs. (Italian).

In a group of 182 subjects, the frequency of positive response of "non-radiological indicators of asbestosis" was evaluated in relation to the degree and duration of risk and the time elapsed since the beginning of exposure; the relationship between association of the various indicators and occupational hazard was also examined and the predictive value of disease was established for each indicator and for associations of indicators. The frequency of positive response of the indicators was significantly correlated with the intensity of exposure to asbestos, with a latency period that can be calculated in the order of several years after beginning of exposure. The predictive value of the individual indicators and of associations of several indicators was very high: when determinations are carried out using the correct methods and the results are correctly evaluated, the presence of pulmonary lesions due to asbestos can be diagnosed in 90% of the cases, independently of the results of radiological examination. Therefore, the periodic surveillance of workers must always include examinations to detect asbestos bodies and siderocytes in the sputum, small crepitating rales, functional alterations consisting of restrictive ventilatory insufficiency and/or impairment of alveolar-capillary diffusion: the results must be considered together in a single concise judgement, bearing in mind the type of lesion that induces positive response of each parameter. Compared to the data obtained with radiological examination, much more accurate information can be gained from these indicators on the possible presence of initial pulmonary lesions. --Authors' summary in English

- 953/78 Lung Function in Asbestos Workers. P. Scotti, et al.
Med. Lavoro 69: 471-480, June 1978. 18 refs. (Italian).

A lung function study was made in 744 subjects occupationally exposed to the inhalation of asbestos fibres, investigating also possible differences in physiopathologic response between the group of workers in the mining industry (exposed exclusively to chrysotile asbestos), workers in an asbestos-cement industry (exposed to both chrysotile and crocidolite), and a group of insulation workers (exposed to mixtures of chrysotile and various amphiboles). The subjects were divided into 4 groups according to radiological findings (U.I.C.C. classification, Cincinnati 1970) and length of employment: 1st and 2nd groups -- 0/0 and 0/1 radiograph and occupational exposure respectively under or above 10 years; 3rd group -- 1/0 and 1/1 radiograph; 4th group -- 1/2, 2/1, 2/2, 2/3 radiograph. Behaviour of VC, FEV₁, T_{co} at rest (steady-state method) and lung ductances for CO according to Lacoste were examined. No significant differences were observed in the behaviour of functional parameters among the three categories of workers. There was a prevalence of subjects with restrictive type ventilatory syndrome compared to the cases with obstructive ventilatory insufficiency. A reduction in T_{co} at rest below the normal lower limit was found in a considerable percentage (~ 20%) of the subjects of the 1st group. Functional alterations increase in degree and frequency in the three categories with the progressive increase in exposure and radiological alterations.

--Condensed from authors' summary in English

- 954/78 Development of an Animal Model, Techniques, and an Exposure System to Study the Effects of Asbestos Cement Dust Inhalation. A. P. Wehner, et al. Environ. Res. 16: 393-407, July 1978. 23 refs.

An aerosol exposure system and procedures for delivering asbestos cement (AC) dust to the lungs of hamsters are described. Groups of hamsters were exposed to AC aerosol concentrations of 1 and 10 $\mu\text{g}/\text{liter}$, respectively, 3 hr/day, 5 days/week, for 3 and 6 months and were sacrificed for histopathologic examination. One subgroup from both the 1 and the 10 $\mu\text{g}/\text{liter}$ exposure group was withdrawn from exposure after 3 months and sacrificed after a 3-month recovery period to determine whether or not some of the histologic changes might be reversible. There was an apparent dose-response relationship between AC exposure and the number of asbestos bodies and small randomly distributed foci of alveolar macrophages. No other treatment-related lesions were observed. The 3-month recovery period had no apparent effect.

--Authors' abstract reprinted by permission

- 955/78 The Effects of Asbestos -- Cement Dust Inhalation on Baboons. B. Goldstein, et al. Environ. Res. 16: 216-225, July 1978. 15 refs.

To study the effects of asbestos -- cement dust under laboratory conditions, baboons were exposed to dust collected from the extraction system in the hard sheet cutting section of an asbestos -- cement factory. The animals developed fibrosis of the lungs morphologically similar to asbestosis and most likely due to the asbestos component of the dust, possibly modified by the cement. Two of the animals also showed atypical metaplasia of the bronchiolar epithelium and a bronchiole-aveolar carcinoma could not be excluded.

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- 956/78 The Acute Effects of Chrysotile Asbestos Exposure on Lung Function. K. W. Hartless, et al. Environ. Res. 16: 360-372, July 1978. 23 refs.

Lung function was determined in 23 men 1.5 months after an intense 5-month exposure to chrysotile asbestos using spirometry, plethysmography for determination of lung volumes and specific conductance, single breath nitrogen washout for determination of closing volume, and rest and postexercise arterial blood gas analysis. Although no man showed evidence of restriction, 12 of the 23 had documented airflow obstruction. Eight months following exposure, 16 of the 23 had a repeat pulmonary evaluation. This included the repetition of all previous testing and determination of the diffusion capacity for carbon monoxide and pulmonary compliance. Three men developed airflow obstruction, as determined by the closing volume, during the interval of study. Seventeen of the 23 had airflow obstruction documented on either the initial or follow-up study. Of these 17, 12 were nonsmokers, current light smokers (less than 10 pack years), or ex light smokers. It is concluded that acute intense chrysotile asbestos exposure causes airflow obstruction.

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- 957/78 On the Utility of Dark-Field Electron Microscopy in the Determination of the Degree of Deformation in Chrysotile Asbestos: An Environmental Research Application. K. Seshan. Environ. Res. 16: 383-392, July 1978. 12 refs.

The degree of microcrystalline deformation in fibers of chrysotile asbestos may be distinguished using high resolution dark-field electron microscopy. This is demonstrated by comparing undetained chrysotile with Union Internationale Contre le Cancer (UICC) standard reference samples. The UICC samples are shown to be partially deformed as a result of milling in the mixing process. Samples of used and unused brake shoe lining dust were

examined using this technique; it is shown that chrysotile asbestos in various stages of deformation -- relatively undeformed to heavily deformed -- survives in automobile brake drum dust. Such dark-field images can serve to identify the source of asbestos found in environmental pollution samples.

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- 958/78 Biochemical Changes in Guinea Pig Lungs due to Amosite Asbestos. V. Misra, et al.
Environ. Res. 16: 55-61, July 1978. 24 refs.

The changes in hexosamine, glucuronic acid, and sialic acid contents and carbonic anhydrase activity in guinea pig lung at 40, 80, 120, and 160 days after intratracheal injection of amosite dust have been followed. The continuous increase in hexosamine and glucuronic acid throughout the development of the disease and the initial increase and later decrease in sialic acid indicate that these carbohydrates are among the loci of asbestos toxicity. Carbonic anhydrase activity of lungs also decreased in later stages along with alterations in serum chloride and bicarbonate levels, indicating likely respiratory disturbances. Carbonic anhydrase activity also decreased in vitro on incubation of lung homogenates with various silicate dusts, presumably due to the dissolution products of the dusts. The findings are discussed in relation to the involvement of biomembranes in the development of asbestosis and the mechanisms operating therein.

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- 959/78 Amount and Distribution of Welding Fume Lung Contaminants Among Arc Welders. P. Kalliomaki, et al.
Scand. J. Work Environ. Health 4: 122-130, June 1978. 16 refs.

The amount and distribution of the welding fume lung contaminants was measured in 44 arc welders from two shipyards. The measurement was made from the determination of the permanent field after the subject was magnetized in a low external magnetic field, the values being used for the calculation of the amount of contaminants in the lungs. Less than 4 mg of dust was found in the lungs of nonexposed controls. In the shipyard welders' lungs, after two years of exposure, on the average 7 mg (range 4 -- 15) of welding dust was observed. After a continuous exposure of about 18 years the amounts were 200 mg (range 30 -- 1,500) in shipyard A and 700 mg (150 -- 2,000) in shipyard B, respectively. On the basis of data obtained from retired welders, the clearance rate of 45% in welders from shipyard A and 18% in shipyard B were calculated, the latter figure being probably more accurate. The distribution of contaminants was 52% in the right and 48% in the left lung. The radiological findings correlated well with the amounts of welding fume contaminants measured with the magnetic method.

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- 960/78 Pulmonary Response to Haematite Dust: A Biochemical and Histopathological Study in Guinea Pigs.
A. K. Jaiswal, et al. Ind. Health 15: 117-122, December 1977. 12 refs.

Intratracheal inoculation of 40 mg of haematite dust did not cause any marked change, histological or biochemical, in guinea pig lungs. Presence of the dust in decreasing amounts with lapse of time by analytical methods and its demonstration in the lung and lymph nodes by histopathological techniques point to the existence of an efficient clearance mechanism in vivo in response to haematite dust exposure.

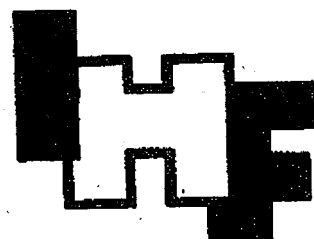
--Authors' abstract

October 1978
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INDUSTRIAL HYGIENE DIGEST

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INDUSTRIAL HEALTH FOUNDATION, INC.
5231 CENTRE AVENUE PITTSBURGH, PA. 15232

INDUSTRIAL HYGIENE DIGEST

Editor: Jane F. Brislin, M.L.S.
Abstractors: Cynthia S. Bryan, B.A.,
Jean L. Collins, B.A.

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occupationally diseased lung tissue was assessed by evaluating the results of an analysis of variance. The personal histories were used as the criteria for classifying the observations (lung concentrations) into groups for the statistical analysis.

--Authors' abstract reprinted by permission

- 1065/78 Welding and Respiratory Hazards. National Safety Council. Natl. Safety News 118: 83-85, July 1978.

Two topics are covered in this article on the respiratory hazards of welding: copper-free welding and hexavalent chromium, a suspected carcinogen.

--CB

- 1066/78 The Adsorption of Biological Macromolecules by Mineral Dusts. R. Desai and R. J. Richards. Environ. Res. 16: 449-464, July 1978. 13 refs.

Evidence is presented that the absorptive capacity of various mineral dusts (asbestos, quartz, treated titanium dioxide samples) for complex mixtures of organic macromolecules (serum proteins, pulmonary surfactant) may be explained as a sum of their specific surface area, which partly determines the amount of material adsorbed, and their surface chemistry, which determines the specificity of binding. Both "weak" and "strong" adsorption reactions were noted with serum proteins, the latter being considered as the most specific for each mineral and perhaps the most important physiologically. The implications of the observed adsorption phenomena to the reaction between mineral particles, organic macromolecules, and cells in vivo and in vitro are discussed.

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- 1067/78 An Early Case of Asbestosis. D. S. Ross. Occup. Health 30: 258-260, June 1978.

The author describes the detection of very early asbestosis in a pipe fitter and discusses the problems of telling the patient of his condition without causing undue alarm. He had not had contact with asbestos until the age of 22. Thereafter he had worked for 10 years repairing boilers. During this period he had been in constant contact with ladders who were either removing or applying vast quantities of asbestos. From the age of 32 onwards he had been in only intermittent contact with asbestos fibres — this was while carrying out repair work, often near asbestos lagging. During the eight years prior to the examination he had worn a gauze mask at work when in contact with asbestos fibres. A presumptive diagnosis of very early asbestosis was made based on X-ray findings, finger clubbing and the history of extensive exposure to asbestos fibres in the ten year period between the ages of 22 and 32.

--Condensed from text

- 1068/78 How the Industrial Physician Can Reduce Mortality from Asbestos-Related Diseases. R. J. Levine. J. Occup. Med. 20: 464-468, July 1978. 64 refs.

Risk indicators for asbestos-related diseases (cancers of the lung, larynx, and alimentary tract; mesothelioma; and asbestosis) and methods of early detection are reviewed and evaluated. The best medical means of reducing mortality from these diseases is to recognize particularly susceptible persons during a preemployment examination, and to recommend that they not be hired for jobs involving asbestos exposure. Workers necessarily exposed to asbestos should be enrolled in a medical screening program and urged not to smoke.

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- 1069/78 Induction of Pulmonary Carcinoma in Rats by Chronic Inhalation of Dust From Pulverized Asbestos Pipe Covering.
B. K. J. Leong, et al. *J. Toxicol. Environ. Health* 4: 645-659, July 1978. 24 refs.

Rats and hamsters were exposed to the dust of pulverized asbestos pipe covering at an average concentration of 85 mg/m³ for 6 h/d, 5 d/wk, for 7 mo, followed by a lifetime observation period. In rats, the pulmonary responses were alveolar adenomatous proliferation, nonprogressive fibrosis, squamous metaplasia, and a substantial incidence of pulmonary carcinoma formation. A smaller group of hamsters exposed under these conditions experienced an earlier onset of mortality than control hamsters, which were not subjected to the exposure regimen. Although this prevented conclusive evaluation of the pulmonary response in this species, no pulmonary neoplasms were noted in the surviving hamsters.

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- 1070/78 Effects of Quartz on Lung Surfactant. S. Gabor, et al. *Environ. Res.* 16: 443-448, July 1978. 38 refs.

The effects of fibrogenic dust on the alveolar lining layer were studied in intratracheally quartz-instilled rats. At intervals of 30, 90, and 180 days following quartz treatment the pulmonary washings showed an increase of surface tension activity. Total lipid, phospholipid, and protein concentrations were significantly higher than those obtained in the two control groups (inert nonfibrogenic dust-treated and dust-free animals respectively). The authors' results suggest that quartz interferes with phospholipid metabolism of the type II alveolar epithelial cells and possibly with protein synthesis in the terminal bronchiole Clara cells.

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- 1071/78 Pulmonary Clearance and Hilar Lymph Node Content in Rats after Particle Exposure.
J. Ferin and M. L. Feldstein. *Environ. Res.* 16: 342-352, July 1978. 8 refs.

The alveolo -- bronchial and the lymphatic pathways are most important in pulmonary clearance of relatively insoluble particles. The authors were interested in studying the effect of the lung burden on the size of the fraction cleared via the lymphatic system. TiO₂ particles, representing the "inert and insoluble" class of particulate matter, were used in rats utilizing both intratracheal instillation and inhalation exposures. After a single exposure about 40-45% of the deposited particles are cleared from the lung in 25 days and about 0.7% are found in the hilar lymph nodes at low exposures. At high exposures lung clearance decreases, in some experiments to zero values, and the lymph node content increases to ~4%. At low exposures both exposure techniques result in similar clearance values; however, the lymphatic node content rises with increased lung burden faster after intratracheal instillation. The possible mechanisms involved are discussed.

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- 1072/78 Labeling of Monodisperse Polystyrene Microspheres with Tightly Bound ⁵¹Cr. R. J. Hinrichs, et al.
Am. Ind. Hyg. Assn. J. 39: 570-575, July 1978. 5 refs.

Monodisperse radioactive polystyrene latex microspheres have been prepared by attachment of chromium-51 to latex spheres. Labeling was by emulsion polymerization of chromium acetylacetonate dissolved in styrene monomer using commercially available microspheres. This was accomplished with two successive polymerization steps: radiation excitation and radical polymerization initiated with potassium persulfate. After attachment of the label the particle suspension was purified by repeated centrifugation wash cycles to remove labile radioactivity. Results indicate a radioactive binding yield of greater than 80% to the particles. The stability of the label was tested in in vivo and in vitro leaching studies. In these tests, the activity leaching rate was estimated to be less than 0.2% per day.

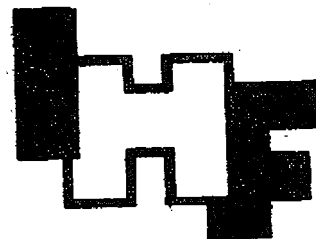
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November 1978
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INDUSTRIAL HYGIENE DIGEST

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INDUSTRIAL HEALTH FOUNDATION, INC.
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INDUSTRIAL HYGIENE DIGEST

Editor: Jane F. Brislin, M.L.S.
Abstractors: Cynthia S. Bryan, B.A.
Jean L. Collins, B.A.

November 1978
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INDUSTRIAL DUSTS AND INHALANTS

- 1191/78 UK Naval Dockyards Asbestosis Study: Radiological Methods in the Surveillance of Workers Exposed to Asbestos. G. Sheers, et al. Brit. J. Ind. Med. 35: 195-203, August 1978. 11 refs.

In a survey of the effects of exposure to asbestos in the UK Naval Dockyards, small- and large-film chest radiographs of 674 men have been examined. These films have been read under survey conditions by two readers using a simple screening classification, and also in a controlled trial by five readers using the full ILO U/C classification. Comparison between the reading methods showed a deficiency, independent of the size of film, of at least 30% in the detection of asbestos-related radiographic abnormalities when the screening classification was used. For adequate diagnostic sensitivity the ILO U/C classification appears to be essential. There was a deficiency of 43% in significant abnormalities observed by a majority of readers in the small films when directly compared with large film readings. This deficiency could be reduced to 7% by using readings of the small films at any level of abnormality by any of the five readers. When the ILO U/C readings were related to the clinical diagnoses, the only abnormality missed was a small pleural plaque. Films with previously agreed coding were inserted at intervals during the reading trial and helped to maintain the consistency of reading. Right oblique views were taken for 1884 men, in addition to the full-sized postero-anterior view, but the contribution provided by this view proved insufficient to justify its use in large surveys. The cost of a survey when small films are used as a screening method is reduced to between one-third and one-half of the cost when large films are used, assuming that the abnormality rate is not more than 5%. However, this cost advantage for small films is likely to be overtaken by the development of automatic large-film units. The radiation dose when small films are used is increased by a factor of about 20, but is within the prescribed safety level. It is concluded that at least three readers should be involved, using the full ILO U/C classification. Small films may be of particular use in a large-scale survey, in which the abnormality rate is expected to be low, and which might otherwise be too expensive. A sensitive reading method and a high standard of film quality are essential factors in the use of this technique.

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- 1192/78 A Review of Asbestos Exposures in Ontario. G. S. Rajhans, et al. Am. Ind. Hyg. Assn. J. 39: 767-771, September 1978. 5 refs.

In order to evaluate whether or not the current Ontario Asbestos Standard of 2 fibers greater than 5 micrometers in length per milliliter of air is technologically feasible, a review of asbestos sampling data available in official records was undertaken. The data are based on samples collected at various dates between 1972 and 1976 using the membrane filter technique. The majority of the membrane filter samples prior to 1974 are area samples, in contrast with later ones, which are personal samples. The results indicate that the level of 2 fibers per milliliter is technologically feasible in the five plants studied. The paper also describes the dust control measures deemed to be adequate in achieving the present Ontario standard for asbestos.

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- 1193/78 Familial Mesothelioma After Intense Asbestos Exposure at Home. F. P. Li, et al.
J. Am. Med. Assn. 240: 467, August 4, 1978. 3 refs.

Mesothelioma is primarily an occupational disease of asbestos workers, but the neoplasm may also develop after intense exposure to asbestos outside the workplace. This report of pleural mesotheliomas in the wife and a daughter of an asbestos handler suggests that gross asbestos contamination of the home can be a serious health hazard.

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- 1194/78 Malignant Mesothelioma and Gas-Mask Assemblers. D. B. Jefferys and J. A. Vale.
Brit. Med. J. 2: 607, August 26, 1978. 5 refs.

Since the relation between malignant mesothelioma and asbestos exposure was first described in 1960 there have been several studies of groups exposed to asbestos. Jones reported the incidence of mesothelioma at three factories which assembled service respirators containing blue asbestos and charcoal fibres during the second world war. To date, 50 workers at these factories have developed a mesothelioma. Apparently there are no reports of mesothelioma after the assembly of gas masks in the first world war. The authors describe one such patient, who assembled masks in the 1914-18 war, and another case in a man who was briefly employed at a mask assembly plant in Leyland, Lancashire, in the second world war.

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- 1195/78 On the Substantiation of Maximum Permissible Concentrations of Silica-Containing Condensation Aerosols.
L. M. Petin. Gig. Trud. Prof. Zabol. (6): 28-33, 1978. 7 refs. (Russian).

It has been confirmed that in the condensation aerosols generated in the course of electrothermal processes the content of free silica subsides parallel with its diminishing content in the melted stock, but is much higher than in the latter, being represented pre-eminently by the amorphous variety. As evidenced, a mounting silicon content in the smelted ferrosilicon is attended by an increasing degree of the developing aerosol dispersion and solubility of its particles with their subsequent lesser accumulation in the lungs. In spite of this, the greatest silicotic changes in the lungs of the rats during chronic inhalation produces aerosol with the highest content of free SiO_2 (82.9 per cent), these changes being even more intensive than with an analogous inhalation of the quartz dust (89.9 per cent of free SiO_2). On the ground of a comparative assessment of the fibrogenous nature of quartz dust and 3 condensation aerosols of the ferrosilicon production containing different percentages of silica correction to the existing maximally permissible concentrations are proposed.

--Author's summary in English

- 1196/78 Bacterial Contamination of Cotton and Cotton Dust and Effects on the Lung. R. Rylander and M. Lundholm.
Brit. J. Ind. Med. 35: 204-207, August 1978. 20 refs.

Bacterial contamination of various parts of the cotton plant and of cotton from different mills was investigated. The predominant bacterial species were Gram-negative rods mainly of the Enterobacter genus. When guinea pigs inhaled strains of these bacteria cultivated from cotton, a strong leucocyte mobilising capacity was found for Pseudomonas and Enterobacter but not for Agrobacterium or Bacillus species. The aetiology of the development of pulmonary symptoms after inhalation of bacteria-containing dusts and subsequent production of endotoxins is discussed.

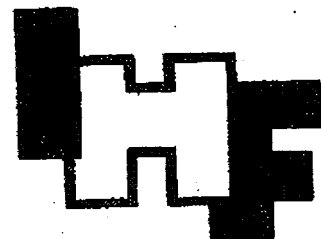
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INDUSTRIAL HYGIENE DIGEST

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INDUSTRIAL HEALTH FOUNDATION, INC.
5231 CENTRE AVENUE PITTSBURGH, PA. 15232

INDUSTRIAL HYGIENE DIGEST

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1234/78x NIOSH Manual of Analytical Methods. Second Edition. Volume 4.

National Institute for Occupational Safety and Health. Single copies available at no charge.

Send self-addressed mailing label to: Publications Dissemination, NIOSH, 4676 Columbia Parkway, Cincinnati, OH 45226. v.p. (1978). DHEW (NIOSH) Publication Number 78-175.

This fourth volume of the NIOSH Manual of Analytical Methods contains 60 environmental monitoring methods. These NIOSH sampling and analytical procedures give step-by-step information and instructions on how to monitor for toxic chemicals found in the workplace. All but one of the methods is designed for personal air monitoring to determine exposures to individual workers. The majority of the methods have been validated using the protocol developed under the joint NIOSH/OSHA Standards Completion Program. The other methods have been only partly evaluated and are presented for your information and trial use.

--Author's abstract

1235/78x Asbestos-Related Disease. L. Preger, et al.

Available from: Gruen & Stratton, 111 Fifth Avenue, New York, NY 10003. 271 p. (1978). Price: \$24.00.

A voluminous literature on asbestosis and its complications has appeared during the past three decades. Asbestos-Related Disease brings together this growing body of information about the radiographic and clinical manifestations of asbestos exposure and inhalation. The book coordinates a vast amount of previously scattered information by presenting it in a systematic, easily accessible form. Sections on radiographic techniques are combined with a section on the clinical management of patients with objective evidence of asbestos exposure. A major feature of the book is the close attention paid to a correlation of the epidemiologic, pathogenetic, pathological, roentgenologic, and clinical manifestations of asbestos-related disease. The illustrations, of uniformly high quality, reveal changes that are often subtle and extremely difficult to reproduce. The inclusion of a number of computed tomographic scans provides a new dimension in illustration. Where appropriate, reference is made to the use of ultrasonography and scintiphotography in the study of the disease.

--Publishers' release

1236/78x Biochemical Effects of Environmental Pollutants. S. D. Lee and B. Peirano, editors.

Available from: Ann Arbor Science Publishers, Incorporated, 230 Collingwood, P.O. Box 1425, Ann Arbor, MI 48106. 478 p. (1977). Price: \$28.00.

The primary purpose of this book is to emphasize the necessity of understanding the biochemical effects of environmental pollutants. Early detection of biochemical lesions that are related to subsequent changes in structure and physiology is imperative to the assessment of environmental hazards that produce disease in human populations. Major topics discussed include: trace metal and oxidant pollutant toxicology, the interaction of nutritional factors in modifying the effects of toxic substances, the multiplicity of mechanisms that will interfere with particular systems, specific interactions between environmental chemicals, the development of tolerance following exposure, and the variation of response among individuals. This book will provide invaluable information to biochemists, toxicologists, environmental and public health professionals, and to all those concerned with the degenerating quality of the environment and human health.

--Publishers' release

- 1240/78 Mortality in Unionized Truck Drivers. R. V. Luepker and M. L. Smith.
J. Occup. Med. 20: 677-682, October 1978. 12 refs.

To determine occupational mortality in the Central States Teamster population, all death certificates for a three-month period in 1976 were collected and coded. With the exception of respiratory tract cancer and motor vehicle accident deaths, mortality rates were lower than those found in the U.S. population and comparable to those found in other employed populations. It was not possible to separate the effect of cigarette smoking from environmental exposure to explain the excess respiratory tract cancer death. Unexpectedly, the majority of accident mortalities occurred away from work rather than at work.

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- 1241/78 The Comparability of Chest X-Ray Interpretations and Pulmonary Function Test Results by Different Observers.
R. J. Halen. J. Occup. Med. 20: 670-674, October 1978. 1 ref.

A comparison of interpretations of chest x-ray findings on the same subject by different observers utilizing the ILO/UC classification of the pneumoconioses indicates that substantial differences of opinion about the presence or absence of pneumoconiosis and its extent can occur. The lack of randomness of major differences between readers and the relatively recent adoption of this classification method in this country suggests that further educational efforts may reduce discrepancies between readings. Differences between one visit results of selected pulmonary function tests by different examiners of the same subject support the wisdom of cautious interpretation and application of isolated observations.

--Condensed from author's conclusion

- 1242/78 In-Plant Evaluation of the Muscle Strength of Workers. E. Kamon and A. J. Goldfuss.
Am. Ind. Hyg. Assn. J. 39: 801-807, October 1978. 12 refs.

The static muscular strength of the back extensors, arm flexors and hand grip were measured on industrial workers (463 men and 139 women) involved in physically demanding jobs. No significant differences in strength were found among workers on different jobs. However, strength differences were evident with respect to age and sex: women were about 60 percent as strong as men, and men below 31 years of age were stronger than men above this age.

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- 1243/78 Malignant Mesothelioma: Current Status and Future Prospects. J. Aisner and P. H. Wiernik.
Chest 74: 438-444, October 1978. 97 refs.

A number of leads have been generated from the reports on malignant mesotheliomas over the past years. Epidemiologic data have allowed us to link this disease to industrial and environmental exposure to asbestos and, thus, identify a particular population at risk. Pathologic studies have enabled us to develop specific criteria for the histologic identification of this tumor. Diagnostic studies have developed criteria that can be utilized to find and follow the course of this disease. Finally, there have been many reports of attempts to treat malignant mesothelioma, most of which have been applied to relatively small groups of patients. Although no definitive treatment is available to date, analyses of these studies can give us important leads to pursue for future investigational efforts. These include combining one or more of the methods discussed into prospective studies.

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tidal volume in the determination of pulmonary uptake of O_3 in man is examined. The consistency and similarity of the dose curves for the three species lend strong support to the validity of extrapolating to man the results obtained on animals exposed to O_3 .
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- 1273/78 Biological Effects of Chrysotile After SO_2 Sorption. II. Effects on Alveolar Macrophages and Red Blood Cells.
M. C. Jaurand, et al. Environ. Res. 17: 216-227, October 1978. 36 refs.

An experimental study has been carried out using different biological and biochemical in vivo and in vitro tests for assessing the toxicity of natural UICC (A) chrysotile and SO_2 -sorbed UICC (A) chrysotile and for detecting a possible synergistic effect. For in vivo studies, rabbits received an intratracheal injection of chrysotile fibers suspended in physiological saline (PS). The control group received only PS; all animals were sacrificed after 68 hr. The alveolar free cells were harvested by pulmonary lavage. The results have shown that chrysotile induces a decrease in the free cell population but there was no significant difference in the number of viable cells or in the nature of cells harvested between the two chrysotile groups. Enzymatic activities of the alveolar macrophages from animals injected with SO_2 -sorbed chrysotile showed a significant increase of the enzymes LDH and acid phosphatases. The LDH increase could be related to the affinity of the enzyme regarding some chemical forms of SO_2 . In vitro studies using alveolar macrophages harvested by pulmonary lavage have shown no differences between the two chrysotile groups when cell viability and enzyme release were studied. The toxic effect was due to chrysotile fibers (decrease of 38% in cell viability and increase in cellular enzyme release when compared with control). When rabbit red blood cells were used, both natural and SO_2 chrysotile fibers showed the same hemolytic activity. The failure to detect high differences between the two chrysotile groups may be related to the chemical form of sorbed SO_2 .
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- 1274/78 Effects of Asbestos on Epithelioid Cell Lines. A. I. Neugut, et al.
Environ. Res. 17: 256-265, October 1978. 29 refs.

The in vitro effects of asbestos fibers on the growth and viability of CHO cells, an epithelioid cell line derived from Chinese hamster ovary, and on K-22 cells, an epithelial cell line derived from rat liver, have been studied. Relatively low concentrations of asbestos (10 $\mu\text{g/ml}$) were quite cytotoxic to both cell types. A sample of chrysotile asbestos was more toxic than samples of crocidolite or amosite. The toxic factor could not be extracted from the asbestos and toxicity occurred only if there was physical contact between the fibers and the cells. Although the phorbol ester class of tumor promoters induces the synthesis of plasminogen activator in various cell cultures, asbestos did not induce this protease in epithelioid or fibroblast cell cultures. The results obtained are compared to previous in vitro results obtained with fibroblast or macrophage cultures and are discussed in terms of their possible relevance to asbestos-induced fibrosis and tumorigenesis.
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- 1275/78 The Consistency of the Gravimetric and Impinger Methods in Evaluating Hazardous Dusty Conditions.
B. Samimi, et al. Am. Ind. Hyg. Assn. J. 39: 817-824, October 1978. 6 refs.

The questions addressed in this paper are: 1) in dusty conditions where both Impinger and Gravimetric Sampling methods can be used, such as in the case of silica bearing dusts, which of the two methods (considering the TLV's) would be more sensitive in detecting hazardous concentrations? and 2) what is the consistency of the two methods in monitoring dusty conditions? The Midget Impinger technique has the least accuracy, and may fail in evaluating