

PLAINTIFF'S EXHIBIT

IHF-507

I H F

1965 - 1972

207

Volume II

1) Abstracts

1965-1976

2) Pneumomoniasis abstracts

3) IHF Digests

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT NUMBER		34.1		2/65		FC		FILE NUMBER 753	
AUTHOR: W. J. Williams									
TITLE: Asbestosis and Lung Cancer									
ORIG. REF.:		VOL.		PP.		DATE		ABST. REF.:	
Arch. Envir. Health		10		44-45		Jan. 1965			
ABSTRACT									

This report records 52 American cases of asbestosis among whom there were 10 patients with malignant tumors, an incidence similar to that reported in Britain. There are 17 references.

-- Author's conclusion

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ABSTRACT
NUMBER

DATE

FILE NUMBER

1/66

72

NEC

753

AUTHOR: P. C. Elmes, W. T. E. McCaughy, and O. L. Wade.

TITLE: Diffuse Mesothelioma of the Pleura and Asbestos.

ORIG. REF.	VOL.	PP.	DATE	ARCH. REF.	VOL.	PP.	DATE
Brit. Med. J.	1	350	Feb. 6, 1965	J. Occ. Med.	7	541	Oct. '65

ABSTRACT

Mesothelioma of the pleura is an uncommon tumor and, in recent years, studies have indicated a relationship of this tumor to exposure to asbestos. The occupational histories of 42 patients with diagnosed mesothelioma were contrasted to 42 control patients with regard to their exposure to asbestos. Thirty-two of the 42 patients with diagnosed mesothelioma had a history of exposure to asbestos which was considered to be heavy exposure in eight and a light exposure in 24. In the 42 control patients there was a history of exposure in only nine, and in two of these it was considered heavy. The difference between these two groups was highly significant. In another study it was shown that the finding of asbestos bodies in lung tissue was significantly related to the history of industrial exposure to asbestos. When the lungs of 24 patients with diagnosed mesothelioma were examined for the presence of asbestos bodies, 21 of the 24 patients showed this finding. In contrast, asbestos bodies were found in only six of the 24 controls, a highly significant difference. The occupational histories of these patients revealed that the interval between the first exposure to asbestos and the diagnosis of mesothelioma was often long and in some cases exceeded 40 years. Exposure to asbestos, even though many years before and transient, is an important factor in the development of mesothelioma of the pleura. -- J. Occ. Med. Abstr.

MELLON INSTITUTE, PITTSBURGH, PA.

NUMBER		DATE		FILE NUMBER	
		12/12		753	
AUTHOR: J. F. Cordova, H. Tesluck and K. P. Knudtson					
TITLE: Asbestosis and carcinoma of the lung.					
ORIG. REF.	VOL.	PP.	DATE	ABSTR. REV.	DATE
Cancer	15	1181	Nov. - Dec. 1962	JAMA	182
					229 P 11/10/62
ABSTRACT					
Eleven cases of asbestosis associated with carcinoma of the lung are presented. A known exposure to asbestos dust was obtained in 7 of these cases. In 2 cases, evidence is presented for multifocal origin of the malignant tumor. The relationship of asbestos bodies as a carcinogen in the production of lung cancer is discussed. --J. Am. Med. Assn. References & Reviews					

ABSTRACT
NUMBER

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73

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753

FILE NUMBER

AUTHOR: I. J. Selikoff, J. Churg, and E. C. Hammond.

TITLE: Relation Between Exposure to Asbestos and Mesothelioma.

QNO. REC'D.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
New Engl. J. Med.	274	560	Mar. 18	J. Occ. Med.	7	542	Oct. '65
			1965				

Ten deaths due to mesothelioma were found in a study of 307 consecutive deaths among asbestos-insulation workers in New York and New Jersey. There were four pleural mesotheliomas (1.3%) and six peritoneal mesotheliomas (1.9%). This is probably an underestimate of the true incidence, since, of the remaining 297 deaths, only 110 cases were autopsied. These figures can be contrasted to a prospective study of the American Cancer Society in which only three deaths due to mesothelioma were noted in 31,652 deaths of patients between 30 and 89 years of age. In an autopsy series of 2,500 deaths, asbestosis was found in 26. There were four mesotheliomas of the pleura, three mesotheliomas of the peritoneum, and seven bronchogenic carcinomas recorded in the patients with asbestosis. No mesotheliomas were found in the absence of asbestosis. Cases of diagnosed mesothelioma from the files of the Armed Forces Institute of Pathology were reviewed and in all cases where lung tissue was available it was examined for asbestos fibers. Asbestos fibers were found in five of the 19 pleural mesotheliomas and in 17 of the 26 peritoneal mesotheliomas. This is probably an underestimate of the true incidence of asbestosis among cases of mesothelioma in the United States since very little lung tissue was available for review and only asbestos bodies and not asbestos fibers were looked for. Mesothelioma should be added to the neoplastic risks of exposure to asbestos along with cancer of the lung (53 of 307 deaths) and of deadly cancer of the stomach (34 of 307 deaths).

-- J. Occ. Med. Abstr.

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT NUMBER	DATE	FILE NUMBER
16-7	7/1/65	NFC 752

AUTHOR: H. B. Eisenstadt

TITLE: Benign Asbestos Pleurisy

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
J. Am. Med. Assn.	192	419-421	May 3, 1965				

ABSTRACT: Reprint requests to 2301 Procter St., Port Arthur, Texas.

(Dr. Eisenstadt)

Benign Asbestos Pleurisy. H. B. Eisenstadt.
J. Am. Med. Assn. 192, 419-421 (May 3, 1965).

The clinical picture of benign asbestos pleurisy differs greatly from that of classical asbestosis. It may occur in the absence of significant pulmonary disease and respiratory dysfunction. This entity must be considered in the differential diagnosis of any form of idiopathic pleurisy. The history of exposure to asbestos will aid in directing the attention to this entity; however, the final diagnosis depends on a lung tissue specimen containing asbestos corpuscles or asbestos fibers.

-- Author's summary

AUTHOR: D. Cauna, R. S. Totten and P. Gross

TITLE: Asbestos Bodies in Human Lungs at Autopsy

ORIG. REF.	VOL.	PP.	DATE	ABST'D. REF.	VOL.	PP.	DATE
J. Am. Med. Assn.	192	371-373	May 3, 1965				

ABSTRACT

Asbestos Bodies in Human Lungs at Autopsy. D. Cauna, R. S. Totten, and P. Gross. J. Am. Med. Assn. 192, 371-373 (May 3, 1965). Reprints Available from Industrial Hygiene Foundation Upon Request.

The incidence of asbestos bodies in the lungs was investigated in 100 autopsies of adults. Lung smears were taken from the sectioned surfaces of the upper and lower lobes of both lungs. The slides were dried and mounted without staining, and approximately 400 low-power fields were examined in each slide. Routine histological sections of unexpanded lungs were also examined in all cases. Asbestos bodies were found in 41% of the subjects. They were not encountered in persons up to 24 years of age. Among males the incidence was 47%, and in females 34%. Although significant microscopic pulmonary fibrosis was encountered in two positive cases, no instance of classical asbestosis was found. Mesothelioma of the pleura was not encountered. Primary lung carcinoma occurred in one patient with asbestos bodies at autopsy without.

-- Abstracted from

ABSTRACT
Number

DATE
4/66

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752

AUTHOR: F. M. Kogan, A. A. Cerasimenko, and G. I. Bunimovich.

TITLE: Certain Immunobiological Shifts in Asbestosis.

ORIG. PUBL.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Gigiena i Sanit.	30	34-40	May '65	APCA Absts.	1	6	Jan. '66
Russian							

ABSTRACT

Long-term inhalation of asbestos dust brought about a fall of the immunobiological reactivity of the body and, probably, its allergic responses. There was a most distinct inhibition of the complement titer. The changes of the complement titer preceded the onset of clinical and x-ray symptoms of pneumoconiosis. The study of the immunobiological reactivity of persons sick with asbestosis, caused by the inhalation of chrysotile-asbestos and anthophyllite-asbestos showed that in the first case the reactivity was inhibited to a greater extent. This was noted in the clinical course of asbestosis as well. Persons sick with asbestosis and those working under conditions of high dust content of the air presented lesions peculiar to auto-immunologic disease: rise in the alpha-globulin content and anti-complement activity of the serum.

-- APCA Absts.

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT
Number

DATE

FILE NUMBER

FC

753

AUTHOR: International Union Against Cancer

TITLE: Asbestos and Cancer. The Report and Recommendations of a Working Group Convened Under the Auspices of the Geographical Pathology Committee of the International Union Against Cancer.

ORIG. REF.	VOL.	DATE	PAGE
Can. Med. Assn.	92	1020-1025	May 8, 1965

ABSTRACT

Asbestos and Cancer. The Report and Recommendations of a Working Group Convened under the Auspices of the Geographical Pathology Committee of the International Union Against Cancer. Can. Med. Assn. J. 92, 1020-1025 (May 8, 1965).

This report is not suitable for abstracting, however the Editor of the Canadian Medical Association Journal summarizes the purpose and work of this international meeting as follows: "In October 1964, the New York Academy of Sciences sponsored an international meeting on the biological effects of asbestos. Following this meeting, some 40 delegates from Australia, Canada, Finland, France, Germany, Great Britain and Ireland, Italy, South Africa and the United States were invited to study the vast amount of information which had been presented with a view to the organization of an international study of asbestos and cancer. The terms of reference of this Working Group covered three major aspects of the problem: epidemiology, pathology and experimental pathology, and physics and chemistry. The findings of the Working Group and their recommendations arising from these studies are recorded, at length, in the attached form.

-- Cond. from Editor's summary

MILLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT NUMBER	DATE	FILE NUMBER
	4/66	NEC 752
AUTHOR J. M. C. Davis.		
TITLE Electron Microscope Studies of Asbestos in Man and Animals.		
ORIG. REF.	VOL.	DATE
Med. Javaro	56	521-522 June
		July
		APCA Absts.
		11 6 Jan. '65
ABSTRACT 1965		

In both guinea pig and human lung material the formation of asbestos bodies has been shown to be an intracellular process. The first sign of asbestos body formation is the accumulation of dense granules approximately 60 Å in diameter around the asbestos fiber. It is suggested that these granules represent ferritin material. Usually the asbestos body coating consists of a single dense layer of ferritin, but often a whole series of layers of varying density is present. The outermost zone of these bodies often consists of an irregular layer of radially arranged fibrous material but occasionally the whole body coat consists of these fibers which have a diameter of 50-60 Å. From the evidence of this study it would appear that the well known segmentation of asbestos bodies can be of two types. In one the segmented appearance is due to a deposition of the body coating in separate globules, and in the other it is due to a deposition of a previously formed coat.

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752

AUTHOR: K.F.W. Hinson.

TITLE: Cancer of the Lungs and Other Diseases After Exposure to Asbestos Dust.

ORIG. REF.	VOL.	PAGE	DATE	ANSTR. REF.	VOL.	PAGE	DATE
Brit. J. Diseases	59	121-129	July 1965	APCA Absts.	12	6	June 1966
Chest							

ABSTRACT

That exposure to the fibers of asbestos may cause a disabling and fatal fibrosis of the lungs has been recognized for many years. That patients with an established fibrosis (asbestosis) have a high incidence of bronchial carcinoma is also known. During the last few years there has been an accumulation of evidence to suggest that certain pleural or peritoneal tumors may be associated with a slight, and therefore possibly unrecognized, exposure to these minerals. The world production of asbestos has been increasing rapidly since 1959 and its industrial uses are becoming more varied. Three varieties of asbestos are most often used industrially: chrysotile (white asbestos) crocidolite (blue asbestos), and amosite. In Great Britain, exposure to asbestos dust might be to any or all three of the above kinds of asbestos; on the North American Continent it would probably be to chrysotile because of the huge native deposits found in Canada. The author discusses briefly the pathogenesis of asbestos, but dwells much more on the possible relationship of asbestos exposure and pleural tumors and tumors of the peritoneum. He also reviews the literature concerning the probable association between asbestosis and carcinoma of the lungs. Mentioned are the findings of J.G. Thomson and his co-workers (Industrial Hygiene Digest, Abst. 663, July 1963) of the high incidence (26.4%) of asbestos bodies found in the lung fluid of 500 consecutive autopsy subjects in South Africa. One of the authors of the paper on those findings is said to consider that the incidence in Miami, Florida, would be even higher.

-- APCA Absts.

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT
NUMBER 1114
DATE
NFC 753

AUTHOR: Geographical Pathology Committee of the International Union Against Cancer (UICC)
TITLE: Report and Recommendations of the Working Group on Asbestos and Cancer.

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Brit. J. Ind. Med.	22	165-171	July, 1965				

ABSTRACT

The Geographical Pathology Committee of the International Union Against Cancer (UICC) convened a Working Group on October 22 to 23, 1964 in New York to discuss evidence of an association between exposure to asbestos dust and cancer. Forty delegates from eight countries attended, and separate panels on epidemiology, pathology and experimental pathology, and physics and chemistry met and, at the final session, under the chairmanship of Dr. Harold Stewart (USA) prepared the Report and Recommendations published in the present article.

-- Preface to paper

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ABSTRACT NUMBER	DATE		NFC.	P.O. #
0766	'77			

AUTHOR H. L. Hardy.

TITLE Asbestos Related Disease.

CMD. REF.	VOL.	PP.	DATE	ASSTY REFS.	VOL.	PP.	DATE
Am.J.Med.Sci.	250	381-389	Oct.'65	APCA Absts.	12	6	June'66

ABSTRACT

Four cases of asbestos related disease have been briefly described. Together with past and presently accumulating evidence, epidemiologic and experimental, these cases illustrate the potential hazard posed by asbestos exposure to both worker and neighbor. The purpose of this report is to interest clinicians in the harmful biologic effects of asbestos already documented. Evidence is impressive that asbestos exposure, often delayed in effect, will in the future be responsible for an important amount of pulmonary disease, especially chest tumors. In addition new evidence points to asbestos exposure as being significantly associated with abdominal tumors as well.

-- APCA Absts.

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71

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752

Author: Muriel L. Newhouse and Hilda Thompson.

Title: Mesothelioma of Pleura and Peritoneum Following Exposure to Asbestos in the London Area.

ORIG. EXPL.	VOL.	NO.	DATE	ABST. REF.	VOL.	NO.	DATE
Brit. J. Ind. Med.	22	261-269	Oct. '65				

A series of 83 patients from the London Hospital with a diagnosis of mesothelioma confirmed by necropsy or biopsy has been studied for possible exposure to asbestos. The series consisted of 41 men and 42 women; 27 of the patients had peritoneal and 56 pleural tumors. The earliest death recorded was in 1917, but only ten of the series died before 1950 and 40 (48%) between 1960 and 1964. In 76 of the series full occupational and residential histories were obtained. Forty (52.6%) gave a history of occupational or domestic (living in the same house as an asbestos worker) exposure to asbestos compared with nine (11.8%) out of 76 patients from the same hospital suffering from other diseases ($P < 0.001$). None of the 17 suspected cases of mesothelioma, rejected on pathological grounds, was found to have had any exposure to asbestos. There was also evidence that neighborhood exposures may be important. Among those with no evidence of occupational or domestic exposures, 30.6% of the mesothelioma patients and 7.6% of the in-patients with other diseases lived within half a mile of an asbestos factory ($P < 0.01$). Out of the 31 patients with occupational exposures only ten were in jobs scheduled under the Asbestos Regulations of 1931. The interval between the first exposure and the development of the terminal illness of mesothelioma ranged between 16 and 55 years. In 47 patients in the mesothelioma series, lung tissue or sputum was available for examination. In 30 (62.5%) either asbestos bodies or asbestos bodies were present.

-- Author --

MELLON INSTITUTE, PITTSBURGH, PA.

CLASSIFIED SUBJECT

4/66

FELLOWSHIP
NUMBER

FILE NUMBER
752

AUTHOR: New York Academy of Sciences.
AUTHOR'S POSITION AND ADDRESS: Physiological Effects of Asbestos.

TITLE: Available from: N. Y. Acad. of Sci., 2 East Sixty-third St., N. Y., N. Y.
10021

PUB. DESIGNATION
AND SERIAL NO.,
PLACE PUBLISHED
AND PUBLISHER

REVIEWED IN:

VOL.

PP.

DATE

EDITION:

DATE: Dec. 3, 1965

PRICE:

PAGES: 766

DISCUSSION (P.P.):

GRAPHS:

GENERAL:

THEORETICAL:

ECONOMIC:

ADMINISTRATIVE:

EXCELLENT:

REFERENCES:

MAPS:

REVIEW:

MATHEMATICAL:

ADMINISTRATIVE:

GOOD:

FAIR:

CONCLUSIONS:

COST DATA:

POPULAR:

EXPERIMENTAL:

PROPAGANDA:

USELESS:

FOR PURPOSE:

TABLES:

INDEX:

ORIGINAL:

STATISTICAL:

CALL NO.:

ABSTRACT:

This series of papers is the result of a conference held by the New York Academy of Sciences on the same subject (October 19-21, 1964), covering the following general areas: Asbestos Materials in Modern Technology; Lung Tissue and Mineral Matter: Problems of Pathogenesis; Human Exposure to Asbestos; Industrial Populations, Community Studies, Dust Controls and Standards; Clinical Studies of Pulmonary Asbestosis; Asbestos and Neoplasia: Experimental, Epidemiology, and Diffuse Mesothelial Tumors; and Problems and Perspectives. Appendix I presents the findings of the working group on Asbestos and Cancer, under the general headings of Epidemiology, Pathology, Physics and Chemistry. It is recommended that the relationship of different types of asbestos and tumorigenesis be studied in exposed populations on an international basis; that the importance of dosage (concentration and duration of exposure) be evaluated; and that the question of progression following removal from exposure be studied with

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SUBMITTED:

BY:

ABSTRACT

PURPOSE
OF SEARCH:

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consideration of cancer mortality as well as morbidity from asbestosis in populations not exposed to the dust. Conversely, all cases of diffuse mesothelial tumors of pleura and peritoneum should be investigated by standardized pathological techniques for presence of asbestos to establish any association with asbestos or other factors. Criteria for pathological diagnosis are discussed. Hyaluronidase is mentioned as being often present in mesothelial tumors and where present is a valuable diagnostic aid, but as it is not invariably found in histochemical and chemical tests in the presence of mesothelioma, it should not be the sole diagnostic criterion. Other diagnostic pitfalls, such as encountered in use of exfoliative cytology and tissue culture are also mentioned. Need for more precisely planned experimental studies is emphasized and recommendation is made for creation of pathology reference panels to help establish standards for pathological classification. Appendix 2 reviews in detail the status of compensation for dust diseases of the lungs under State Workmen's Compensation laws. The cost of dust diseases is heavy when compared to the cost of all occupational disease, but not in comparison to the total for all accidental injuries and occupational diseases combined. Correction of certain inequities in payment of medical benefits and compensation of workers with occupational diseases is recommended. Appendix 3 presents in tabular form statistics on asbestos production, updating data in the U.S. Bureau of Mines Information Circular of 1959 to 1962 and data on other countries up to 1963 is present.

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752

AUTHOR: G. Naegelschmidt.

TITLE: Some Observations of the Dust Content and Composition in Lungs With
Asbestosis, Made During Work on Coal Miner's Pneumoconiosis.

Curr. Ref.	VOL.	PP.	DATE	ASTN. REF.	VOL.	PP.	DATE
Ann. N. Y. Acad. Sci.	132	64-76	Dec. 31, 1965	APCA Absts.	12	7	June '66

ABSTRACT:

In the conclusion of this paper it is said that the most interesting result of this study of lung tissue from asbestosis sufferers, was that in over half the lung tissue samples from Great Britain and South Africa practically no asbestos at all was found, irrespective of the grade of fibrosis. It is unlikely that this was due to faulty technique although further study of the technique of recovery of asbestos, especially of chrysotile, from lungs is undoubtedly required. It is likely that this effect—the disappearance of asbestos from the lungs—is real and needs to be explained. The most likely explanation is that asbestos does get dissolved in the lungs. The process of dissolution is likely to start with a removal of the cations, magnesium, sodium, iron, and aluminum, which would leave a skeleton of hydrated silica or polysilicic acid. On physiochemical and structural reasoning one would expect chrysotile to be most easily attacked, crocidolite to be intermediate, and amosite to be the most resistant form. The finding of amosite only in some of the lung residues would be in agreement with such reasoning. The most prevalent type of fibrosis seen in asbestos is a diffuse interstitial fibrosis, in contrast to focal or nodular lesions

found initially in most other forms of pneumoconiosis. At a later stage massive lesions may develop. A theory linking this contrast with lung dust studies has been advanced (Nagelschmidt, 1960). According to this theory the dust remaining in the lungs causes the fibrosis in coal workers and similar forms of pneumoconiosis, and a positive correlation between amount of dust and severity of fibrosis or x-ray category of simple pneumoconiosis is found. The amounts of dust in the lungs are large and may average 50gm. for advanced stages of coal workers pneumoconiosis. In diffuse interstitial fibrosis, as seen mainly in aluminosis and asbestosis, this does not seem to be the case; the amounts of asbestos found in the lung are very small and are not clearly related to grade of fibrosis; dissolution of the dust is the most likely explanation. Similar views with regard to the action of chrysotile have already been expressed. Further research is obviously required before the mechanism by which asbestosis is produced can be said to be known.

-- APCA Absts.

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT
NUMBER

10/66

DATE

NFC

FILE NUMBER
752

AUTHOR: J. C. Wagner.

TITLE: The Sequelae of Exposure to Asbestos Dust.

ORIG. EXPL.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Am. N. Y. Acad. Sci.	132	691-699	Dec. 31, 1965	APCA Absts.	12	2	July '66

ABSTRACT

The sequelae of exposure to asbestos dust, include its inhalation, deposition, and the results of subsequent retention. The actual type of asbestos dust to which an individual is exposed depends upon the environment in which he works or lives and his occupation. It is necessary to know the mineralogical variety of asbestos and its contaminants, whether they come from the mines, mills, method of transport, or additives used in industry. The preliminary results of several experiments in which tumors have been obtained in experimental animals have been presented. In these studies a variety of dusts were inoculated into animals of several species. The yield of tumors is high but the dose of intrapleural dust is very large compared with the amount present in man. Experiments show that standard dusts from the different types of asbestos are required to establish a base line. This applies to dusts from all animal experiments, chemical analyses, and other investigations.

-- APCA Absts!

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT NUMBER	DATE	FILE NUMBER
9/66	891	752
AUTHOR. P. F. Holt, J. Mills, and D. K. Young		
TITLE. Experimental Asbestosis With Four Types of Fibers. Importance of Small Particles.		
ORIG. REF.	VOL.	PP.
Ann. N. Y. Acad. Sci.	182	87-97
DATE	Dec. 31, 1965	APCA Absts.
VOL.	12	6
DATE	June 1966	
ABSTRACT		

The guinea pig lung reacts immediately to inhalation of asbestos dust. There is a bronchiolitis with extension of the inflammatory reaction to the adjacent alveoli. At a later stage there is a widespread and progressive fibrosis of the lung, adenoid proliferation of the bronchiolar epithelium, and reticulosis and fibrosis of the tracheal lymph glands. The inhaled dust early becomes coated with an iron-containing protein to form asbestos bodies. These have been recognized within seven days of exposure to the dust. Fine dust particles, too small to be seen under the light microscope, will produce asbestosis in the guinea pig. The difficulty of controlling the spread of dust has been demonstrated.

-- APCA Absts.

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT
NUMBER

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FILE NUMBER

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752

AUTHOR: L.J. Selikoff.

TITLE: The Occurrence of Pleural Calcification Among Asbestos Insulation Workers

ORIG. ACCESSION	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Am. N.Y. Acad. Sci.	134	351-367	Dec. 1965	APCA Absts.	12	6	July 66

ABSTRACT:

Roentgenographic study of 1,117 asbestos insulation workers showed pleural calcification to be a common finding, and 150 instances of such calcification were present. Data are presented which demonstrates that pleural calcification among workers exposed to asbestos in this trade rarely occurs in less than 20 years from onset to exposure. Pleural calcification was found in five of 725 asbestos insulation workers with less than 20 years from beginning work with asbestos. The pleural calcification is primarily found in the parietal pleura, more heavily, in the lower portions of the chest. Data concerning correlations with pleural fibrosis and asbestotic parenchymal fibrosis are given. Pleural calcification not infrequently is present in the absence of radiologically visible parenchymal fibrosis. The finding of calcification as described generally indicates asbestos exposure more than 20 years.

-- APCA Absts.

MELLON INSTITUTE, PITTSBURGH, PA.

NUMBER

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FILE NUMBER
752

AUTHOR: J. G. Wagner and J. W. Skidmore.

TITLE: Asbestos Dust Deposition and Retention in Rats.

ORIG. RECD.	VOL.	PP.	DATE	ASBEST. REFS.	VOL.	PP.	DATE
Ann. N.Y. Acad. Sci.	132	77-86	Dec. 31 1965	APCA Absts.	12	8	June '66

ABSTRACT

A method of producing asbestos dust clouds has been devised and an animal inhalation experiment carried out to test it. Observations on the histological distribution of the dusts in the lungs of the rats have shown that the dusts tend to accumulate in the alveoli arising directly from the respiratory bronchioles. The weights of the asbestos dusts found in the lungs of the rats at the end of exposure were found to differ considerably, but the subsequently determined elimination rates indicated that the weights of dust deposited were in a constant ratio with the weights of dust collected by the size-selective sampler. To deposit an equal amount of a nonfibrous dust, allowance must be made for the reduced efficiency of the upper respiratory tract in preventing the penetration of the compact dust particles to the alveolar regions. The elimination rate of Rhodesian chrysotile has been found to be three times greater than that of amosite and crocidolite, which suggests an explanation for the previously observed reduced fibrogenicity of this dust. The reason for the difference in the elimination rate remains to be determined.

-- APCA Absts.

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT NUMBER	DATE	FILE NUMBER
	7/66	NFC 752
AUTHOR: V. Timbrell.		
TITLE: The Inhalation of Fibrous Dusts.		
ORIG. REF.	VOL.	PP.
Ann. N. Y. Acad.	134	255-273
Sci.	1965	Dec. 31
ABST. REF.		DATE
APCA Absts.		Apr. '66
ABSTRACT		

The largest compact particles normally found in lungs are about 10 microns in diameter. Asbestos fibers 50 microns and even 200 microns, long can be explained by the fact that the parameter of the two main deposition mechanisms is particle free-falling speed, determined by the diameter and not the length. If the diameter of an asbestos fiber is less than 3.5 microns, the fiber has a chance of escaping deposition by these two mechanisms and of penetrating deeply into the lung. The more symmetrical a fiber is, the greater its chance of penetrating. The limitation on the lengths of the fibers which reach the pulmonary air spaces is imposed by the nasal hairs and by the small diameters of the respiratory bronchioles. Asbestos and glass fibers are discussed.

-- APCA Absts.

MILLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT NUMBER	DATE	FILE NUMBER
	7/66	
AUTHOR		
J. G. Thomson		
TITLE		
Asbestos and the Urban Dweller.		
ORIG. REF.	VOL.	DATE
Ann. N. Y. Acad. Sci.	132	1966-21
		Dec. 31
		1965
ABST. REF.	VOL.	PP.
APCA Absts.	11	5
		Apr. '66

ABSTRACT

Investigations were made in Cape Town, South Africa, to determine the extent to which the ordinary urban dweller is exposed by occupation or environment to the inhalation of asbestos. Investigations were made by counting asbestos bodies in smears from the lung bases from 500 consecutive autopsies in subjects over 15 years of age in Cape Town and 500 in Miami, Florida. The results were similar in the two cities. Approximately 30% of the males and 20% of the females showed asbestos bodies. The finding of abundant asbestos bodies in the lung bases of one in 17 of the male hospital population suggests that the occupational hazard from asbestos is greater and more diversified than realized at present. As a limited basal asbestosis may be associated with malignant mesothelioma of pleura and peritoneum an increase in this tumor is forecast as the main ground for regarding asbestos as a potential urban hazard.

-- APCA Absts.

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT
NUMBER

DATE

11/66

1107

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752

AUTHOR S. A. Roach.

TITLE Measurement of Airborne Asbestos Dust by Instruments Measuring Difficult Parameters.

SERIAL	VOL.	PP.	DATE	ABST. NO.	VOL.	PP.	DATE
Ann. N. Y. Acad. Sci.	132	306-3	5 Dec. 3	APCA Absts.	12	4	Aug. '66
			1965				

ABSTRACT

The size and shape of the airborne dust was measured in five samples taken with a Casella thermal precipitator. These samples were examined with a light field microscope using a 2 mm. oil immersion objective having a numerical aperture of 1.30. The results of fiber and particle counts are discussed. The counts obtained varied with the sampling instrument and particular microscope assembly used. Results obtained by four sampling instruments are shown in table 5. The work described in this report was undertaken to determine a suitable method of measuring the dust exposure of many workers for some years in studies of the effects of inhaling asbestos dust.

-- APCA Absts.

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT
NUMBER

DATE

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FILE NUMBER

NFC

752

AUTHOR: J. S. Harrington.

TITLE: Chemical Studies of Asbestos.

ORIG. REF.	VOL.	NO.	DATE	ABST. REF.	VOL.	NO.	DATE
Ann. N.Y. Acad. Sci.	132	31-47	Dec. 31, 1965	APCA Absts.	12	3	June '66

ABSTRACT

Further chemical studies of the three main types of asbestos, crocidolite, amosite, and chrysotile have been made. The origin of the primary oils associated with crocidolite and amosite has been discussed. By suitable methods 0.32% of extractable material can be removed from crocidolite and 0.28% from amosite. A sample of commercial amosite known to be carcinogenic yielded 0.76% of extractable material. Chemical investigations have been made of the oils from crocidolite and amosite by various techniques. Low levels of polycyclic aromatic hydrocarbons were detected. In addition to the primary oils, asbestos may contain secondary oils derived from contamination or from the intentional application of oil during processing in industry. Up to 80% of the jute oil in the jute bags used for storing asbestos may be absorbed by the asbestos fiber. This could explain why chrysotile, which apparently has no primary oils, may contain, after milling and other industrial treatment, yields of from 0.1 to 0.4%. Insulation materials also contain significant amounts of extractable material. Finally, studies have been made to assess wherever possible, the part which metals and metal complexes may play in the carcinogenic action. --APCA Abstr.

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT
NUMBER

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FILE NUMBER

10/66

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752

AUTHOR L. Miller, W. E. Smith, and S. W. Berliner.

TITLE Tests for Effect of Asbestos on Benzo(a) Pyrene. Carcinogenesis in the Respiratory Tract.

ORIG. ACCL.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Ann. N. Y. Acad. Sci.	132	482-500	Dec. 1965	APCA Absts	12	6	July, '66

ABSTRACT

Time of appearance and yields of papillomas and carcinomas in the respiratory tract of hamsters after intratracheal injections of benzo(a) pyrene are reported. Addition of chrysotile variety of asbestos in the injections gave results consistent with an hypothesis that this material promoted benzo(a) pyrene carcinogenesis in the respiratory tract. Addition of the amosite variety of asbestos to injections of benzo(a) pyrene did not increase the yield of tumors found in the respiratory tract. Two experiments were carried out. All lesions recognized as tumors in gross specimens by examination at 7X with a dissecting microscope proved to be papillomas or carcinomas when studied in histological sections. Tabulation of tumors in the present report is restricted to those that were detected by examination of gross specimens and then confirmed in histological sections.

-- APCA Absts.

The anatomy of birds differs from that of mammals in that there are multiple air sacs in direct communication with the lungs, with a system of primary and recurrent bronchi. Physiologically the respiratory cycle consists of inspiration through the primary bronchi directly into the air sacs followed by forcible expiration when the air sacs return the air through the recurrent bronchi which lead to the pulmonary alveoli where the exchange takes place. The reaction of the mesothelial and pulmonary epithelial tissues of fowls to asbestos was investigated. The technique has proved satisfactory for this type of study.

--APCA Abstr. modified

-- AFCA Absorb. m: 31103

MELION INSTITUTE, PITTSBURGH, PA.

ABSTRACT
NUMBER

DATE

FILE NUMBER

8/66

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752

AUTHOR

E. C. Hammond, I. I. Selikoff, and I. Churg

TITLE

Neoplasia Among Insulation Workers in the United States With Special
Reference to Intra-Abdominal Neoplasia.

ORIG. SERIAL

VOL.

PP.

DATE

ABSTR. REF.

VOL.

PP.

DATE

Ann. N. Y. Acad. Sci.

132

519-525

Dec.

APCA ABSTS.

11

6

May '66

ABSTRACT

Malignant neoplasms produced by exposure to chemical agents or ionizing radiation typically have a long latent period and there is a long delay between first exposure and the appearance of the neoplasm. The probability that neoplasia will occur and how soon it appears generally depends upon the degree of exposure. The early reports apparently concerned workers who were heavily exposed to asbestos dust. Pulmonary diseases including tuberculosis and pneumonia were among the leading causes of death.

-- APCA Absts.

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT
NUMBER

DATE

FILE NUMBER

2/67

NFC

752

AUTHOR: B. Pernis, et al.

TITLE: Rheumatoid Factor in Serum of Individuals Exposed to Asbestos.

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Ann. N.Y. Acad. Sci.	132	112	Dec 31, '65	APCA Absts.	12	7	Oct '66

ABSTRACT

The presence and titer of rheumatoid factors in the sera of 315 asbestos insulation workers and of 103 controls were determined by conditioned hemagglutination with tanned red cells coated with aggregated human or rabbit gamma globulins. The asbestos workers were exposed to the dust for periods from 1 to 54 years, and most of them showed x-ray evidence of asbestosis that was graded into grades from one to three. A definite increase in frequency and titers of rheumatoid factors in the controls of same age and sex, was found in workers with asbestosis of grades in two and three. Similar serological abnormalities are found in cases of pulmonary fibrosis of different origin, idiopathic, silicosis, coal workers' pneumoconiosis, and sarcoidosis.

-- APCA Absts.

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT NUMBER DATE 1/67 FILE NUMBER 752

AUTHOR A. David.

TITLE A Simple Method for Detection of Asbestos Bodies in Sputum.

CHG. DESK	VOL.	PP.	DATE	ANAL. REPT.	VOL.	PP.	DATE
Placovni Lekar	17	244-245	1965	APCA Absts.	12	4	Sept. '66

ABSTRACT

The author describes a simplified method, according to Champeix and Faur, for estimating asbestos particles in sputum. To the sputum collected in the course of 24 hours, 4% NaOH is added, the mixture is centrifuged and from the sediment smears are made in which asbestos particles are sought either directly or under cedar oil immersion. Even when the expectoration of bronchial secretion is small, asbestos particles are regularly detected in subjects exposed to asbestos dust a number of years ago.

-- APCA Absts.

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT
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FILE NUMBER

752

AUTHOR: Anonymous

TITLE: Exposure to Asbestos and Malignancy

OSHA REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
London Clin. Med.	7	10-11	Jan/66	APCA Absts.	12	7	Oct. 66

ABSTRACT

Recent surveys have shown asbestos bodies to be present in many of the otherwise normal lungs of those living in clean, non-industrial communities, suggesting that environmental contamination with asbestos dust is widespread. Perhaps this is not altogether surprising considering the variety of domestic asbestos products that exist and their wide use in modern building. Present evidence suggests that there is a wide spectrum of pathological changes resulting from asbestos inhalation. Prominence was given recently to the relationship between asbestos exposure and mesothelioma. Possible widespread community contamination by asbestos clearly calls for a full assessment of its carcinogenic properties. Both crysolite and crocidolite have been associated with bronchial carcinoma and mesothelioma, but amosite has not. It follows that both qualitative and quantitative analyses of asbestos in tissues could be most helpful in the further elucidation of this problem. In addition the relationship between asbestos exposure, smoking, and neoplasia formation, requires analysis.

-- APCA Absts.

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT NUMBER	DATE	FILE NUMBER
	11/66	1054
		NFC
		752

AUTHOR: Anon				
TITLE: Health Hazards of Asbestos.				
Q. REF.	VOL.	PP.	DATE	ABST. REF.
Lancet	1	530-53	Mar. 5 1966	Pub. Hlth. Eng. Absts.
				46
				259
				Aug. '66

ABSTRACT

Health Hazards of Asbestos. Anonymous. Lancet 1, 530-531 (March 5, 1966).

The effects of exposure to asbestos and preventive measures taken by industry to eliminate all heavy or unnecessary exposure are outlined. There are 35 references.

-- Public Health Eng. Absts.

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT
NUMBER

DATE

FILE NUMBER

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752

AUTHOR: D. Hourihane, et al.

TITLE: Hyaline and Calcified Pleural Plaques As an Index of Exposure to Asbestos.

(A Study of Radiological and Pathological Features of 100 Cases with a Con-

sideration of Epidemiology).

DATE

ABSTR. REF.

VOL. PP.

DATE

Brit. Med. J.

1

1069-1074 Apr. 30, 1966

APCA Absts.

12

5

Aug. '66

ABSTRACT

A close association between exposure to asbestos and the development of pleural plaques has been shown. A cause-and-effect relationship is probable. The most extensive lesions are radiologically detectable, and the disease asbestosis is then also present, despite the absence of any other radiological abnormality. The sources of asbestos are considered and evidence is presented to suggest that there is a widespread non-industrial community exposure. Mesotheliomata are common in patients with pleural plaques, and it is suggested that there is a dose-response relationship between the asbestos and the development of these neoplasms. The question of the relationship between lung cancer and asbestos is left open, but the value of radiological surveys for pleural plaques is emphasized in any study of this problem. Asbestos is not the sole cause of pleural plaques, but it is certainly the most common.

-- APCA Absts.

EDITOR'S NOTE: Regarding pleural plaques and asbestos exposure also see abstract No. 1036 this issue.

MELLON INSTITUTE, PITTSBURGH, PA.

AUTHOR C. G. Adkinsley

TITLE Asbestos Dust and its Measurement.

9

ORIG. ACCT.	VOL.	DATE	ANALYST	VOL.	PP.	DATE
Ann. Occ. Hyg.	9	73-82	Apr. '66	APCA Absts.	12	1
(London)						

ABSTRACT

The nature of asbestos dust and the testing requirements are discussed. Existing standard methods are briefly reviewed. The development of a membrane filter method of dust counting for asbestos is described in detail. It is thought to be an improvement on existing methods. Tyndallometric methods are considered, and a description of the application of the "Royco" Particle Counter, an instrument based on this principle, to factory testing is described. It is believed that this instrument represents a big advance in routine test methods.

-- APCA Absts.

ABSTRACT
NUMBER

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FILE NUMBER

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752

AUTHOR: A. Laamanen, L. Noro, and V. Raino.

TITLE: Observations on Pollution Caused by Asbestos.

ORIG. RECD.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE

ABSTRACT:

The quarrying of asbestos in Finland has a tradition of approximately 50 years. The production is nowadays about 15,000 tons of antophyllite-asbestos. In his work on non-occupational endemic asbestosis, published in 1960, Dr. R. Kiviluoto mentioned that in approximately 500 persons living around the quarries calcifications of pleura were found in x-ray examinations. Dr. V. Rainio, who at present is studying further the incidence of pleural calcifications among the population around the quarries, has mentioned that 1300 additional cases have been found. Dr. Kiviluoto, however, estimates that approximately ten per cent of the population living around the quarries might have pleural plaques. At the request of Dr. V. Rainio and the Finnish asbestos company, Suomen Minerali, the Institute of Occupational Health has performed some air pollution studies around quarries, trying especially to find out the presence of asbestos in the air. In the following there are some preliminary observations. The first survey was made between August 20—November 28, 1961, and

second survey was made between June 24—November 24, 1963. The results of these surveys are presented and are available upon request.

MELLON INSTITUTE, PITTSBURGH, PA.

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752

FILE NUMB.-

AUTHOR: R. H. Mann, J. L. Grosh, and W. M. O'Donnell

TITLE: Mesothelioma Associated With Abestosis. A Report of Three Cases.

CARD REG.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Cancer	19	521-525	Apr. '66				

ABSTRACT

A study of 54 autopsies of patients dying with pulmonary asbestosis disclosed three cases of peritoneal mesothelioma, one of which was complicated by a mesothelioma of the pleura. In two of the three patients there was an occupational exposure history of 20 and 34 years in an asbestos textile plant. Although the remaining patient had classical asbestosis of the lungs at autopsy, there was no known history of industrial exposure to asbestos. The authors think asbestos can produce mesothelioma of either peritoneum or pleura; they present three cases to support the concept of a causal relationship. The increased utilization of asbestos material and the recent demonstration of asbestos bodies in the lungs of urban dwellers may have significant implications for cancer epidemiology in the future.

-- Authors' abstr.

MELLON INSTITUTE, PITTSBURGH, PA.

INSTRUMENT
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FILE NUMBER

NFC

752

AUTHOR

J. G. Thomson and W. M. Graves, Jr.

TITLE

Asbestos as an Urban Air Contaminant.

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Arch. Pathol.	81	158-46	May 1966				

ABSTRACT

Asbestos bodies were demonstrated in smears from the lung bases in 20% of the females and 30% of the males of 500 consecutive autopsies in subjects of 15 years or over in Miami, Florida. In the great majority of these cases, including all the females, the asbestos bodies were scanty, were not associated with any pulmonary changes, and were regarded as the result of contamination of the urban atmosphere by asbestos. In 6% of all males examined the asbestos bodies were numerous and were presumably of occupational origin. It is suggested that both urban air contamination and industrial exposure to asbestos are likely to increase in the future, in view of the increasing consumption and diversity of uses of asbestos and asbestos-containing products and of its virtual indestructibility. An increase in the frequency of malignant mesothelioma of pleura and peritoneum is forecast rather than pulmonary disease or disability. -- Authors' summary

Editor's Note: Dr. Gross, Director of the Foundation's Research Laboratory, has submitted a letter to the editor disagreeing with several of this article's assumptions and conclusions. The authors state: "The suspicion that asbestos fibers are now a hazard of urban living is confirmed more amply than expected" and, in another place, "There are statements in the literature on asbestos mainly by people other than pathologists that the asbestos body is nonspecific. These opinions are not held by histopathologists today." An editorial in the same issue, entitled "Progressive Metamorphosis," encourages letters to the editor, suggesting that "The airing of some controversial subject in a communication may on occasion prove of even more value than the original." Digest readers should, therefore, be alert to the existence and availability of opposing opinions on several important areas covered.

-- RTP:et

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT
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FILE NUMBER

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.752

AUTHOR J. V. Crable.

TITLE Quantitative Determination of Chrysotile, Amosite and Crocidolite by X-ray Diffraction.

CONF. SERIAL	VOL.	NO.	DATE	ABST. REF.	VOL.	NO.	DATE
Am. Ind. Hyg. Assn.	27	293-298	May-June				
1			1966				

ABSTRACT

Quantitative Determination of Chrysotile, Amosite and Crocidolite by X-ray Diffraction.
J. V. Crable. Am. Ind. Hyg. Assn. J. 27, 293-298 (May-June, 1966).

The determination of asbestos by x-ray diffraction in environmental samples is described. Evenly distributed mats of asbestos samples on membrane filters are prepared for x-ray diffraction examination. Each asbestos mineral has its characteristic x-ray diffraction pattern. A qualitative scan of a mounted filtered sample identifies the crystalline substances present including the asbestos minerals. A quantitative determination of a given type of asbestos is made by measuring the area under its major diffraction peak and comparing this area with that of a known quantity of an external standard.

-- Author's abs:.

ABSTRACT
NUMBER

DATE

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753

AUTHOR M. Kleinfeld, J. Messite, and J. Shapiro.

TITLE Clinical, Radiological, and Physiological Findings in Asbestosis

ORIG. SERIAL	VOL.	NO.	DATE	ABST. REF.	VOL.	PP.	DATE
Arch. Internal. Med.	117	813-819	June	1966			

Clinical, electrocardiographic, and physiological observations were made of 21 asbestos workers who had an average exposure to asbestos dust of 29.2 years and who had radiological findings compatible with asbestosis. Ten of the 21 workers had chronic cough, and seven evidenced exertional dyspnea. Basilar crepitations were found in eight, and six had clubbing. Electrocardiographic findings were abnormal in six but in none of these were the abnormalities consistent with the criteria of cor pulmonale. In eight individuals, the pulmonary infiltration was minimal, in nine it was moderate, and in four it was classified as severe. Varying degree of obliteration of the costophrenic sinuses was observed in 16 or cardiac borders in ten. Pleural calcification was observed in five. Two individuals showed emphysema which was localized. The abnormal lung function findings were consistent with a restrictive breathing and diffusion capacity impairment. This was characterized by low values in vital capacity (14 persons), in total lung capacity in (eight), and in diffusion capacity (13). The workers with dyspnea and lung crepitations had a significantly lower mean vital capacity and total lung capacity than those without these clinical findings. In addition, the group with pulmonary crepitations had a lower mean diffusion capacity for carbon monoxide (DL_{CO}). There was a poor correlation between clubbing and vital capacity, total lung capacity, and diffusion capacity. There was a weak correlation between these lung function parameters and the degree of pulmonary infiltration. When 16 of the 21 asbestos workers were compared with a group of 20 asbestos workers of similar age and duration of asbestos exposure, but having negative radiological findings, there were no significant differences in the clinical findings between the two groups. There was, however, a significantly lower vital capacity, total lung capacity, and diffusion capacity in the group with positive radiological signs as compared with the group with negative roentgenograms. There are ten references. — Arch. Int. Med.

PITTSBURGH, PA.

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT
NUMBER

DATE

FILE NUMBER

Health Hazards of Asbestos. Recent Studies on its Biological Effects.

Wyers Memorial Lecture, 1965.

ORIG. JZTL.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Trans. Soc. Occ. Med.	16	62-74	7/68				

ABSTRACT

The author discusses the subject under the following headings: Types of fiber and production thereof; animal experimental work with asbestos; inhalation of fibers; experimental asbestosis; experimental carcinogenesis; health hazards of asbestos; asbestosis-present position in the clinical aspects; exposure and control; beneficial tumors; diffuse mesothelial tumors; and outstanding problems.

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT NUMBER	DATE		FILE NUMBER
	11/66		NFC 752
AUTHOR J. V. Crable and Marta J. Knott.			
TITLE Application of X-ray Diffraction to the Determination of Chrysotile in Bulk or Settled Dust Samples.			
ORIG. PUBL.	VOL.	PP.	DATE
Am. Ind. Hyg. Assn.	27	383-387	July-Aug.
J.			1966
ABSTRACT			

The pursuit of an environmental study of the asbestos industry has emphasized the need for determining quantitatively, on a mass basis, the asbestos fibers present in bulk or settled dust samples. The use of x-ray diffraction in the analysis of industrial dusts is a widely accepted procedure. In the present paper a quantitative procedure has been developed for analyzing bulk or settled dust samples for chrysotile, the asbestos fiber most widely used in the United States asbestos industry. This asbestos mineral is a hydrated magnesium silicate with a crystalline structure which provides a distinct x-ray diffraction pattern of sufficient intensity to be used in quantitative analyses. X-ray diffraction is utilized for qualitative and quantitative determinations of this type of asbestos. The qualitative method establishes the presence of fibers in the dust samples and indicates possible interferences. An internal standard, aquamarine, is used in the quantitative determination of the asbestos mineral. This method for chrysotile is not limited to environmental samples but can be applied to l-g. samples of materials from other sources.

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT
NUMBER

DATE

FILE NUMBER

2/67

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752

AUTHOR: W. T. Keane and M. R. Zavon

TITLE: Occupational Hazards of Pipe Insulators.

ORIG. REF.	VOL.	NO.	DATE	ABSTR. NRS.	VOL.	PP.	DATE
Arch. Environ.	13	171	Aug. '66				
Health		184					

ABSTRACT

In this survey the attempt has been made to investigate all of the substances with which insulators come in contact in the normal pursuit of their trade. In the present state of technology, and in light of existing medical and toxicological data, the majority of the substances examined proved incapable of presenting a serious health hazard to insulators. The only insulating substance which justifies concern is asbestos. This report and other available scientific data at the present time are insufficient to provide an adequately based conclusion. The most convincing data are those of Selikoff. The further results of his and other investigations will be awaited and should contribute toward sound judgment of this matter. There are 155 references. -- Authors' summary

MELLON INSTITUTE, PITTSBURGH, PA.

10/66

NFC

753

Author: W. M. O'Donnell, R. H. Mann, and J. L. Grosh.

Title: Asbestos, An Intrinsic Factor in the Pathogenesis of Bronchogenic Carcinoma and Mesothelioma.

CHG. EXPL.	VOL.	PP.	DATE	ART. REF.	VOL.	PP.	DATE
Cancer	19	1143-1148	Aug. 1966				

ABSTRACT

In 55 asbestos textile workers who had pathologically proven asbestosis, 28 malignant neoplasms were found—23 bronchogenic carcinomas and five mesotheliomas of peritoneum or pleura. Of the 28 patients with neoplasms, 26 had been exposed to asbestos dust before 1936; the median total occupational exposure was 20 years. The interval from initial exposure until the recognition of the neoplasms varied from 20 to 40 years. Thirteen of the individuals no longer were employed in the industry when evidence of the neoplasms appeared. The primary anatomical site of the carcinomas was in the lower lobes of the lungs in 22 patients and in one instance was multicentric in origin. In the morphologic classifications of the neoplasms, ten were of the squamous cell variety; seven were anaplastic; five were adenocarcinoma and one was bronchiolar. The frequent association of pulmonary asbestosis with bronchogenic carcinoma (42%) and mesothelioma (87%), as seen in this study, lends further support to the opinion that asbestos is a carcinogen in susceptible individuals after critical exposure in the textile phase of the industry.--Authors' abst.

MELLIAN INSTITUTE, PITTSBURGH, PA.

CLASSIFIED SUBJECT	6/68	554	FELLOWSHIP NUMBER	NEC	FILE NUMBER	752
AUTHOR: Gold, C., and Cuthbert, J. TITLE: Asbestos--A Hazard to the Community.						
ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.
Public Hlth. (London)	80	261-70	Sept. 1966	APCA Absts.	13	7 March, 1968

During a recent study of pulmonary fibrosis in a Southeast Glasgow clinic, 21 proved cases and 3 possible cases of lung pathology associated with exposure to asbestos have come to light. A patient with suspected asbestosis should have, in addition to x-rays, an examination for asbestos bodies in the sputum, lung function tests, and open lung biopsy, since asbestosis has been proved in patients with normal or borderline x-rays by the lung function test and most reliably by lung biopsy. It is also important to take a complete occupational history in cases of obscure pulmonary fibrosis, since asbestosis or pleural tumors may occur many years after a short exposure to the asbestos dust. Also, persons in occupations usually not associated with health hazards may be endangered by working in close proximity with people who use asbestos, especially in confined spaces. Case histories are given and a table is presented showing the type of asbestosis, occupation, length of exposure, age, and period elapsed since exposure of the 24 patients studied. Since the use of asbestos has become more widespread in recent years, it is recommended that,

possible alternative materials to asbestos should be used whenever possible. A proposal to mix asbestos with tarmacadam for road use is viewed with concern.

-- APCA Absts.

Editor's Note: Reference 554-566, interested readers are referred to the Editorial in the May issue of JCO and JHP Medical Series Bulletin No. 11 and 12 which report progress and planning of JHP asbestos bioeffects research.

-- R. T. P. del

ABSTRACT 8-486 FOR CIRCULAR USE

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT NUMBER DATE 11/67 FILE NUMBER 752

AUTHOR. E. Walter

TITLE. Evaluation and Assessment of the Dust Measurements in Asbestos Plants of the Textile Industry.

CHIL. RECD.	VOL.	PP.	DATE	ABSTR. RECD.	VOL.	PP.	DATE
Staub Reinhaltung der Luft (English Ed.)	26	6-19	Oct. 1966	Public Health Eng	47	252	Aug. 1967

ABSTRACT

The konimeter measurements in asbestos plants of the textile industry and their classification according to the microphotographic tests give an accurate picture of dust concentration. Gravimetric measurements give an average value; they can also be used for an assessment by coefficients. There is a limited relationship between the values measured by filtering instruments and those obtained by konimeter. This is particularly valid when the dust concentration lies below the danger limit. There are 4 references.

-- Author's abst., Public Health Eng. Absts.

ABSTRACT
NUMBER

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1/67

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FILE NUMBER

752

AUTHOR: J. R. Lynch and H. E. Ayer.

TITLE: Measurement of Dust Exposure in the Asbestos Textile Industry.

CIT. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Am. Ind. Hyg. Assn.	27	431-437	Sept.				
1			Oct '66				

ABSTRACT

Data obtained from environmental surveys of nine asbestos textile mills, which represent the baseline for the textile segment of the Public Health Service epidemiological study of asbestos processing industries, are presented. From these data concentration ranges are derived which yield significant differences between typical sample groups. Variance ratio tests of different methods of counting and analysis were made and count weight ratios based on magnesium analyses for asbestos were calculated. There are 13 references.

-- Authors' Abst.

CLASSIFIED SUBJECT

6/68

FELLOWSHIP
NUMBER

NFC

FILE NUMBER

752

AUTHOR

Films, P. C.

TOPIC

The Epidemiology and Clinical Features of Asbestosis and Related Diseases

JOURNAL

Postgrad Med. J. 42 623-35 Oct., 1966 APCA ABSTS.

DATE

ABSTRACT

VOL.

PP.

DATE

137 March, 1966

ABSTRACT

Pulmonary fibrosis caused by asbestos dust has become less common since the introduction of dust suppression measures in 1932-33. However, in occupations where these safety measures are not observed, asbestosis is still a threat. Symptoms of asbestosis are breathlessness on exertion, productive cough, tightness in the chest, clubbing of fingers, warts, cyanosis, restricted chest movement, kyphosis, and fine rales heard over the lung bases. Changes in x-rays are not conclusive, since they also occur with other forms of chronic diffuse fibrosis involving the pleura. No laboratory tests except lung biopsy are diagnostic of asbestosis but sputum examination and respiratory function tests help to support the diagnosis. Carcinoma of the lung resulting from exposure to asbestos appears to be common in patients whose exposure to the dust was moderate or light or intense to cause crippling fibrosis. The rapidly increasing number of cases of carcinoma of the lung in the pleura and peritoneum have been definitely traced to exposure to asbestos dust. The degree of exposure in many cases is slight and there can be a long interval between exposure and the development of the tumor. Preventive measures are necessary to avoid exposure to asbestos dust and greater precautions in the handling of all types of asbestos.

MILITARY INSTITUTE, PITTSBURGH, PA.

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT NUMBER	DATE	FILED
	11/67	
AUTHOR A. Martin		
TITLE Dust Measurement in Plants With Asbestos Processing Machinery		
ORIG. FILED	VOL.	DATE
Staub Reinhaltung der Luft (English Ed.)	26	14-16 Oct. 1966
ABSTRACT	Public Health Eng.	17. 252 Aug. 1967

Systematic measurements of dust concentration began about 10 years ago in the asbestos processing branch of the textile industry. Long-term observations have given basic data for dust concentrations occurring in the individual processing stages. Statistical evaluation of these dust measurements shows that there has been a continuous decrease in dangerous dust concentration.

-- English summary cond., Public Health Eng. Abstr.

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT
NUMBER

DATE

2/67

1064

FILE NUMBER

FC 752

AUTHOR: J. Lieben

TITLE: Malignancies in Asbestos Workers.

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Arch. Environ.	13	619	Nov. '66				
Health		621					

ABSTRACT:

A study of 68 hospital admissions with asbestosis from an asbestos textile and friction materials plant included 21 malignancies—13 of these were carcinoma of the lung and eight carcinomas of other organs. Eighteen of the patients had exposures to asbestos in their occupational environment for a period of 10 to 36 years. Only three patients had their first exposure after 1940. Extensive dust control measures have been instituted by the plant. There are six references.

-- Author's summary

AUTHOR

B. Pernis, et al.

TITLE

Observations on the Effect of Asbestos on Cells in Vitro.

ORIG. REFS

VOL. PP.

DATE

ABSTR. REFS.

VOL. PP.

DATE

Med. Lavoro

57, 721 Dec., 1966

J. Occ. Med.

9 586 Nov., 1967

ABSTRACT

Studies were made on the effects of different kinds of asbestos on various types of cells in vitro. Results showed that both guinea pig peritoneal macrophages and mouse L fibroblasts phagocytose asbestos dust actively. An attempt to induce the formation of asbestos bodies in vitro by adding asbestos to KB tumor cells cultivated in vitro with the addition of FeSO_4 failed. These experiments indicate that the mechanism of the production of asbestosis is probably different from that of silicosis and that a direct effect of asbestos dust on fibroblasts should be seriously considered.

-- Mod. from J. Occ. Med. Absts.

MELIION INSTITUTE, PITTSBURGH, PA.

MELLON INSTITUTE, PITTSBURGH, PA.

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DATE

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7/66

NFC

752

AUTHOR W. C. Hueber

TITLE Occupational and Non-Occupational Exposures to Asbestos.

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Ann. N. Y. Acad. Sci.	132	184-195	Dec. 31, 1966	APCA Absts.	11	6	Apr. '66

ABSTRACT

The sources and types of occupational and non-occupational exposures to asbestos and various occupational and non-occupational population groups having such contacts are presented. The biologic functional and anatomic effects associated with and produced by the inhalation of asbestos dust are discussed. Asbestosis and asbestos cancer hazards related to an inhalatory exposure exist not only for asbestos workers engaged in direct and regular production, processing, handling, and use of asbestos containing materials, but also for the large number of individuals who may have contacts on an incidental basis. The rise in the production and industrial use of asbestos has resulted in a widened exposure to asbestos dust for an increased number of workers. The principal worker groups exposed to respiratory contact with asbestos are employed in the mining and milling industries, the production and commercial use of asbestos cement and plaster, and secondary products. There are 91 references.

-- APCA Absts.

3/69

NFC

752

Author: H. Bohlig

Title: Pathological Symptoms Due to Inhalation of Asbestos Dust.

Orig. Ref.

Vol.

Pg.

Date

Abstr. Ref.

Vol.

Pg.

Date

Zentr. Arbeitsmed. 16 353-55 Dec., 1966 APCA Absts. 14 22 Oct. '68

M. Arbeitsschutz.

40 In brief literature review, in which authors are mentioned but no references cited, the problem of asbestos dust as a carcinogenic substance is surveyed. Despite greatly increased preventive measures taken in many asbestos plants, and the resultant reductions in cases of asbestosis, problems of asbestos inhalation have acquired new significance during the past five years. The retrospective examination of mesothelioma autopsy material in various countries has implicated asbestos dust as a malignant-tumor inducing agent, not only in asbestos workers but even in others. The well-known "pleura-plaques" of asbestosis and diffuse mesotheliomas have been observed in individuals who had never had occupational contact with asbestos but who had resided in the vicinity of asbestos plants or mines. It can be stated with assurance that pollution of the ambient air (emission) by asbestos factories—which were relatively late in utilizing the asbestos dust of their dedusting installations instead of simply releasing it to the atmosphere—has been a causative factor in a significant increase in the rate of appearance of both pleural plaques and mesotheliomas. Whether or not the quantities of asbestos dust released into the atmosphere from brake linings of automobiles are also responsible for these malignancies is a question which has yet to be determined; however, asbestos was detected histologically in the lungs of city dwellers not exposed occupationally in the following percentages: Pittsburgh 41.0%, Miami 27.9%, Cape Town 20.4%. Individuals endangered by asbestos, in addition to those just cited, include persons who have occasional contact with asbestos in connection with their activities (such as roofers, insulation specialists). The properties of asbestos, as well as the health hazards involved, are briefly mentioned.

Abstract taken from abstract, 1968

MELION INSTITUTE, PITTSBURGH, PA.

ABSTRACT NUMBER	DATE				
	4/67		364	FC	752
AUTHOR: R. Pernis, et al.					
TITLE: Observations on the Effect of Asbestos on Cells "In Vitro."					
ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.
Med. lavoro	57	721-29	Dec. '66		

ABSTRACT:

Experiments have been conducted on the effects of asbestos dust on different kinds of cells cultivated in vitro. Guinea pig peritoneal macrophages phagocytose asbestos dust very actively but in contrast to what happens after phagocytosis of silica dust, are not damaged by the mineral as assessed by morphological observation or measurement of their glycolytic activity. Mouse fibroblasts, cultivated in vitro in the presence of asbestos, also take up the mineral quite actively and, when viewed afterwards with the electron microscope, show the mineral particles or short fibers collected in vacuoles or lysosome-like bodies in their cytoplasm; the amount of collagen produced by fibroblasts in vitro, with respect to the other proteins, is higher when these cells are cultivated in the presence of asbestos. Finally, an attempt has been made to induce the formation of asbestos bodies in vitro by adding asbestos to KB cells cultured in vitro with the addition of ferrous sulfate; this attempt failed. With respect to the problem of the pathogenesis, these experiments indicate that the mechanism of the production of asbestosis is probably different from that of silicosis and that a direct effect of asbestos dust on fibroblasts should be seriously considered.

-- Authors' summary modified

MELLON INSTITUTE, PITTSBURGH, PA.

CLASSIFIED SUBJECT

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1036

FELLOWSHIP
NUMBER

752

FILE NUMBER

AUTHOR: Lauri Meurman

AUTHOR'S POSITION
AND ADDRESS:

Asbestos Bodies and Pleural Plaques in a Finnish Series
of Autopsy Cases.

TITLE:

Available from: Central Hospital of Kuopio and the Dept. of Path. Anatomy,
University of Turku, Finland

PUB. DESIGNATION
AND SERIAL NO.
PLACE PUBLISHED
AND PUBLISHER:

REVIEWED IN:

VOL. PP.

DATE

EDITION:

DATE: 1966

VOL.

LIST PRICE: Not Given.

PAGES: 07

DISCUSSION (PP.):

GRAPHS:

GENERAL:

REVIEW:

THEORETICAL:

ECONOMIC:

ADMINISTRATIVE:

EXCELLENT:

REFERENCES:

MAPS:

POPULAR:

EXPERIMENTAL:

PROPAGANDA:

GOOD:

FAIR:

CONCLUSIONS:

COST DATA:

ENGINEERING:

STATISTICAL:

USELESS:

FOR PURPOSE:

TABLES:

INDEX:

AUTHOR'S SUBJ.:

AVAILABLE AT:

CALL NO.:

ABSTRACT:

Meurman undertook the monumental task in 1963-64 of studying a series of 438 consecutive autopsy cases of subjects aged 15 years and older, collected from three separate Finnish hospital districts, the cases falling into three groups. Recognizing that routine autopsy cases from general hospitals are primarily selected and thus do not fulfill the strict criteria of an epidemiological investigation, he has subjected the relationship between the frequency of pleural plaques and asbestos bodies to statistical analysis and presents the results. The frequency of cases with

ABSTRACTS OF RESEARCH PAPERS PRESENTED AT THE ANNUAL MEETING OF THE AMERICAN SOCIETY OF CLIMATE ENGINEERS

Plagues was about the same in two of the three hospital districts investigated in different parts of Finland, whilst in the third it was lower. Plaques proved to be an equally common finding in a district in southwest Finland with no asbestos deposits and no particular asbestos industries, as in a district in east Finland with an asbestos mine and mill and extensive anthophyllite asbestos deposits near its eastern border. Plaques were encountered in 52.2% of the urban population and 1.8% of the rural population. Asbestos bodies in the lungs and pleural plaques occurred more often in conjunction than separately. Pleural plaque formation, in particular when bilateral, and the occurrence of asbestos bodies in the lungs appear to have some etiological factor in common. The dust which induces the formation of asbestos bodies does not, however, seem to be the sole cause of plaque formation.

EDITOR'S NOTE: In this regard the author's findings are similar to those reported by Kenneth W. Smith, M.D., in the section on "Asbestosis" in Lanza's "The Pneumoconioses;" "If inhalation of the asbestos fibre alone could cause these plaques, one would expect to find plaques wherever the fibre is used." (See Industrial Hygiene Digest 27:5 p.4, May 1963.)

-- RTP de I

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STUDY OF THE EFFECTS OF ASBESTOS

ORIG. PUBL.	VOL.	NO.	DATE	ABST. REF.	VOL.	NO.	PAGE
Ann. N.Y. Acad. Sci.	132	1-766	Dec. 31, 1966	ABCA Absts.	11	6	

ABSTRACT:

Trichloroacetic acid (TCA) extracts of moldy hay contained three antigens that produce precipitations with a typical farmer's lung serum. These antigens were fractionally precipitated with ethanol; antigens were present in the fractions precipitated between the limits of 50 to 60%, 60 to 70%, and 70 to 90% alcohol. Each of these alcohol fractions were further purified on diethylaminoethyl (DEAE-) cellulose and analyzed for sugars and amino acids. It is concluded that these TCA-soluble antigens involved in farmer's lung disease are composed of peptides and carbohydrates that were not separated by TCA extraction, alcohol fractionation, or by chromatography on DEAE-cellulose ion exchange columns. There are 13 references.

-- Public Health Eng. Abstr.

MELLON INSTITUTE, PITTSBURGH, PA.

Author: L. A. Aitken and W. M. Thelborth.

Title: The Incidence of Asbestos Bodies in the Lungs at Random Necropsies in Montreal.

ORIG. ACQ.	VOL.	NO.	DATE	ASSTN. REFS.	VOL.	PP.	DATE
Can. Med. Assn. J.	95	1179-1	82 Dec.				
		3, 166					

Asbestos bodies were found in the lungs of 48 of 100 random adult necropsies performed in four hospitals in Montreal. The proportion of positive smears depended on the technique and amount of lung sampled; this made comparison with other similar surveys difficult. Asbestos bodies were more common in men, whose lungs were also more heavily contaminated. No association was noted between the presence of asbestos bodies and death from malignant disease. The only criteria used in the present study for the recognition of asbestos bodies was their morphological appearance. These bodies are the same morphologically as those in asbestosis, and are quite easy to distinguish from pseudosbestos bodies and other atypical bodies in deeply pigmented lungs. It may be that these structures are not formed by asbestos fibres at all, although this does not appear likely at the present time. Whatever their origin or structure, asbestos bodies are common in a high proportion of cadavers in Montreal. For this reason, asbestos is probably a significant air contaminant.

EDITOR'S NOTE: Recent studies by Dr. Paul Gross reported at the Foundation's 31st Annual Meeting demonstrate ability to produce typical ferruginous (so-called asbestos) bodies with filamentous aluminum silicate; and a variety of other filamentous dusts are being examined by Dr. Gross to determine their potential in this regard. The high incidence of ferruginous bodies in lungs of urbanites merits careful consideration but is not, of itself, adequate proof of asbestos exposure. The Foundation's current research is described in Medical Series Publication No. 10, Asbestos Bioeffects Research for Industry, now in distribution.

MELLON INSTITUTE, PITTSBURGH, PA.

ABSTRACT
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FILE NUMBER

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F. M. Kogan, et al.

On the Carcinogenic Effect of Asbestos Dust

TITLE

AUTHOR

ORIG. PUBL.	VOL.	NO.	DATE	ASBEST. REFS.	VOL.	PP.	DATE
Cignona i Sanit.	31	28-33	1966	Public Health Eng. Absts.	46	417	12/66
	No. 8						

ABSTRACT

When the death rate from lung cancer between 1953 and 1962 was compared among asbestos workers, the town population, and the Sverdlovsk region population, the rate among workers was three times that of town dwellers and the rate of the town dwellers was two times that of the general population of the region. The possible causes of increased mortality among those inhaling asbestos dust are discussed. There are 27 references. -- Public Health Eng. Absts.

MELION INSTITUTE, PITTSBURGH, PA.

ABSTRACT
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752

AUTHOR: I. Ghezzi, G. Molteni, and U. Puccetti

TITLE: Asbestos Bodies in the Lungs of Inhabitants of Milan.

ORIG. SERIAL	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Mcd. Lavoro	58	223-227	3/67				
		(in English)					

ABSTRACT:

The incidence of asbestos bodies in the lung of adult inhabitants of Milan was studied by lung smears obtained at autopsy, following the same technique used by Thomson and by Caura et al. None of the individuals studied had been occupationally exposed to asbestos. Asbestos bodies were found in 51 out of 100 subjects studied. The incidences observed were 54% for men and 49% for women. Positive cases were more frequent in the oldest group of subjects and in those showing evidence of pulmonary edema. In one case, positive for asbestos bodies, a slight pulmonary fibrosis was histologically demonstrated but no case of clear-cut asbestosis was found. No parietal pleura plaques or thickening were found in any of the 65 subjects accurately studied from this point of view, 35 of whom were positive for asbestos bodies. -- Authors' summary

MILAN INSTITUTE, PITTSBURGH, PA.

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FILE NUMBER

752

AUTHOR: I. Chezzi, G. Molteni, and U. Puccetti

TITLE: Asbestos Bodies in the Lungs of Inhabitants of Milan

ORIG. REFS: VOL. PP. DATE ABST. REFS. VOL. PP. DATE

Med. lavoro 58 223-227 March, 1967 APCAs Absts. 14 15 June, 1968

ABSTRACT

The incidence of asbestos bodies in the lungs of 100 inhabitants of Milan (aged 25-83, 64 males) was studied by lung smears obtained at autopsy. None of the subjects was believed to have been occupationally exposed to asbestos. Asbestos bodies were found in 51 (51%) of the autopsies, with 54% of the cases observed in males, and 44% in females. The older subjects (older than 50) exhibited asbestos bodies more frequently than the younger subjects. No parietal pleural plaques or thickenings were found in any of a group of 65 subjects examined. 35 of whom were positive for the presence of asbestos bodies.

--APCA Absts

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4-64

12/67

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752

AUTHOR: I. J. Selikoff, et al.

TITLE: Asbestosis and Neoplasia.

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Am. J. Med.	42	487-496	April, 1967	APCA Absts.	13	13	Sept., 67

ABSTRACT:

The prediction that asbestos-induced neoplasms will rival cigarette-induced lung cancer in the next several decades is reviewed as well as the present state of our knowledge of the role of asbestos in pulmonary asbestosis, lung cancer, mesothelioma, other neoplasms, and pleural calcification. The progression of asbestos disease without continued exposure and the diagnosis of asbestos disease are reviewed also. All of the conditions arising from asbestos are slow in developing. The neoplasms now encountered in both industry and in the general public are the result of the inhalation of asbestos associated with the limited asbestos production of 30 years ago. The neoplasms associated with the present utilization of and exposure to asbestos will not be evident until the 1990's. From 50 tons a year 90 years ago, the world production is now 4 million tons a year. Asbestos has been described as the fiber with a half life of infinity. In at least 1/4 of the adults who die in the U.S. and other industrial countries, asbestos bodies are found in the lung. At present, in most cases, neither pulmonary fibrosis nor neoplasia is associated with the asbestos now being found postmortem. There are many questions which have to be answered such as: whether different kinds of fibers exert the same biological effects; the nature of the dose-disease relationship; sources and extent of environmental contamination; the range of industrial exposure; the range of neoplastic effects of asbestos exposure; and whether asbestos bodies may not sometimes result from mineral fibers other than asbestos.

-- APCA Absts.

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752

AUTHOR J. Cuthbert

TITLE The Community Hazards of Asbestos

ORIG. REF.

VOL.

PP.

DATE

ABST. REF.

VOL.

PP.

DATE

Muenich, Med. Wochschr. 1369-72 Apr. -

APCA Absts.

14

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Oct. '68

109

June, 1967

•• The inhalation of asbestos is far more dangerous than is generally recognized by the public, since even a transient period of exposure can lead to disease (interstitial fibrosis of the lung, lung cancer, mesothelioma, endothelioma of the pleura and the peritoneum, painful dermal warts) and death many years later. Electron microscopic studies have shown that for every asbestos fiber recognizable under an ordinary (light) microscope, there are hundreds of tiny unrecognized particles, which dust experiments with guinea pigs have shown to be just as deadly as the larger fibers. While the asbestos industry has taken energetic measures toward the prevention of classical forms of asbestosis by dust elimination in its plants (vacuum removal of the dust, use of gas masks, automation of manufacturing processes), such prophylactic measures have not prevented the gradual long-term development of cancer in persons who come into occasional, slight, or temporary contact with asbestos. This group certainly includes wives of asbestos workers and all persons living within 1.5 km of an asbestos plant; these persons tend to succumb to mesothelioma after many years of such contact. A number of examples are given, including those of carpenters and construction workers, who do not realize that their relatively brief contact in sawing or handling asbestos materials can lead to lung cancer many years later. The great increase in asbestos production and in asbestosis in recent years is badly planned; the need for utilization of alternate materials in industry, and for further research on biological effects is emphasized. The presence in asbestos of carcinogenic materials and their effects, including heavy metals and chromium, is mentioned.

MELION INSTITUTE, PITTSBURGH, PA.

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FILE NUMBER

752

AUTHOR: T. F. Mancuso and A. A. El-Attar.

TITLE: Mortality Pattern in a Cohort of Asbestos Workers. A Study Based on Employment Experience.

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
I. Occ. Med.	9	147-162	4/67				

ABSTRACT

Mortality Pattern in a Cohort of Asbestos Workers. A Study Based on Employment Experience. T. F. Mancuso, and A. A. El-Attar. J. Occ. Med. 9, 147-162 (April, 1967).

A cohort study of 1265 white males and 228 white females who were employed in a plant manufacturing asbestos products in 1938-1939 was established through Social Security records and observed in mid-1964. It was observed in this study that when the 1938-1939 cohort was considered as individual groups, that 1939 had a lower mortality experience than 1938. There was a consistent increase in the average mortality rates as the cumulative employment experience increased. This was true for each of these categories with the exception of the digestive system, which involved a smaller number of cases and analysis could not be made. The duration of cumulative employment experience among asbestos workers in the asbestos-products company was directly related to a general increased mortality rate for all causes of death and specifically for malignant neoplasms, cardiovascular diseases, and asbestosis.

-- Cord. from authors' summary

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CLASSIFIED SUBJECT	1/68	45	ELLOWSHIP NUMBER	FILE NUMBER
			NFC	752

AUTHOR: G. Macnab and J. S. Harington.
TITLE: Haemolytic Activity of Asbestos and Other Mineral Dusts.

ORIG. REF.	VOL.	PP.	DATE	ABSTN. REF.	VOL.	PP.	DATE
Nature	214	522-523	April 29, 1967	Public Health Eng. A.	47	292	Sept., 1967

ABSTRACT:

Chrysotile asbestos was found to be as potent a hemolytic agent as silica powder, but both differ in the nature of their hemolytic action. Under the same conditions, chrysotile adsorbs 5 times more protein from serum than silica. Chrysotile also has the highest Mg/Si ratio of the 3 forms of asbestos tested and differs also in that iron is not formally included in the lattice. There are 10 references.
-- Public Health Eng. Absts.

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ABSTRACT NUMBER	DATE	FILE NUMBER	
	7/67	678	752
AUTHOR: A. Hany, P. Burckhardt, and A. Bühlmann.			
TITLE: Clinical and Pathophysiological Findings in Pulmonary Asbestosis.			
ORIG. REF.	VOL.	PP.	DATE
Schweiz. med. Wochschr.	97	597-602	5/13/67
ABSTR. REF.		VOL.	PP.
I Am. Med. Assn.		200	237
			6/5/67

ABSTRACT

Clinical and Pathophysiological Findings in Pulmonary Asbestosis. A. Hany, P. Burckhardt, and A. Bühlmann. Schweiz. med. Wochschr. 97, 597-602 (May 13, 1967).

The pertinent clinical and functional data in eight patients with pulmonary asbestosis contracted in a Swiss factory are summarized. Asbestosis causes diffuse pulmonary fibrosis, with a decrease in pulmonary compliance and a reduction in lung volume. Advanced restriction leads to impairment of diffusion and cor pulmonale. There is only slight elevation of airway flow resistance. Reduced compliance may precede the radiological signs of fibrosis. The prognosis in advanced cases is poor and, therefore, early diagnosis and ending of exposure to asbestos are of great importance.

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

ABSTRACT
NUMBER

DATE

9/67

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752

AUTHOR J. Cuthbert.

TITLE Danger of Asbestos for General Population.

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Monch. med. Wochsch.	109	1369-1372	6/23/67	J. Am. Med. Assoc.	201	153	7/17/67

ABSTRACT

Formation of asbestos bodies and the development of interstitial pulmonary fibrosis are possible sequelae of the inhalation of asbestos. The increase in pulmonary carcinoma can be traced back to extensive contact with asbestos and to asbestosis. Heavy air pollution with asbestos dust leads to the classical form of asbestosis. A decrease in asbestos dust possibly provides the time necessary for the development of the carcinogenic effect of asbestos. Cases are presented in which endotheliomas have formed many years after a short contact with asbestos. Increased import and use of asbestos increase the danger connected with it. Carpenters who manufacture asbestos plates or persons who live in the neighborhood of asbestos factories, are especially exposed.

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

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FILE NUMBER

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10/67

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752

AUTHOR: M.C.S. Kenndey and R. Routledge

TITLE: Investigation of a Minor Asbestos Hazard

Q&A REF.

VOL.

PP.

DATE

ANCTR REF.

VOL.

PP.

DATE

Brit. J. Ind. Med.

24

232-239

July, 67

ABSTRACT:

Twelve men who had been exposed to a minor asbestos hazard have been examined clinically, radiologically, and physiologically, and an assessment of the airborne asbestos concentration has also been made. Ten men had worked in a transformer department lagging transformer windings with asbestos paste for between 15 and 37 years. Two of these men showed minor radiological and minor physiological changes suggestive of early asbestosis. Two insulation workers had been engaged in milling and sawing asbestos sheets for five and 23 years respectively; both men showed minor radiological and abnormal physiological changes. These two men had been exposed to higher airborne concentrations of the asbestos dust than the transformer men. It is impossible to be dogmatic concerning the aetiology of these pulmonary changes, and further follow-up studies are planned. However, the findings are presented in view of the recommendation by Gilson (1966) that more evidence is required concerning possible pulmonary changes in men exposed to low concentrations of asbestos.

- Author's Abst.

CLASSIFIED SUBJECT

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FELLOWSHIP
NUMBER

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752

AUTHOR:

P. E. Enterline and Mildred A. Kendrick.

TITLE

Asbestos-Dust Exposure at Various Levels and Mortality.

ORIG. REF:

VOL.

PP.

DATE

ABSTR. REF:

VOL.

PP.

Arch. Environ. Health 181-186 Aug, 1967

15

ABSTRACT:

A study was conducted on the mortality experience up to 16 1/2 years of 21,755 white male three asbestos products industries and comparisons were made with the mortality experience of 6,281 white males in an industry without asbestos dust exposures and with the mortality experience of the entire U.S. white male population. An elevated death rate for all causes was found among workers in the asbestos textile industry, an industry which has probably had heavy dust exposures. The other two asbestos products industries—asbestos building products asbestos friction materials—probably had considerably lower levels of asbestos-dust exposure and here death rates for all causes were below those experienced in all U.S. white males, nearly identical to those among workers in the industry without asbestos-dust exposures. It is believed that asbestos-dust exposures among workers in the asbestos building products industry and the asbestos friction materials industry greatly exceeded those in modern urban areas and that the modest response of the workers in these industries indicates that asbestos levels to which general populations are exposed probably is of little importance in the etiology of disease. There are 11 references.

-- Cond. from authors

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AUTHOR:

M. Kleinfeld, Jacqueline Messite, and Olive Kooyman.
Mortality Experience in a Group of Asbestos Workers.

TITLE

ORIG. REFS.

VOL.

PP.

DATE

ABST. REFS.

VOL.

PP.

DATE

Arch. Environ.

11th 177-180 Aug, 1967

15

ABSTRACT

Mortality data on 46 asbestos insulators in New York state who had 15 or more years of exposure to asbestos dust by 1945 or had achieved 15 years of exposure between 1945 and 1965 were reviewed. The average age at death was 60.3 years with a range of 33 to 81 years. There were 12 deaths due to malignancies of lung or pleura. The differences in the mean age and mean duration of exposure for the 46 deaths and the group that developed cancers of lung or pleura were not statistically significant. Six references are given.-- Cond. from authors' summary

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NFC 752

AUTHOR
Borow, N., et al.
TITLE
Mesothelioma and Its Association With Asbestosis.

ORIG. REF.
JAMAVOL. PP.
201 587-91DATE
Aug. 21, 1967

ABSTR. REF.

VOL. PP.

DATE
Apr. 1, 1968

ABSTRACT:

Within a three-year period 17 cases of mesothelioma (9 of the pleura and 8 of the peritoneum) were seen at a community hospital in New Jersey located near a major asbestos mill. The incidence of mesothelioma as well as asbestosis appears to be increasing.

--Am. Rev. Resp. Dis. Abstrs.

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752

FILE NUMBER

AUTHOR:

I. M. Freundlich and R. R. Greening.

TITLE:

Asbestosis and Associated Medical Problems.

ORIG. REF.:

VOL. PP.

DATE

ABSTR. REF.:

VOL. PP.

DATE

Radiology

89, 224-229 Aug, 1967 Public Health E. A.

47, 374 Nov, 1967

ABSTRACT:

Pulmonary roentgenologic changes were found in 56 of 187 asbestos workers. Pleural thickening was the most common finding, often associated with parenchymal fibrosis. Various reports from the literature, indicating an increased incidence of bronchogenic carcinoma and mesothelioma in asbestos workers, were summarized, and asbestos as a possible urban hazard was discussed. There are 53 references.

-- Authors' abst., Public Health Eng. Abstr.

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562

FELLOWSHIP
NUMBER

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FILE NUMBER

752

AUTHOR: Nakamura, I.

TITLE: Clinical and Pathological Studies of Pulmonary Asbestosis.

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Nara Med. Assn.	18	455-65	Aug., 1967	APCA Absts.	13	9	March, 1968

ABSTRACT:

The environmental conditions in asbestos factories in Osaka and Nara were investigated. The nature of the dust in the factories was studied by electron microscopy. The concentration of suspended particles is tabulated for different plant operations in a Nara factory. The occurrence of asbestosis among the employees of these factories was studied by periodic x-ray examinations. Although definite asbestosis could not be found in employees working less than 5 years, the frequency of detection of definite asbestosis increased in those working more than 5 years as follows: there was 21% in those employed between 5 and 10 years, 54% between 10 and 15 years, 70% between 15 and 20 years, and 100% for those employed for over 20 years. The classification of x-ray findings and the development of asbestosis are discussed. Case histories and photographs of x-rays and lung sections are presented.

-- APCA Absts.

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AUTHOR J. L. Elder

TITLE Asbestosis in Western Australia

ORIG. REFS.

VOL.

PP.

DATE

ABSTR. REFS.

VOL.

PP.

DATE

Med. J. Australia

2

379-83

Sept. 23, 1967

Am. Rev. Resp. Dis.

98

355

Aug. '68

ABSTRACT

Thirty-one patients with asbestosis or asbestosis with silicosis have been studied at Sir Charles Gairdner Hospital over a five-year period. Twenty-eight patients worked at Wittenoom Gorge and 3 patients, at an asbestos cement works. The diagnosis of asbestosis was made on the basis of a history of exposure, results of pulmonary function tests characteristic of the diffuse interstitial fibroses, and compatible roentgenographic changes. From a study of these patients, the following points emerged. (1) Under work conditions at Wittenoom Gorge in the 1950's, a period of one and one-half to 12 years' exposure was sufficient to produce appreciable disability and death in 7 patients whereas at the cement works, prior to 1956, a period of 17 to 27 years was necessary to produce disability, with death in only one patient. (2) Asbestosis often progresses after cessation of exposure, and pulmonary infection appears to accelerate this progress. (3) Once roentgenographic changes are obvious, the disease is well advanced and, as a corollary, a diagnosis of asbestosis on roentgenographic examination of the chest in early cases is extremely difficult and there is much observer variation, even among experts. (4) In an asbestos worker, a change in vital capacity in some instances may indicate asbestosis before there is a definite change on the chest film. As a prophylactic measure, estimation of the vital capacity before employment and at yearly intervals thereafter, in addition to the yearly examination of the chest film, may indicate which workers should move to a less hazardous industry. (5) Steroids do not appear to play any part in arresting the progress of the disease.

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in fact, as infection tends to accelerate fibrosis in the experimental animal, and clinically in man, steroids are best avoided. In none of the 31 patients studied did calcified pleural plaques or mesothelioma develop, and bronchial carcinoma occurred in only one patient; but these complications would not be expected in the patients at Wittenoom Gorge for another 10 to 20 years.

--Am. Rev. Resp. Dis. Absts.

Editor's Note: See also Abstract No. 912, this issue. Readers concerned about asbestos bioeffects will be interested in the program of the Foundation's 3rd Fibrous Dust Seminar (see Editorial, this issue).

--R. T. P. del.

MELLON INSTITUTE, PITTSBURGH, PA.

12/67

FELLOW-
NUMBER

752

FILE NUMBER

AUTHOR: P. CROSS.

TITLE: Experimental Asbestosis. The Development of Lung Cancer in Rats With Pulmonary Deposits of Chrysotile Asbestos Dust.

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Arch. Environ. Health	15	343-355	Sept. 1967				

ABSTRACT

One hundred and thirty-one rats were exposed to chrysotile asbestos, finely milled, in an exposure chamber for six hours a day, five days a week for a maximum of 62 weeks. Dust concentrations were very heavy, ranging from 42 to 146 mg/cu m (average 86 mg/cu m). About half the animals exposed also had intratracheal application of caustic (lye) to reduce lung clearance and maximize dust retention and pathogenicity. Also, 64 additional animals were given intratracheal injections of chrysotile dust, 14 receiving single doses and the remainder multiple injections of 3.5 mg each. Controls consisted of 30 untreated, unexposed animals and 15 rats treated with caustic but unexposed to asbestos. Designed to study asbestosis the most important findings of the investigation related to lung tumor production. Other investigators have not been successful in producing lung cancer experimentally in rats with chrysotile. Tumor incidence was high. Of those surviving 16 or more months (ie, after appearance of the first tumor) 31% had primary malignant tumors of the lung. Occurrence in rats treated with lye was 48%, twice the rate of those exposed but not treated with caustic. Malignant pulmonary tumors included adenocarcinomas, fibrosarcomas, and squamous cell cancers as well as a mesothelioma and a mucinous adenocarcinoma. A number of pulmonary lymphoblastomas which occur spontaneously in rats were not counted. Also, atypical metaplasia, not manifestly malignant, was commonly noted. Multicentricity of malignant lesions was observed in several animals. Results of this study support the unitarian concept of tumor origin from alveolar cells. Despite extreme exposure conditions, diffuse asbestosis was not seen.

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fibrosis observed was multifocal, centered in the proximal portion of primary lobules with normal appearing tissue intervening. Cancer production with crysotile in this study appears to involve trace metals introduced during hammer milling which increased nickel, chrome, and cobalt. Previous investigators have not reported subjecting their dusts to hammer milling. The increase in content of trace metals after milling was as follows: nickel, 82%; cobalt, 145%; chrome, 34%. Analysis of the worn hammer of the hammer mill revealed a nickel content of 2,335 µg/gm of sample. This finding, if validated by further studies, should provide an important aid to guide industrial hygiene controls of potential health hazards. There are 13 references.

3/63

FC 752

AUTHOR

W. C. Cooper.

TITLE

Asbestos as a Hazard to Health. Fact and Speculation.

ORIG. ACFS

VOL.

PP.

DATE

ABST. REFS.

VOL.

PP.

DATE

Archiv. Hyg. 15, 285-290 Sept, 1967

ABSTRACT

With the increasing use and indispensability of asbestos minerals, there has come realization of some very real hazards that must be better defined and controlled. Present standards for dust control do not appear adequate to prevent asbestosis over a working lifetime, and many segments of industry aggressively attacking the problem have already been using more rigorous standards. The associations between asbestos minerals and malignancies of the lungs, pleura, and peritoneum have become increasingly convincing. Current efforts must be directed toward better definition of the importance of type, size of fiber and the importance of co-factors. It has been suggested that asbestos fibers act as carriers of carcinogenic metals or other substances to vulnerable sites. The demonstration of ferruginous bodies in from one-quarter to one-half of the lungs examined in consecutive autopsies in a number of cities around the world points to an urgent need for the positive identification of the mineral fibers that are responsible. If they prove to be asbestos, we do not know what point on the dosage response curve is represented and consequently are not now in a position to estimate their significance in terms of human health. There are 11 references.

-- Author's Summary

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752

AUTHOR: L. J. Cralley, R. G. Keenan, and J. R. Lynch.

TITLE: Exposure to Metals in the Manufacture of Asbestos Textile Products.

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Am. Ind. Hyg. Assn.	28	452-461	Sept-Oct. 1967				

ABSTRACT:

Asbestos textile workers processing chrysotile were exposed in the past, to significant airborne levels of nickel, chromium, and manganese. Limited studies indicate that other metals were also involved. It is likely that the phenomenon shown in asbestos textile manufacturing is also true in other asbestos mining, milling, and processing operations. Sufficient evidence is presented in this study to indicate that the role of metals in the etiology of disease associated with asbestos inhalation should not be ignored. It is no longer tenable to look only for asbestos fibers or bodies in biological tissue and by their presence assume a cause and effect relationship with the disease. There are 22 references.

-- Authors' abst.

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AUTHOR

TITLE

Norwood, W. D., Fuqua, P. A., and Mancuso, T. F.
Asbestos--An Environmental Health Hazard.

ORIG. REF.

VOL.

PP.

DATE

ABSTR. REF.

VOL.

PP.

DATE

Northwest Med.

66

821

Sept., 1967.

J. Occ. Med.

10

52

Jan., 1968.

ABSTRACT:

Four Case Reports demonstrate asbestosis with pulmonary emphysema and cor pulmonale, asbestosis with lung cancer, mesothelioma, and rectal cancer. The occupational histories of workers as plumbers, boiler makers, carpenters, pipe fitters, steam fitters, mechanics, stationary engineers, undercoaters, foremen, maintenance electricians, builders, rubber workers, construction workers, cement workers, boiler repairers, sheet metal workers and laborers must all be elicited if diagnosticians hope to record the more than 3,000 different exposures to asbestos. For the sake of workers and their dependents with industrial health compensation rights, the diagnostician must not be misled by recent occupational history nor overlook other work exposures within the lifetime of the patients. The obvious need for decreasing the exposure to asbestos by better occupational hygiene programs is recognized but no detailed criteria were presented. Considering the growing uses of asbestos, this occupational and environmental disease may get worse before it gets better.

--J. Occ. Med. Absts.

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FELLOWSHIP
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FILE NUMBER

AUTHOR:

Cross, P., and deTreville, R. T. P.

TITLE:

Experimental Asbestosis. Studies on the Progressiveness of the Pulmonary Fibrosis Caused by Chrysotile Dust.

ORIG. REF.

VOL.

PP.

DATE

ABSTR. REF.

VOL.

PP.

DATE

Arch. Environ. Hlth 15

638-49

Nov., 1967

ABSTRACT:

Rats, hamsters, and guinea pigs were given various lung dust burdens of chrysotile asbestos; some, by inhalation and others, by intratracheal injection. For the rat, chrysotile has about the same order of pathogenicity as quartz dust, insofar as a single intratracheal injection of between 2 and 5 mg of either dust will produce minimal lesions in rats. Evidence for the nonprogressiveness of chrysotile asbestosis in rats consists of the observations that the minimal asbestotic lesion is limited to the wall of the respiratory bronchiole and of the adjoining alveolar ducts and does not extend into adjoining normal alveoli and that the minimal asbestotic lesions heal by becoming collagenized and hypocellular. In hamsters, the asbestotic lesions are not delimited. They are diffuse, cellular, and do not collagenize. These lesions are therefore progressive. The early chrysotile asbestotic lesion in guinea pigs resembles that of rats. The progressiveness of the chrysotile asbestotic lesion in hamsters is ascribed to a less effective pulmonary clearance mechanism and to a greater reactivity of the pulmonary tissue than exist in rats. The efficiency of the clearance mechanism of man approximates more that of the rat than that of the hamster. Man's lung tissue reactivity also more closely resembles that of the rat, being characterized by the ability to heal.

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FELLOWSHIP
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FILE NUMBER

AUTHOR

P. Gross, L. J. Cralley and R. T. P. deTreville.

TITLE

"Asbestos" Bodies: Their Nonspecificity.

ORIG. REF.

VOL.

PP.

DATE

ABSTR. REF.

VOL.

PP.

DATE

Am. Ind. Hyg. Assn. J.

28

641-542 Nov-Dec. 1967

ABSTRACT

So-called "asbestos" bodies were produced in the lungs of hamsters injected intratracheally with respirable filamentous particles composed of aluminum silicate. The production of "asbestos" bodies by aluminum silicate challenges the concept that "asbestos" bodies are a pulmonary response specific to inhaled asbestos fibers. Instead of the term "asbestos" body, the designation of ferruginous body is suggested for the iron-containing structure that forms in response to the inhalation of filamentous dust of unknown composition, since the term, "asbestos body" may be misleading and inappropriate. There are 6 references. -- Authors' abstr.

6/68

NFC 752

Jagatic, J., et al.

Tissue Response to Intraperitoneal Asbestos With Preliminary Report of
 Acute Toxicity of Heat-Treated Asbestos in Mice.

ORIG. REFS: VOL. PP. DATE ABSTR. REFS: VOL. PP. DATE
 Environ. Research 1 217-30 Nov., 1967.

ABSTRACT

Intraperitoneal asbestos not only produced fibrosis, but a special and peculiar type of fibrosis which was proliferative, granulomatous and invasive, and histologically similar to mesothelioma, although morphologic evidence of actual malignancy was not obtained. Further, asbestos fibers exposed to high temperature produced a high degree of toxicity in experimental animals; this resulted in a 60% mortality rate.

-- Authors' abst.

Editor's Note: Although the authors of this 14-page article insist that the fibrous inflammatory tissue resulting from intraperitoneally injected asbestos is histologically similar to mesothelioma and that it is "invasive", they gave no evidence in support of these opinions. The 22 illustrations that are included in this report, support neither the claim of similarity to mesothelioma nor that of "invasiveness" of the inflammatory tissue.

-- P. Gross

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752

AUTHOR:

Tabershaw, I. R.

TITLE:

Asbestos as an Environmental Hazard.

ORIG. REF.

Occ. Med.

VOL.

10

PP.

32-37

DATE

Jan., 1968.

ABSTR. REF.

VOL.

PP.

DATE

ABSTRACT:

In summary, if one accepts the assumptions (1) that asbestos minerals increase the risk of lung cancer in occupational groups, (2) that they lead to an unusual risk of mesothelioma of the pleura and peritoneum in occupational groups and those living near asbestos plants, (3) that such malignancies usually result from exposures 30 to 50 years earlier, (4) that the "asbestos bodies" found in from 25 to 50% of lung smears from routine autopsies are probably due to asbestos in most cases, (5) that these "asbestos bodies" may result from recent exposures as well as those many years earlier, (6) that world production and use of asbestos has increased from 300,000 tons to 3,500,000 tons in 30 years, it is important to consider whether or not asbestos is a major threat to public health. One is not yet justified in such a conclusion, in view of the fact that much of the world tonnage goes into uses that do not lead to air contamination; that asbestos is not act ally implestructible; that the effects are dose-dependent; and that low doses probably lead to lower rates and longer latency. Nevertheless, there is need for epidemiologic studies directed to groups with intermediate exposures and for evaluation of the beneficial effects of cessation of smoking. Another need is for experimental and industrial hygiene studies to determine the nature and degree of exposure. Biologic studies centered on the meaning of the "asbestos body" are crucial to understanding the clinicopathologic response. Strict control of industrial and neighborhood environments is essential, but it is premature to extrapolate from the effects of heavy exposures to minor and low level exposures. There are 15 references.

-- Author's summary

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5-27

FELLOWSHIP
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FILE NUMBER

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752

AUTHOR: Balzer, J. L.

TITLE: Industrial Hygiene for Insulation Workers.

ORIG. REF:

VOL. PP.

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ABST. REF.

VOL. PP.

DATE

Occ. Med.

10 25-31

Jan., 1968.

ABSTRACT:

The asbestos worker is exposed to amosite and chrysotile asbestos-containing materials, fibrous glass, cork, plastics, and adhesives. Working in industrial and commercial building projects and marine construction and repair, he is exposed to many other environmental hazards not created by his own trade. Although he works with asbestos-containing products 15% of the time, the over-all time-weighted average exposure to asbestos-containing materials is below the presently recognized Threshold Limit Values (TLV) of 5 mpcf. The three work areas in which the dust levels were above the TLV (prefabrication, tearing out, and mixing) account for less than 20% of his total work time. However, the incidence of radiographic changes indicative of asbestosis is over 25% in our men with 20 years or more of work. This and other evidence suggest that the present TLV is too high. Incidence of asbestosis and the risk of malignancies in the asbestos worker can be reduced by local and general ventilation, substitution of materials, changes in work habits and personal respiratory protection combined with education of the men to reduce their own exposures to asbestos-containing dusts. There are 17 references.

-- Author's summary.

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FELLOWSHIP
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AUTHOR

Cralley, L. J., et al.

TITLE

Research on Health Effects of Asbestos.

ORIG. PERS

J. Occ. Med.

VOL. PP.

10 38-41

DATE

Jan., 1968.

ABST. PERS.

VOL. PP.

DATE

ABSTRACT

Asbestos is a general term applied to a group of fibrous crystalline hydrated silicate minerals. Although a number of different types of asbestos minerals exist, only four or five are of commercial importance. Each differs somewhat from the others in chemical composition, physical properties such as ability to withstand heat and chemical erosion, crystalline structure, fiber dimension, and degree of fiber harshness and brittleness. It has been known since the early nineteen hundreds that excessive exposure to asbestos gives rise to the disabling pulmonary disease "asbestosis." More recently, evidence has been developed that the incidence of respiratory tract and other malignancies in asbestos workers is excessive. A major problem in studying the health effects of asbestos is the long latent period of 20 or more years from initial exposure to the onset of disease. Also in the mid-nineteen thirties and earlier, there was little dust control and the workers were often exposed to massive levels of dust from asbestos and other associated materials in the manufacture of asbestos products. Thus, the causative agents of the resultant disease are essentially unknown. Included in these potential sources of causative agents, either alone or in combination, are asbestos fibers themselves, materials associated with the fibers in the ores such as trace minerals and polycyclic aromatic oils, materials added during processing such as metals, tars, and pitches, and concomitant external exposures to tobacco smoke or other air pollutants. A strong, supported long-term program is needed to provide the information regarding the pathogenesis of asbestosis and the other effects that appear associated with the inhalation of asbestos dust. More precise data on the physical

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and chemical characterization of the asbestos minerals which lead to their being inhaled and retained in the body, in their carrying with them other chemicals, in their migration, may open up unsuspected avenues of biological research.

-- Cond. from text.

exposures to tobacco smoke or other air pollutants. A strong supported long-term program is needed to provide the information regarding the pathogenesis of asbestosis and the other effects that appear associated with the inhalation of asbestos dust. More precise data on the physical

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FELLOWSHIP
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FILE NUMBER

AUTHOR

Lynch, J. R., and Ayer, H. E.

TITLE

Measurement of Asbestos Exposure.

ORIG. REF.

Occ. Med.

VOL.

10

PP.

21-24

DATE

Jan., 1968.

ABSTR. REF.

VOL.

PP.

DATE

ABSTRACT

As an outcome of an epidemiologic study, a safe level of exposure should be set in terms of a method of exposure measurement which meets the following criteria in the order given: (1) The environmental factor measured should be sufficiently relevant to the disease mechanism to correlate with health status even in environments where exposures to mixed dust occur. (2) The sensitivity of the method should be such as to measure levels well below the Threshold Limit Values (TLV). (3) The method should lend itself to an appropriate sampling strategy; e.g., long-period personal samples in the case of asbestos. (4) The expense of conversion from existing methods should be reasonable. The impinger method of measuring asbestos exposure does not meet any of the criteria well with the exception of expense. Weight methods would be preferred if there were an analytical breakthrough. At present fiber counts on membrane filters are the best method of estimating exposure as related to the risk of asbestosis and the airborne fiber concentration as a factor in the risk of lung cancer. There are 9 references.

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CLASSIFIED SUBJECT	5/68	450	FELLOWSHIP NUMBER	FILE NUMBER
			NFC	752

AUTHOR: Ashcroft, T.

TITLE: Asbestos Bodies in Routine Necropsies on Tyneside.

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Brit. Med. J.	1	614-7	Mar. 9, 1968	JANVA	204	203	Apr. 8, 1968

ABSTRACT:

Smears prepared from an incision in the base of the right lung in a series of 311 routine necropsies in patients over 15 years of age were examined microscopically for asbestos bodies. In cases giving a positive smear 64-histological sections of lung were also examined. The occupational history was obtained by questionnaire or by interviewing the relatives. Asbestos bodies were found in 20.3% of cases (25.5% of 196 males; 11.3% of 115 females). Histological sections of lung revealed bodies in less than half of the cases examined. Minimal asbestosis was found in patients dying from gastrointestinal or lung carcinoma. Positive smears were more common in patients from urban areas. Where information was available, definite, or probably occupational exposure of asbestos occurred in over half the cases with positive smears. A significantly higher incidence of bodies was found in histological sections of lung from 23 cases of diffuse mesothelioma of pleura or peritoneum than in the series of routine cases.

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

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FILE NUMBER

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752

AUTHOR: A. Pollack and M. I. Sacks

TITLE:

Prevalence of Asbestos Bodies in Basal Lung Smears

ORIG. REF.:

VOL.

PP.

DATE

ABSTR. REF.:

VOL.

PP.

DATE

Israel J. Med. Sci.

4

223-6

Mar.-Apr. 1968

APCA Absts.

14

25

Oct. '68

ABSTRACT:

Asbestos bodies were found in basal lung smears in 26 of 100 consecutive adult autopsies in Jerusalem. They were present in 29.1% of males and 22.2% of females, and were more frequently encountered in Ashkenazi than in non-Ashkenazi Jews. Asbestos bodies, when present, were usually scanty (less than 10), and in only two males were more than 30 bodies found under low power. The five subjects with more than ten asbestos bodies each were all Ashkenazi Jews. The prevalence of asbestos bodies is compared with Cape Town, Pittsburgh, Miami, Montreal, Glasgow, and Jerusalem. Highest frequency found is in Montreal (48%) and may reflect differences in the degree of atmospheric pollution.

--APCA Absts.

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644

FELLOWSHIP
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FILE NUMBER

752

AUTHOR:

Leathart, G. L.

TITLE:

Pulmonary Function Tests in Asbestos Workers.

ORIG. REF.:

VOL.

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ABSTR. REF.:

VOL.

PF.

DATE

Trans. Soc. Occ. Med. 18, 49-55 (April, 1968).

ABSTRACT:

There are three ways in which pulmonary function tests may contribute to the management of workers exposed to asbestos; they may be used to confirm a diagnosis of asbestosis, to follow the progress of the disease, or to monitor unaffected workers at risk. The object of this paper is to consider how successfully these three parts are played. The typical physiological abnormalities are described, serial studies in cases of asbestosis are presented, and tentative conclusions are drawn from a small prospective study of asbestos workers who were free of disease when first seen. The findings from this investigation are summarized as follows:

- (1) Established asbestosis causes a loss of diffusing capacity, vital capacity and compliance. Pleural calcification by itself does not.
- (2) Progressive loss of function is seldom arrested when the patient is transferred to other work and most cases deteriorate.
- (3) Diffusing capacity appears to be the best measurement for making an early diagnosis, but the diagnosis has been subsequently confirmed by other means in only four of the cases reported in the literature.
- (4) The development of crepitations at the lung bases sometimes precedes a significant drop in diffusing capacity and this may be a useful observation.
- (5) Finally, as a general conclusion, the function tests should not be interpreted in isolation nor be given undue respect. They should always be considered in conjunction with clinical and radiographic examination.

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753

AUTHOR: ^KSeligoff, I.J., Hammond, E. C. and Churg, J.
 TITLE: Asbestos Exposure, Smoking and Neoplasia.

ORIG. REFS.	VOL.	PP.	DATE	ABST. REFS.	VOL.	PP.	DATE
JAMA	204	106-12	4/8/68				

ABSTRACT:

Asbestos insulation workers, as a group, have a high risk of dying of bronchogenic carcinoma (about seven or eight times expected). We have observed 370 such workmen from January 1, 1963 to April 30, 1967. Our findings indicate that asbestos exposure alone is not the entire explanation. Of 87 noncigarette smokers, none died of bronchogenic carcinoma. Of 283 workmen with a history of regular cigarette smoking, 24 died of bronchogenic carcinoma, although only three were expected to die of this disease. Calculations suggest that asbestos workers who smoke have about 92 times the risk of dying of bronchogenic carcinoma as men who neither work with asbestos nor smoke cigarettes. We conclude that asbestos exposure should be minimized, that asbestos workers who do not smoke should never start and those now smoking should stop immediately.

-- Author's summary

Editor's Note: Also see Editorial pp. i-iii, this issue.

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FILE NUMBER

AUTHOR: J. L. Balzer and W. C. Cooper
 TITLE: The Work Environment of Insulating Workers

ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Am. Ind. Hyg.	29	222-	May-June				
Assn. J.	227		1968				

ABSTRACT:

With the cooperation of the asbestos workers' union and insulating contractors, a study is being made of the environmental exposures and the health of insulating workers in the western United States. Surveys have been made in a number of work situations, including small commercial building, major industrial construction and marine operations. Major emphasis has been on exposures to asbestos-containing materials, fiber glass, cork, plastics, and adhesives. Trends in product usage are presented, as well as illustrative dust counts, based on membrane filter and impinger samples, for various components of the insulator's job, e.g., prefabrication, application, finishing, mixing and tearing out of old insulation.

--Authors' abstr.

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FILE NUMBER

AUTHOR L. Noro

TITLE Occupational and "Non-Occupational" asbestosis in Finland. Yant Memorial Lecture.

ORIG. DATE
Am. Ind. Hyg.
Assn. J.

VOL. 29
PP. 195-
DATE May-June,
201 1968

ABSTR. REFS.

VOL. PP.

DATE

In summary of the Finnish experiences concerning asbestos, we feel that: (1) Asbestos is a rather dangerous material to workers' health, just as hundreds of other agents are if they are not properly controlled in industrial use. We, however, are at present able to control it and make the use of it as harmless as the use of other dusts or toxic materials, even radioactive substances, might be. Every occupation has its health hazards, so also does the asbestos industry; as a part of the total health of workers, asbestosis can be reduced by modern industrial hygiene to a very small hazard. (2) We cannot agree with the recent "horror propaganda" such as was written in the London Sunday Times by Dr. Byrne that asbestos is, "Capable of killing not only the exposed workman but also perhaps his womenfolk and even people living near his place of work." If so, the population in the asbestos area of Finland would already be dead and nobody could live there. Still at present in the asbestos area the mortality rate from cancer and other malignancies is equal to the other rural areas of the country, although in the worker population the frequency of lung cancer might be somewhat higher. (3) As industrial hygienists we, however, have to continue our work to reach better and better hygienic conditions and dust control in places of employment as well as in the environment of factories and mines to safeguard the workers and general population.

--Author's summary cond.

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AUTHOR

M. Viikari, J. Jaaskelainen, and E. Tahiti

27411

Ultrasonic Examination of Pleural Thickening and Calcifications in Occupational Asbestosis

ONIC. REFS

VOL. 1

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ABSTRACT. REF. 1

VOL. 1

DATE _____

Disceases of Chest	54	17-20	July, 1968
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ABSTRACT

The roentgenologic diagnosis of occupational asbestosis is based upon typical pulmonary fibrosis and anteriorly detected pleural calcifications, which appear much later than parenchymal changes. Therefore, a definite diagnosis usually demands a long observation period. We used ultrasonic A- and B-mode methods to examine pleural changes in nine occupational asbestosis patients and five normal persons. In normal persons the parietal pleura was shown as a thin, sharp line when the B-mode method of examination was used. Roentgenographically observed calcifications were easily detected and distinguished from the normal pleura by this examination. It is noteworthy and similar echo peaks were seen in A-mode examinations in lateral and posterior pleura, where roentgenograms did not reveal pleural calcifications, and their size could be traced well with the B-mode examination. Thus it is possible to find early pleural changes, which, in our opinion, are connected with occupational asbestosis. Diagnosis could be made earlier without a long observation time. There are 8 references.

--Authors' abst.

--Authors' abst.

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AUTHOR: I. J. Selikoff and J. Churg
TITLE: Lung Cancer Among Asbestos Insulation Workers.

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Am. Rev. Resp. Dis.	98	149	July, 1968				

ABSTRACT:

Clinical epidemiologic and pathologic findings in a large series of bronchogenic carcinomas were reported among asbestos workers. Among 632 asbestos insulation workers, followed prospectively from January 1, 1943, to December 31, 1967, there have been 358 deaths. Seventy-two were due to cancer of the lung or pleura, approximately eight times the expected incidence. Epidemiologic data are reviewed, including such factors as elapsed period from onset of exposure, total exposure, relation to smoking habits, and comparative incidence of bronchogenic carcinoma and pleural mesothelioma. A personal series of more than 35 cases, the largest so recorded, is analyzed with regard to such clinical and pathologic characteristics as lower lobe localization, variable cell type, peripheral location including infrequency of abnormal bronchoscopic findings, relation to severity of asbestosis, frequency of pleural involvement, diagnostic pitfalls, et cetera.

--Authors' abst

MELLON INSTITUTE, PITTSBURGH, PA.

12/68

NFC 752

AUTHOR
G. Sheers and A. R. Templeton
TITLE
Effects of Asbestos in Dockyard Workers

ORIG. REF. VOL. PP. DATE ABST. REF. VOL. PP. DATE
Brit. Med. J. 3 574-9/7/68 J. Am. Med. Assn. 206 675 10/14/68

ABSTRACT

The prevalence of pleural and pulmonary abnormalities attributed to asbestos among 15,000 workers in a naval dockyard was studied by means of a one-in-ten sample. Ninety-four per cent of the men in the sample were examined. Of these, 3% had experienced continuous occupational exposure and half of the remainder had been exposed intermittently. The prevalence of pleural fibrosis ranged from 28% in continuously exposed workers to 1.9% in those with least exposure. Among intermittently exposed workers the prevalence rose to 1.4% after 25 years had elapsed since first exposure. Most cases of pulmonary fibrosis occurred among the small number of ladders and sprayers who had been continuously exposed for between 15 and 20 years. Pulmonary fibrosis was also seen in a variety of intermittently exposed trades and had been preceded by extensive pleural thickening in some cases. Ten cases of pleural mesothelioma have occurred in the last three years and a large number of men appear to be potentially at risk.

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

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MELLON INSTITUTE, PITTSBURGH, PA.

CLASSIFIED SUBJECT	11/68		107		FELLOWSHIP NUMBER	FILE NUMBER
AUTHOR:	M. Walton and T. Skeoch					
TITLE:	Diagnosis of Asbestosis by Needle Lung Biopsy					
ORIG. REFS:	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.
Thorax	41	556-562	Sept., 1968	J. Am. Med. Assn.	206	425
ABSTRACT:						10/7/68

A method of diagnosing asbestosis during life by needle lung biopsy using the Jack needle as originally described by Smith is presented. It is essentially a punch biopsy. Because pleural adhesions usually accompany asbestosis, pneumothorax did not occur when the needle was inserted 2 cm or less into the lung under local anesthetic. Thus, without thoracotomy adequate biopsy material was obtained to confirm the presence of pulmonary fibrosis in relation to asbestos bodies. Nine cases are described. --J. Am. Med. Assn. References & Reviews

1/69

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752

AUTHOR: L. O. Neuman

TITLE: Pleural Fibrocalcific Plaques and Asbestos Exposure

ORIG. REFS.	VOL.	PP.	DATE	ABST. REFS.	VOL.	PP.	DATE
Environ. Research	2	30-46	Sept., 1968				

ABSTRACT:

In a number of serial investigations an association has been demonstrated between the development of benign calcific pleural plaques or malignant diffuse mesothelioma and slight inhalation of asbestos dust, often some 20 or 30 years previously. As the industrial use of asbestos has increased enormously during the last few decades, a rise in the frequency of mesothelioma—which has hitherto been rare—is anticipated in the near future (Thomson, 1962). From the standpoint of epidemiological research concerning asbestos exposure, the demonstration of calcific plaques on roentgenograms has proved a useful criterion. So far, only an association has been disclosed, however, not an obvious causal relationship. Other pathogenetic factors, still unknown, have to be taken into account either as a contributory or the sole cause. The occurrence of bilateral calcific plaques does not yet imply the presence of asbestosis-pneumoconiosis. In the majority of subjects who have not been occupationally exposed to asbestos, pleural calcification is not combined with pulmonary changes or signs of pneumoconiosis. There are 48 references.

--Author's abstr.

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12/68

NFC 752

AUTHOR: C. M. Nice, Jr., and D. G. Ostrolenk
 TITLE: Asbestosis and Nodular Lesions of the Lung

ORIG. REF.: Diseases of Chest VOL. 54 PP. 226-233 DATE Sept., 1968 J. Am. Med. Assn. VOL. 206 PP. 681 DATE 10/14/68

ABSTRACT:

The rarity of asbestosis and concomitant nodular lesions of the lung has resulted in disagreement regarding the association of the two conditions. The radiographs of six patients with nodular lesions of the lung in association with asbestosis prompted a review. This study confirms the presence of nodular and cystic lesions in radiographs of patients with asbestosis. Since asbestosis may be serious and the complications can be fatal, it should be considered in the differential diagnosis of patients with nodular lung lesions who have been exposed to asbestos.

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

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MELLON INSTITUTE, PITTSBURGH, PA.

FORM 72

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CLASSIFIED SUBJECT	1/69	77	753
AUTHOR	J. F. Knox, et al		
TITLE	Mortality From Lung Cancer and Other Causes Among Workers in an Asbestos Textile Factory		

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Brit. J. Ind. Med.	25	293-303	Oct., 1968				

ABSTR An account is given of work in an asbestos textile factory and of the steps taken to reduce exposure to dust since the introduction of the Asbestos Industry Regulations in 1931. Measurements of the amount of dust to which men were exposed in the scheduled areas have been made by various methods since 1951, but the data obtained by these methods are not directly comparable. Measurements made since 1960 show that the mean yearly dust level has been fairly constant from year to year and has varied from place to place between 1 and 8 particles (5 to 100 microns long and at least three times as long as they were wide) per c.c. of air. Chrysotile was used predominantly in the factory, but small amounts of crocidolite were also processed at all relevant periods. Death rates have been recorded for all the 256 men who were employed for at least 20 years in the scheduled areas since the first man completed 20 years' exposure in 1916, and for the 538 men and 220 women who were employed for at least 10 years in the scheduled areas but were never employed in these areas before 1933. The results show a substantially increased mortality for men who were exposed for 10 or more years before 1933 (48 deaths from all causes against 17.1 expected). The increased mortality among these men can be accounted for by an increased mortality from cancer of the lung (12 deaths against 1.2 expected) and from diseases of the respiratory and circulatory systems associated with asbestos. Men employed before 1933, but for less than 10 years, showed an increased mortality

from lung cancer (5 deaths against 2.6 expected), but no significant increase from other causes. Men and women who were exposed only since January 1, 1933, have had a mortality experience close to the national average. Analysis of the trends in mortality shows (1) a decrease in mortality from lung cancer and other deaths associated with asbestosis with reduction in length of employment before 1933, and (2) an increase in mortality from lung cancer and other deaths without asbestosis with age. Twenty-three cases of lung cancer occurred in men who had been employed in the scheduled areas for at least 20 years. One was regarded as a pleural mesothelioma and the rest (approximately 18 in excess of expected) appear to have been ordinary bronchial carcinomas. Four other mesotheliomas have been diagnosed since 1963, all in men and women with less than 10 years' exposure, one with only seven months' exposure, and one in a man who had been employed in the scheduled areas only since 1937. The results provide grounds for believing that the occupational hazard of bronchial carcinoma has been largely eliminated, but the data are insufficient to estimate the extent of the risk which may remain.

--Authors' abst.

MILLER INSTITUTE, PITTSBURGH, PA.

CLASSIFIED SUBJECT	3/69	283	FELLOWSHIP NUMBER	NFC	FILE NUMBER	752
AUTHOR: R. H. Mortimer and C. B. Campbell						
TITLE: Asbestos Exposure and Pleural Mesotheliomas						
ORIG. REF.	VOL.	PP.	DATE	ABSTR. REV.	VOL.	PP.
Med. J. Australia	2	720-22	Oct. 26, 1968	J. Am. Med. Assn.	206	2371
ABSTRACT:						12/2/68

Diffuse pleural mesothelioma is reported in two patients exposed to asbestos dust. The neoplasmas were dissimilar in macroscopic and histological appearances. Criteria for classification as mesotheliomas are presented. Asbestos bodies were found in the lungs of both patients, but minimal interstitial fibrosis was present.

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

MELION INSTITUTE, PITTSBURGH, PA.

CLASSIFIED SUBJECT

5/69

FELLOWSHIP
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FILE NUMBER

752

AUTHOR L. J. Cralley, et al

TITLE: Characterization and Solubility of Metals Associated with Asbestos Fibers

ORIG. REF.

VOL.

PP.

DATE

ABST. REF.

VOL.

PP.

DATE

Am. Ind. Hyg.

29

569-73

Nov. - Dec.

Assn. J.

1968

ABSTRACT:

A series of uniform samples representing blends from different sources and types of asbestos were analyzed for nickel, chromium, cobalt and manganese. The bulk samples and the less than 10-micron size fractions were analyzed separately. The metals soluble in bovine serum were determined for the less than 10-micron fractions. Free silica content was also determined. The degree of solubility of the same metal varied considerably by source and type of asbestos. Chrysotile had greater amounts of nickel and chromium whereas Amosite was higher in manganese. Crocidolite had the lowest metal content. There are 4 references.

--Authors' abst.

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AUTHOR: J. R. Lynch
TITLE: Brake Lining Decomposition Products

2/69

FELLOW-SHIP
NUMBER nfc

752

ORIG. REVS. VOL. PP. DATE ABSTR. REVS. VOL. PP. DATE
J. Air Poll. 18 824-26 Dec. 1968
Control Assn.

ABSTRACT:

A number of investigators have found asbestos bodies in the lungs of urban residents who were not occupationally exposed to asbestos. A relationship between the carcinogenic properties of asbestos and the urban excess of lung cancer has been suggested. The decomposition products of brake linings have been described as a possible source of these fibers. Brake testing laboratory methods were used to test fiber emission from a variety of friction products. Only a very small fraction of the asbestos escaped as free fiber while the remainder was transformed into some other, nonfibrous, mineral. A significant release of free fiber occurred only under conditions extreme enough to produce brake failure. There are 12 references.

--Author's abstr.

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CLASSIFIED SUBJECT

3/69

FELLOWSHIP
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FILE NUMBER

752

AUTHOR: I. Hagerstrand, L. Meurman, and B. Odlund

TITLE: Asbestos Bodies in the Lungs and Mesothelioma. A Retrospective Examination of a Ten-Year Autopsy Material.

ORIG. REF.

VOL. PP.

DATE

ABST. REF.

VOL. PP.

DATE

Acta Pathol. Microbiol. Scand. (Copenhagen) 72(2), 177-191

1968

APCA Absts.

14 23

Oct. '68

ABSTRACT

In 12,763 autopsies performed during 1957-66 at the General Hospital, Malmö, Sweden, 35 cases of mesothelioma were found (27 of the pleura, 8 of the peritoneum) for a frequency of 0.27% (0.3% if children under 15 years of age are excluded). Of these, 34 were re-examined for the presence of asbestos bodies in the lungs and data compared with data from a matched control group. Asbestos bodies were found in 15 of 26 cases of pleural mesothelioma; a few bodies were found in most cases, but bodies were numerous (more than 20, about 70 μ long) in four. No cases showed pulmonary fibrosis. In the controls, asbestos bodies were found in ten cases, but never in large numbers. Asbestos bodies were found in three of the eight cases of peritoneal mesothelioma; in two, bodies were numerous. Only one of the controls had many asbestos bodies. Of the 15 cases suspected of asbestosis, only one showed advanced pulmonary fibrosis and numerous asbestos bodies.

--APCA Absts.

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MELION INSTITUTE, PITTSBURGH, PA.

CLASSIFIED SUBJECT

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FELLOWSHIP
NUMBER

FILE NUMBER

752

AUTHOR: T. F. B. Collins

TITLE: Pleural Reaction Associated with Asbestos Exposure

ORIG. REFS. VOL. 41, PP. 655-661, 1968, ABSTR. REFS. CARCINOGENESIS ABSTS 7, 113, 1969, DATE March, 1969

ABSTRACT.

Routine miniature radiography of 552 men, working under "favorable" conditions in an asbestos cement factory in Durban, showed obvious pleural reactions in 11/552 (2%), while the incidence among workers not handling asbestos was 0.3-0.6%. These 11 pts. and 4 others are described: all were African males, had worked in the industry 2-5 years and all except 2 had no overt symptoms. One pt. had a probable old tuberculous lesion and another had possible tuberculosis. Asbestos bodies in the sputum, clubbing and a positive Heaf tuberculin reaction (II-IV) were present in 8/15, 9/15 and 15/15, resp. It is suggested that the observed pleural lesions are the first signs of disease induced by light exposure to asbestos over a relatively short time. The "acute" (with visible parenchymal disease) and "chronic" (usually symptomless, with dense soft tissue plaques without apparent calcification) asbestosis, corresponding to sustained heavy exposure or light and/or intermittent exposure, are described and illustrated.

--Carcinogenesis Absts.

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5/72

752

AUTHOR H. T. Plantheydt

TITLE Mesotheliomas and Asbestos Bodies in the expectoration of workers at

Chantre Naval

ORIG. REFS

VOL.

PP.

DATE

ABSTR. REFS.

VOL.

PP.

DATE

Le Poumon Cœur

24

545-

1968

548

ABSTRACT

Mesotheliomas and Asbestos Bodies in the Expectoration of Workers at Chantre Naval. H. T. Plantheydt. Le Poumon Cœur 24: 545-548, 1968

The sputa of 160 shipyard workers were examined for asbestos bodies and in 61% of them the findings were positive. The percentages among production workers ranged from 55 to 88. Two of 17 administrative employees (9%) also had asbestos bodies in their sputum. Within 5 years 19 cases of mesothelioma were found in a community of 300,000 inhabitants which contained 10 hospitals. Of the 19, 17 were shipyard workers but none had worked with asbestos. Eleven were autopsied. Asbestos bodies were found in the lungs of all 11 but none had pneumoconiosis or fibrosis of the lungs. The author states "It was not confirmed that the substance at the center of the asbestos bodies was always asbestos".

--P. G.

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NUMBER

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FILE NUMBER

752

AUTHOR E. A. Gaensler and W. W. Addington

TITLE Asbestos or Ferruginous Bodies

ORIG. REF. VOL. PP. DATE
New Engl. J. Med. 280 488-492 Feb. 27, 1969

VOL. PP. DATE

ABSTRACT

Diatomaceous earth, graphite and carborundum have been identified as the core of typical "asbestos bodies" in man. Substances believed to be biologically inert, including fibrous aluminum silicate, fibrous glass, silicon carbide and forsterite have caused ferruginous bodies in hamsters and guinea pigs. Even fragments of the lung's own elastic tissue may produce "elastosis bodies" that look similar. Techniques are now available for analysis of the core fibers. They include electron beam and x-ray diffraction, laser microprobes, ultrasonic disintegration and mass spectroscopy. The electron-beam diffraction patterns of ferruginous bodies from 22 lungs of "unexposed" persons did not coincide with that of chrysotile. Since 95 per cent of asbestos used in the United States is of this type, it was concluded that the vast majority of ferruginous bodies found at random autopsies are not from asbestos. Obviously, the diagnosis of asbestosis, based on the finding of ferruginous bodies in an apparently unexposed person, must be made with caution. However, one must be equally cautious in making a diagnosis of "nonspecific interstitial pneumonitis" in a person with known exposure because there is no relation between the number of bodies and the severity of asbestos pneumoconiosis. On the contrary, we and others have noted an inverse relation. In persons with prolonged but distant exposure, often retired because of respiratory impairment, the lungs frequently show severe fibrosis with only rare asbestos bodies whereas in patients with more recent exposure, lung biopsy reveals alveoli filled with bodies and debris-laden macrophages but little or no fibrosis.

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This paradox can be explained in a number of ways. The small number of asbestos bodies in workers with fibrosis who were exposed long ago may be the result of clearing of the intra-alveolar material. This clearing occurs most rapidly in areas of supple alveolar walls whereas it is delayed in the more noncompliant regions near the thickened pleura and around larger vessels and bronchi. Therefore, the distribution of asbestos bodies is uneven, and their number in any section need not be representative. The relation between the number of visible asbestos bodies and the degree of fibrosis is also poor because only a very small and variable fraction of fibers become coated. Probably the tiniest, uncoated particles, which are invisible by light microscopy, are most fibrogenic because they have the largest aggregate surface area. This is important because at some stage a chemical reaction must initiate the process of fibrosis. The visible asbestos bodies, therefore, are best considered as markers, rather than as important causative agents. In 1929 W. E. Cooke said that "curious bodies have been found in every necropsy in pulmonary asbestosis, and the problems we have to decide are, first, what the bodies are, and second, whether they are diagnostic of asbestosis." Although at first answers seemed deceptively simple, new information increasingly has raised new questions. That asbestos bodies may contain asbestos is clear. It is equally clear that structures apparently indistinguishable from asbestos bodies may have as their core other materials. Unfortunately, the methods of identification are exceedingly complex, and, even in the best hands, results remain tentative. Nevertheless, recent animal exposure and analytical work suggests that, until asbestos has been identified as the core of an "asbestos body," it is best to use the more general term "ferruginous body." There are 27 references.

--Cond. from text

1. Fibrosis of lungs due to inhalation of asbestos dust. Brt. M. J. 2:147, 1924

11/69

NFC

752

AUTHOR S. Speil and J. P. Leineweber

TITLE Asbestos Minerals in Modern Technology

ORIG. REFS.

VOL. PP.

DATE

ABSTR. REFS.

VOL. PP.

DATE

Environ. Research 2

166-208

4/69

ABSTRACT

A generic term for a variety of hydrated silicate minerals which have one common attribute, namely, the ability to be separated into relatively soft, silky fibers. Although the name is ordinarily associated with those varieties which have technologic importance, it is applicable to all minerals which fit the above description. The term "asbestiform minerals" is perhaps most descriptive. The known varieties of asbestiform minerals can be divided into two main classes on the basis of their crystal structures: serpentine and amphiboles. The sole member of the serpentine class is chrysotile asbestos, which is by far the most common of the asbestiform minerals. It accounts for more than 95% of the asbestos fiber produced today. There are five recognized asbestiform varieties of amphibole: crocidolite, amosite, anthophyllite, tremolite, and actinolite. Although the amphiboles are common rock-forming min-

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erals, the asbestiform varieties are much less abundant than chrysotile. The physical and chemical properties of the asbestiform minerals can be directly related to their crystal structure and chemical composition. In turn, the physical and chemical properties are responsible for the commercial importance of asbestos. It is understandable, therefore, that great emphasis has been placed on the elucidation of the structure and composition of these important minerals. Several comprehensive reviews on the asbestiform minerals have been published in recent years, including N. W. Hendry, R. Gaze, A. A. Hodgson, and W. A. Deer, R. A. Howie, and J. Zussman. The objective of this paper is to bring this information up to date with particular emphasis on recent developments concerning the physics and chemistry of the asbestiform minerals. In addition, the uses of asbestos will be discussed briefly in relation to the properties of the individual species. There are 86 references.

--Authors' abst.

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MELLON INSTITUTE, PITTSBURGH, PA.

CLASSIFIED SUBJECT

9/69

FELLOWSHIP
NUMBER

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FILE NUMBER

753

AUTHOR: M. F. Stanton, R. Blackwell, and Eliza Miller

TITLE: Experimental Pulmonary Carcinogenesis with Asbestos

ORIG. REF.:

VOL.

PP.

DATE

ABST. REF.:

VOL.

PP.

DATE

Am. Ind. Hyg.

30

236-44

May-June,

Assn. J.

1969

ABSTRACT:

Three methods have been used to test the carcinogenic response of the lung and pleura of the rat to asbestos. No carcinogenic response of pulmonary epithelium or pleura was noted to either healing infarcts or implanted wax pellets that contained asbestos. Sarcomas of the pleura and pericardium developed in 74% of rats in which the pleura was covered with an asbestos-impregnated fibrous glass coat. The fibrous glass alone caused only slight reaction, with complete healing. The last method may serve as an accurate and convenient means of quantitating the neoplastic response of the pleura to asbestos. There are 21 references. --Authors' abst.

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FILE NUMBER

752

AUTHOR: M. Kleinfeld

TITLE: Asbestos and Neoplasia

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Industrial Hygiene Review	11	3-10	June, 1969				

ABSTRACT:

Asbestos bodies or mineral-fibre bodies have been discovered in random necropsies of urban populations. The frequency in various cities is as follows: Montreal, 48%; Pittsburgh, 41%; Miami, 27.2%; Capetown, 26.4% and London, 24.3%. Because of the increased frequency of malignant disease in asbestos workers, it has been suggested but not established that the presence of small amounts of asbestos dust in the atmosphere may constitute a public health hazard. The author has pointed out that in none of the necropsy studies where correlations were attempted with diagnosis was there any apparent association with malignancies or other specific causes of death. Furthermore, there is ample evidence that so-called asbestos bodies can be found in workers with exposures to minerals other than asbestos, such as graphite, soft coal and diatomaceous earth, which points up the urgent need for positive identification of the mineral fibres that are responsible for producing the asbestos bodies seen. Hence, it is unwarrented to draw the conclusion from what is now known that the asbestos bodies necessarily presage a significant rise in the incidence of neoplasms. There are 9 references.

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CLASSIFIED SUBJECT

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FILE NUMBER

752

AUTHOR: P. Gross, R. T. P. deTreville, and M. N. Haller

TITLE: Pulmonary Ferruginous Bodies in City Dwellers. A Study of Their Central Fiber.

ORIG. REF.

VOL.

PP.

DATE

ABSTR. REF.

VOL.

PP.

DATE

Arch. Environmen-19 186-88 8/69
tal Health

ABSTRACT:

Chrysotile, which comprises more than 90% of the asbestos used in this country, has a characteristic electron diffraction pattern because of its unique, hollow, tubular, crystalline structure, as seen under the electron microscope. On the basis of the electron diffraction pattern, chrysotile was decisively excluded as a constituent of the cores of all 28 ferruginous bodies isolated from lungs of urban dwellers not occupationally exposed to asbestos. This exclusion is considered highly significant because if the ferruginous bodies in the above city dwellers had been caused by the inhalation of asbestos dusts, then some of the cores should logically be composed of chrysotile. There are 7 references.

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7. 结论:

Prevalence of "Asbestos" Bodies in Human Lungs at Necropsy

АВСТРАЛИЯ

Scrappings and sections of lungs and hilar lymph nodes from 100 necropsies of residents of the state of Michigan were examined for "asbestos" bodies. Lungs from 18 cases, and hilar lymph nodes from four cases yielded positive findings. In one case in which the lung scrapings were negative, the scrapings of hilar lymph node were positive. In only four of the 19 positive cases were "asbestos" bodies seen in the sections of lung tissue. The lung scrape technique achieves maximum positive results in the detection of "asbestos" bodies when upper and lower lobes of both lungs are scraped. Upper and lower lobes of lungs can be expected to yield about the same number of "asbestos" bodies. None of the subjects had manifested pulmonary asbestosis during life. Their occupational and environmental histories were quite varied; in general, they did not "point" to a history of exposure to asbestos. There are 12 references.

--Authors' Abst.

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MELION INSTITUTE, PITTSBURGH, PA.

CLASS. NO. SUBJECT

1/70

FILE NUMBER

752

AUTHOR G. W. Gibbs

TITLE Some Problems Associated with the Storage of Asbestos in Polyethylene Bags

ORIG. REF.

VOL.

PP.

DATE

ABSTR. REF.

VOL.

PP.

DATE

Am. Ind. Hyg.

30

458-

Sept.-Oct.

1969

Assn. J.

464

ABSTRACT

Samples of milled Canadian chrysotile asbestos, collected and stored in polyethylene bags, were found on extraction with benzene to yield oils in substantially greater quantity and with at least one different constituent from those collected and stored in glass jars. The constituent isolated from the asbestos collected in certain polyethylene bags is yellow and shows a strong absorption band at 421 mμ. Extracts of polyethylene bags do not contain this compound, but the compound is formed on the introduction of asbestos into the bag. The relevance to sample collection for subsequent organic analysis and to animal experiments for tests of carcinogenic activity of samples of asbestos and other substances is discussed. There are 12 references.

--Author's abstr.

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752

AUTHOR J. Milne

TITLE Fifteen Cases of Pleural Mesothelioma Associated with Occupational Exposure to Asbestos in Victoria

ORIG. REF. Med. J. Australia 2 669-673 Oct. 4, 1969

ABSTRACT

Fifteen cases of pleural mesothelioma occurring in Victoria are described. Occupational histories and the finding of asbestos bodies in lung tissue indicate a relationship between occupational exposure to asbestos and induction of pleural mesothelioma many years later. The exposure in some cases was relatively short but intense. Crocidolite or blue asbestos would seem to be particularly potent in the induction of these tumors. There are 16 references.

--Author's abst.

MILLON INSTITUTE, PITTSBURGH, PA.

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241

752

AUTHOR: M. L. Newhouse

TITLE: A Study of the Mortality of Workers in an Asbestos Factory

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Brit. J. Industr. Med.	26	294-301	Oct. 1969				

ABSTRACT:

A cohort study of over 4,500 male workers employed at an asbestos factory making both textiles and insulation materials is described. The main analysis is of the mortality of workers employed between April 1, 1933, the date of the implementation of the Asbestos Regulations, and May 1, 1964. The analysis was made in relation to job, length of exposure, and length of follow-up after first exposure. There was no significant difference between the number of deaths occurring in the factory population and the national figures, until an interval of 16 years or longer had elapsed from first exposure in the factory. There were 1,160 men who fulfilled this criterion. In this group there was no excess mortality among those who worked in jobs where exposure was low or moderate, but among those with jobs which entailed heavy exposure there was a significant excess of deaths from cancer of the lung and pleura, and cancer of other sites, in men with a total period of employment in the factory of less than two years, as well as with those who worked for longer. Excess mortality from respiratory disease was observed only among severely exposed workers with long service.

--Author's abst.

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12/69 1243 NFC 752

AUTHOR: G. W. Wright

TITLE: Asbestos and Health in 1969

ORIG. REFS.	VOL.	PP.	DATE	ABST. REFS.	VOL.	PP.	DATE
Am. Rev. Resp. Dis.	100	467-479	10/69				

ABSTRACT:

The relationship between asbestos and health of humans, as reviewable in 1969, indicates that serious exposures to asbestos fiber can occur in certain occupational and immediately adjacent environments. Fortunately, the concentration of asbestos fibers in these settings can be controlled. The environment of the insulation workers is more difficult to control than the more fixed and permanent environment of the factory and associated neighborhood. An approximation of the concentration of respirable-sized asbestos fiber that can be tolerated without the risk of pulmonary fibrosis has been achieved. There is reason to believe that this concentration will also minimize the risk of pulmonary malignancy including mesothelioma. Because of the long time lapse associated with the development of malignancy, longer periods of observation are desirable for a final decision on this point. There is reason to believe that the occupational use of asbestos fiber can achieve the same degree of safety as the use of explosives, radiation, and beryllium, although extensive alterations may be required in the control of production and manufacturing, the containment of asbestos fiber so that none escapes to the outside, and the proper disposal of solid wastes containing the fiber.

DATE RECEIVED BY PURPOSE OF SEARCH CONT'D.

The risk to the general public posed by the mostly intermittent exposure to the low concentrations of asbestos likely to be present in the ambient air has been exaggerated beyond the limits imposed by known facts. Research to develop the necessary additional information upon which appropriate and realistic measures for safe use of asbestos fiber can be taken should be the goal in the next few years.

--Cond. from text

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3/70

752

FOLLOWING
NUMBER

AUTHOR

E. O. Longley

TITLE

The Many Faces of Asbestos Disease

ORIG. REFS

VOL.

PP.

DATE

ABSTR. REFS.

VOL.

PP.

DATE

Med. J. Australia

2

1063-

Nov. 22,

1969

ABSTRACT

Asbestosis is seen as one of the most significant medical problems deriving from industry in the present age. As not only asbestosis but also carcinoma of the lung and mesothelioma of the lung are accepted by the New South Wales Workers' Compensation (Dust Diseases) Board as compensable injuries provided that adequate industrial exposure to asbestos can be proven, it is important that all physicians should be acquainted with the three conditions and should, when they see conditions resembling carcinoma or mesothelioma of the lung, be alerted to make the fullest possible inquiries into the patient's industrial background and place of residence. The presence of asbestos bodies in the sputum or in the lung tissue indicates only that the patient has been industrially or environmentally exposed to asbestos, and not that the patient has pulmonary asbestosis.

--Author's abs:.

Page 1 of 1
Mellon Institute
Pittsburgh, Pa. 15260

10/70

1179

752

AUTHOR: H. Otto and J. G. V. Fragstein

TITLE: ~~Zur Häufigkeit von Asbestnadeln in menschlichen Lungen~~ (German).
Occurrence of Asbestos Needles in Human Lungs.

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Int. Arch. Gewerbehyg.	25	193-	1969				
path. Gewerbehyg.		201					

The present paper deals with the examination by phase contrast microscopy of 218 samples of dust isolated from human lungs from individuals both exposed and not exposed to dust through their occupation. In all lungs of persons not occupationally exposed, needle-shaped particles up to 50 μ length could be demonstrated. Among 190 lungs of persons occupationally exposed to dust, most of them employed in ceramics industry, 14 contained no needle-shaped particles at all, or only particles below 10 μ in length, resp. These dusts were nevertheless collected from lungs of serious cases of silicosis, the nature and quantity of dust deposited in these lungs thus being determined by their occupational exposure. In contrast to the single although regular occurrence of needle-shaped particles in normal and silicotic lungs, the dust deposits in the lungs of persons exposed to asbestos contained many or even abundant needleshaped particle. However, a similarity with the asbestos-bodies of histological sections becomes obvious only when these needles are longer than 20 μ . The difference in the proportion of needleshaped particles in the lung dust collected from individuals exposed and not exposed to asbestos is of diagnostic value.

--Authors' Summary

MELION INSTITUTE, PITTSBURGH, PA.

DATE: 10/70
BY: 1179
REPRODUCTION OF
ABSTRACT: 752

SIPED SUBJECT

4/70

453

FELLOWSHIP
NUMBER

752

FILE NUMBER

AUTHOR: M. V. Klin ~~et al~~

TITLE: The influence of asbestos dust on the health of workers

ORIG. REFS:

VOL.

PP.

DATE

ABSTR. REFS:

VOL.

PP.

DATE

Arbeitsmedsozialmed
arbeitshyg

87-88

43/69

Excerpta Med

22

511

12/69

ABSTRACT:

In 400 workers, an increase of subjective symptoms progressive with the duration of exposure was observed with dyspnea and dry cough being the predominant symptoms. Laboratory examinations revealed an uncharacteristic increase of the BSR and, in the cases of asbestosis, an increase of the γ globulins. In the group examined, pulmonary asbestosis was diagnosed 15 times; these patients had been exposed for an average period of 9.9 yr. This duration of exposure is shorter than that reported by other authors. One case was complicated by a bronchial carcinoma, another by pulmonary tb. Bronchographic and bronchoscopic examinations revealed the frage of incapacitating bronchitis. The incidence of pulmonary tb observed in this group exposed to asbestos dust was precisely the same as that observed by other authors; no causative relation between asbestosis and tuberculosis was manifest.

--Excerpta Med. Abstracts

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MELLON INSTITUTE, PITTSBURGH, PA.

CLASS. SUBJECT | 4/70 | 413 | FOLLOWING NUMBER | 752 | FILE NUMBER

AUTHOR: J. Stumphius
 AVAILABLE FROM: Van Gorcum & Co. N.V. Assen, The Netherlands
 TITLE: Asbest In Een Bedrijfsbevolking (Asbestos in an industrial population)

PUB. DESIGNATION AND SERIAL NO.:
 PLACE PUBLISHED AND PUBLISHER:
 EDITION: 280
 DATE: 1969
 VOL.:
 PRICE: Not given
 REVIEWED IN:
 VOL.:
 PP.:
 DATE:

GENERAL: THEORETICAL: ECONOMIC: EXCELLENT:
 This book, 280 pages with nine plates, written in Dutch, but with a nine-page English summary, is divided into two parts. The first part, consisting of seven chapters totaling 120 pages, is a review of the literature inclusive of papers published in 1968. It discusses in some detail the more significant publications dealing with the biological effects of asbestos, often tabulating the data. The definition of asbestos, the description of the different varieties, their chemical composition, the applications in which they are used, and the tonnages mined (1963) are followed by chapters on asbestosis, the relation of asbestos to different types of cancers, to mesothelioma, and to pleural plaques. One chapter is devoted to the relationship of iron to neoplasia. The second part, divided into six chapters, is concerned with the author's investigation of the working population in the Royal Schelde Shipyards and Engineering Works in Flushing, involving 3,100 people. Of a total of 25 cases of mesothelioma diagnosed during 1962-1968, in and around Flushing, 22 had been connected with the shipyard. However, much of the investigation revolved around asbestos bodies in the sputum of the employees, the method for demonstrating them, the distribution of the workers with positive sputa, and the relation of the asbestos bodies to asbestos dust exposure, as well as to iron oxide. Some of the asbestos bodies (how many is not stated) were stripped of their ferruginous coating and subjected to x-ray diffraction analysis. The central cores were found to consist of amphibole asbestos. The author gives the following noteworthy statement in the summary (page 232): "In view of the extremely wide dissemination of asbestos, particularly outside industry, we must fear that entire

APPROXIMATE NUMBER OF PAGES: 280

populations will soon be subjected to the same sort of slight exposure. The results will then become apparent a few dozen years from now. From a problem associated with industrial medicine, asbestos is rapidly developing into one affecting our national health." A somewhat similar statement appears on the dust cover of the book. These somber warnings are apparently based on one fact and one assumption. The fact is that adults in urban populations generally have large numbers of ferruginous bodies indistinguishable from asbestos bodies in their lungs; whereas the assumption is that these bodies have an asbestos fiber as their central core. Another intriguing concept discussed in this book is the relationship of iron to the development of both neoplasia and asbestos bodies. Although it is admitted that iron is an essential component of hemoglobin and that workers with siderosis do not run an excessive risk of developing lung cancer, nevertheless, there is iron in crocidolite which is associated with the development of mesothelioma. Iron is also associated with the formation of asbestos bodies, and iron oxide in combination with benzo- α -pyrene has been used successfully in the experimental production of lung cancer. Therefore, according to the author, iron may be considered a co-carcinogen. An interesting observation made by Dr. Stumphius and illustrated in Plate 9, is that a patient with mesothelioma may have a posture which slants to the affected side. This book is recommended for those who can read Dutch and who want a fairly comprehensive review of the recent literature on asbestos dust as an occupational hazard.

--P. G.

6770

752

AUTHOR J. Bignon, et al.

TITLE Method for the Isolation and the Concentration of Ferruginous bodies of Human Lungs, Their Frequency and their Significance.

ORIG. REFS. VOL. 24 PP. 71-86 DATE Jan. 1970

ABSTRACT

The frequency of ferruginous bodies with transparent axial fiber or without axial visible fiber was studied in 45 lungs from the post-mortem or the surgical theater. The technique of concentration allows for a quantitative approach. The ferrous bodies were found in 97.8 % of the subjects, aged 17 to 77. The proportion was the same in both sexes. The series contained 3 pleural mesotheliomas and 14 broncho-pulmonary cancers; 2 mesotheliomas and 6 cancers had an excess of ferrous bodies.

--Authors' summary

MILLION INSTITUTE, PITTSBURGH, PA.

2/71

1871

FOLLOWING
NUMBER

FILE NUMBER

752

AUTHOR: S. A. Roach

TITLE: Hygiene Standards for Asbestos.

ORIG. REF.:

VOL. PP.

DATE

ABSTR. REF.:

VOL. PP.

DATE

Ann. Occ. Hyg.

13

7

Jan. 1970

Med. Bull. (St. Ott. N.J.)

30

318 Nov. 1970

New British hygiene standards for airborne chrysotile dust were developed on the basis of a medical and environmental study at an asbestos textile factory where 290 men were employed in the period 1933-1956. A curve was developed relating the prevalence of asbestosis to exposure. It was concluded that the probable risk of being affected to the extent of early clinical signs will be less than 1% for an accumulated exposure of 100 fiber years/cu.cm (an average concentration during working hours over 50 years of 2 fibers/cu.cm). Reducing exposures to below this level would reduce the risk of contracting asbestosis to less than 1% of those exposed for a lifetime. Recent evaluations of health experience in U.S. asbestos plants indicated that an accumulated exposure of 100 fiber years/cu.cm corresponds to 15 million particle (mp) years/cu.ft. The American TLV of 5 mp/cu.ft. would not be sufficiently low to protect workers exposed for 30 years. Therefore, the ACGIH TLV committee has proposed changes in its hygiene standard to 12 fibers/cu.cm, 8 hr. average. If this proposed change is accepted there will be a rough degree of consistency between the hygiene standards from the two countries' organizations.--Med. Bull. (Std. Ott. N.J.) 318 Nov. 1970

CLASSIFIED SUBJECT

4/70

FELLOWSHIP
NUMBER

752

FILE NUMBER

AUTHOR R.J. Schnitzer and F.L. Pundsack

TITLE Asbestos Hemolysis

ORIG. REF.

VOL.

PR.

DATE

ABSTR. REF.

VOL.

PR.

DATE

Environ. Research 3 1-13

1/70

ABSTRACT

Chrysotile fibers exert a marked hemolytic activity on suspensions of washed sheep erythrocytes, but amphibole asbestosiform minerals such as crocidolite, amosite, tremolite, and anthophyllite possess only negligible hemolytic properties. The minimal hemolytic concentration of chrysotile asbestos is dependent on the openness of the fibers as characterized by the air permeability surface area and decreases with increasing surface area. This fact was also observed in the evaluation of hemolysis of fibrous, nonasbestosiform minerals, e.g., sepiolite and nealite. Chrysotile hemolysis can be inhibited by disodium ethylenediaminetetraacetic acid (EDTA) and by certain acidic polymers particularly by polystyrene sulfonates, carboxymethylcellulose ether sodium salt (CMC), and the pyran-copolymer HSC 46015. These substances are not effective as inhibitors of silica (quartz) hemolysis, whereas polyvinylpyrrolidone-ii-oxide (PVP-ii-O), a very potent antagonist of silica hemolysis, interferes with chrysotile only at high concentrations. The hemolytic action of chrysotile can be markedly reduced by repeated treatment with red blood cells. The mechanism of asbestos hemolysis cannot yet be satisfactorily interpreted. There is a varied correlation of hemolytic potency with the surface area and the degree of opening of the fibers which may be influenced by the action of the antagonistic polymers. The role of the fibrous asbestos surface characteristic for chrysotile is not yet elucidated, because "ag-rection" of chrysotile is not hemolytic, although nealite, a natural fibrous magnesium hydroxide, and a highly layered magnesium oxide are active hemolytic agents.

--Authors' abst.

MELLON INSTITUTE, PITTSBURGH, PA.

 PREPARED BY
 RESEARCH DEPT. OF CHEMISTRY
 MELLON INSTITUTE
 PITTSBURGH, PA.

CONT'D

CLASSIFIED SUBJECT

8/70

FELLOWSHIP
NUMBER

FILE NUMBER

752

AUTHOR:

A. Donna

TITLE:

Experimental Tumours from Asbestos (chrysotile, crocidolite and amosite) in the Sprague-Dawley rat.

ORIG. REFS.

VOL. PP.

DATE

ABSTN. REFS.

VOL. PP.

DATE

Med. Lavoro

61 1-17

Jan. 1970

ABSTRACT:

The author has experimented the carcinogenic action of chrysotile, crocidolite and amosite asbestos. The experiments were carried out in the Sprague-Dawley rat, which is known to have a low rate of spontaneous tumors of the respiratory apparatus. The asbestos dust suspended in saline solution was injected into the pleural cavity. After at least 13 months from the treatment mesotheliomas of the pleura and undifferentiated lung cancers were observed. Tumours were obtained in 11.76% of the animals. The statistical evaluation of the data obtained showed a significant and marked dependence of the tumours from asbestos. The correlation between site of injection and site of the neoplasia resulted to be almost constant.

--Author's summary

4/71

FILE NUMBER

752

AUTHOR

F. M. Kogan, E. L. Svirskii and E. N. Pochashev.

TITLE

Data for Hygienic Evaluation of Asbestos-Containing "Asbozirlite" and "Sovelite" Dusts.

ORIG. REFS.

VOL. PP.

DATE

ABSTN. REFS.

VOL. PP.

DATE

Hygien&Sanitation

35

339-344

Jan./Feb.

1970

ABSTRACT:

Asbozurite dust containing asbestos in free mixture with diatomite was found to be more fibrogenic than sovelite dust containing fibers covered with a binding substance (white magnesium and calcium carbonate). Among persons with a sufficiently long record of work under exposition to asbozurite dust several men presented suspicious signs of pneumoconiosis. In hygienic assessment of dust containing asbestos it is necessary to consider, besides its content the presence of a binding component and the type of connection existing between them.

--Authors' summary

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FORM 77

MELLIAN INSTITUTE, PITTSBURGH, PA.

CLASSIFIED SUBJECT

6/70

FELLOWSHIP
NUMBER

FILE NUMBER

752

AUTHOR

M.A. Gerber

TITLE

Asbestosis and Neoplastic Disorders of Hematopoietic System

ORIG. REFS.

Am. J. Clin.
Pathol.

VOL.

53

PP.

204

DATE

Feb.
1970

ABSTR. REFS.

J. Am. Med. Assn.

VOL.

211

PP.

1560

DATE

March 2,
1970

ABSTRACT

Five cases of asbestosis associated with tumors of the hematopoietic system in a series of 35 cases of asbestosis proved by autopsy are reported. Two were cases of multiple myeloma, two were myeloproliferative disorders and included a case associated with reticulum cell sarcoma, and there was one case of Waldenström's macroglobulinemia. The incidence of this association is significantly higher than the overall incidence of such disorders in the corresponding age group of patients without asbestosis.

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

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CLASSIFIED SUBJECT

FELLOWSHIP
NUMBER

FILE NUMBER

753

AUTHOR:

M. A. Gerber

TITLE:

Asbestosis and Neoplastic Disorders of the Hematopoietic System.

ORIG. REF.:

Am. J. Clin.
Path.

VOL.

53

PP.

204-208

DATE

Feb. 1970

ABST. REF.:

VOL.

PP.

DATE

ABSTRACT:

Gerber, Michael A.

ASBESTOSIS AND NEOPLASTIC DISORDERS OF THE
HEMATOPOIETIC SYSTEM. *Am. J. Clin. Path.*, vol.
53:204-208, Feb. 1970, 17 refs.

During a period of 11 years, five cases of asbestosis associated with tumors of the hematopoietic system were encountered in a series of 35 cases of asbestosis proved by autopsy. The diagnosis of asbestosis in each of the five cases was based upon pulmonary fibrosis, hyaline plaques upon the parietal pleura, including the leaves of the diaphragm, and the presence of characteristic asbestos bodies in the lungs. In Case one and Case two, the associated malignancy was multiple myeloma; Case two was noteworthy for the presence of carcinoma of the lung also. In Case three, malignant lymphoma was combined with a myeloproliferative disorder. In Case 4, the myeloproliferative disorder was represented by polycythemia vera and splenoma, with terminal extreme hyperleucocytosis. The patient previously had had a surgical operation for villous adenoma of the colon. In Case 5 the clinical picture and cytology of the bone marrow were consistent with Waldenstrom's disease. The incidence of this association (14%) is significantly higher than the overall incidence of 1% of bone marrow disease in the contemporary age group of patients with asbestosis.

NO. 100 SUBJECT

10/71

FELLOWSHIP
NUMBER

1083

FILE NUMBER

752

AUTHOR: M. Navratil

TITLE: The frequency of pleural calcifications in persons exposed to asbestos dust

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Studia pneumo.	30	48-54	Feb. 1970	Occ. Safety & Health	9	392	1971
phthiscol. cecchoslo.				Absts.			

ABSTRACT

THE FREQUENCY OF PLEURAL CALCIFICATIONS IN PERSONS EXPOSED TO ASBESTOS DUST. M. Navratil. *Studia*

pneumo. phthiscol. cecchoslo. 30: 48-54, Feb. 1970

In the course of a campaign for the detection of asbestosis, the author found pleural calcifications in 5.5% of 400 workers currently or formerly employed in sections of an asbestos factory, where dust exposure was particularly great. Analysis of clinical observations made over a period of 12 years disclosed that pleural calcifications were present in 35% of subjects suffering from asbestosis and in 38.1% of persons in whom possible asbestosis had not been confirmed. No tuberculous aetiology was established, but clinical and anatomical-pathological findings led the author to the conclusion that asbestos dust is only one of the aetiological factors which may favor the development of calcifications; there would otherwise be no explanation for the presence of these formations in persons who have never been exposed to asbestos dust.

--Occ. Safety & Health Absts.

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6/70

FELLOWSHIP
NUMBER

FILE NUMBER

752

AUTHOR

Y. Suzuki and J. Churg

TITLE

Formation of the Asbestos Body, A Comparative Study with Three Types of Asbestos

ORIG. REFS.

VOL.

PP.

DATE

ABSTR. REFS.

VOL.

PP.

DATE

Environ. Research

3

107
118

March
1970

ABSTRACT

Asbestos bodies were produced experimentally in the lungs of hamsters by intratracheal instillation of three types of asbestos: soft chrysotile, harsh chrysotile, and amosite. Though some differences were noted, harsh chrysotile and amosite fibers were converted into asbestos bodies by the same successive steps that were previously described for soft chrysotile: (1) phagocytosis of asbestos by alveolar macrophages and other phagocytic cells and incorporation into phagolysosomes; (2) accumulation of iron micelles around the fibers, possibly by fusion of asbestos-containing phagosomes with hemosiderin granules; and (3) compaction of the micelles and clearing of the peripheral zone, to form a mature asbestos body. Formation of asbestos bodies seems to be a continuous process with old bodies growing in thickness and uncoated fibers being converted into bodies months or years after instillation of asbestos. Possible origins of hemosiderin granules are discussed. Striking hyperplasia of cell organelles was found presumably indicative of their participation in the development of the asbestos bodies.

--Authors' abst.

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MELLON INSTITUTE, PITTSBURGH, PA.

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FELLOWSHIP
NUMBER

752

AUTHOR: N. Moreschi, G. Farina, and A. Cardani

TITLE: The pleural calcifications in asbestosis and tuberculosis: elements of differential diagnosis. (Italian)

ORIG. REF.

VOL.

PP.

DATE

ABSTR. REF.

VOL.

PP.

DATE

Med. Lavoro

61

141-
153

March 1970

ABSTRACT:

Forty three cases of pleural calcifications of tubercular origin, observed at the Consorzio Provinciale Antituberculare of Milan, and 43 pleural calcifications in subjects with asbestosis observed at the Clinica del Lavoro of the University of Milan are presented. The aim of this study was to compare and to study the differential characters of these pleural calcifications. The incidence, the age, the relationship with the length of the exposure to the dust, the latency period, the site and the X-ray aspect were taken into consideration. The percent incidence of pleural calcifications among the

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cases with TB history (1.41%) and among the subjects with asbestosis (19.2%) was significantly different. All asbestotic calcifications and 76% of the TB calcifications were observed in subjects less than 40 years old. Most asbestotic patients with pleural calcifications had been exposed for more than 15 years to the risk. In no cases has less than 15 years passed since the beginning of the dangerous work; on the contrary among the subjects with past tuberculosis seldom (25%) had the original disease occurred less than 15 years before. Almost all the tubercular pleural calcifications were monolateral and localized to the costal pleura, they were generally unique, large, with marked opacity and granular structure, and presented an irregular outline, often with an evident fibrous implantation site. On the contrary the asbestotic calcifications resulted to be mostly bilateral (54% of the cases) and multiple; they were distributed in the regions where the respiratory excursion is greatest, involved separately or in association the costal, diaphragmatic and mediastinal pleura; were small, of light opacity, homogenous in structure, with distinct and sinuous outlines. The single differential characters observed in this study can be of scant diagnostic significance when considered separately; only the finding and the comprehensive evaluation of various elements can help to differentiate pleural calcifications of different origin. --Authors' summary modified

5/71

FELLOWSHIP
NUMBER

FILE NUMBER

752

AUTHOR

J. MCK. ELLISON and W. P. HOWARD.

TITLE

The Control of Asbestos in the Working Environment.

ORIG. REF.

Ann. Occ. Hyg.

VOL.

13

PP.

153-158

DATE

April 1970

ABSTR. REGR.

Occ. Safety & Health

VOL.

9

PP.

27(1)

DATE

1971

ABSTRACT

Abstracts

THE CONTROL OF ASBESTOS IN THE WORKING ENVIRONMENT. J. MCK. ELLISON and W. P. HOWARD. Ann. Occ. Hyg.

13: 153-158, April 1970

Summary report of a joint conference on the control of asbestos in the working environment, held by the British Occupational Hygiene Society and the Asbestos Research Council in London on 18 June 1969. Papers were presented on: asbestos products and health problems; hygiene standards for plants in which exposure to chrysotile asbestos dust occurred; legislation (comparison of the Asbestos Industry Regulations 1931 and the Asbestos Regulations 1969; monitoring techniques and sampling procedures; medical supervision and control. The gist of the papers is reported, together with the ensuing discussion.

--Occ. Safety & Health Abstracts

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MELLON INSTITUTE, PITTSBURGH, PA.

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752

AUTHOR:

J.M.G. Davis, P. Gross and R.T.P. detreville

TITLE

"Ferruginous Bodies" in Guinea Pigs

ORIG. REF.

Arch. Pathol.

VOL.

89

PP.

364-

DATE

April

1970

ABST. REF.

VOL.

PP.

DATE

ABSTRACT

Electronmicroscope studies of "ferruginous" bodies, produced in guinea pigs in response to fine glass fiber and ceramic aluminum silicate, have shown that the fine structure of these bodies is identical to that of asbestos bodies. All these bodies are produced intracellularly, mainly in giant cells. Their coating consists of small dense granules, approximately 60 Angstroms in diameter, that probably represent ferritin or hemosiderin. This coating may be laid down as a single dense layer or as a series of variable layers. Usually all bodies are separated from the giant cell cytoplasm by a distinct membrane, but in some of the older bodies this membrane is no longer present.

--Authors' abstract

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752

AUTHOR: J. C. Wagner

TITLE: The Pathogenesis of Tumors following the intrapleural injection of asbestos and silica

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Proc. Conf. Morphol.	347-358	May 13-16/70	Air Poll. Absts.	13220	Sept. 1971		
Exptl. Respirat. Carcinogenesis, Gatlinburg, Tenn.							

The Pathogenesis of Tumors Following the Intrapleural Injection of Asbestos and Silica. J. C. Wagner. Proc. Conf. Morphol. Exptl. Respirat. Carcinogenesis, Gatlinburg, Tenn., May 13-16, 1970 pp. 347-358

The inhalation of asbestos dust has been associated with the development of pleural and peritoneal mesotheliomas in man. Since experiments had shown that similar tumors could be produced in rats by intrapleural inoculation of several different types of asbestos, a series of experiments was then undertaken to determine if a particular type of fiber or other material could be implicated in the production of the tumors. Early results showed that chrysotile and crocidolite dust produced a high rate of tumors and that the extraction of the oil from the crocidolite had no effect; fewer neoplasms occurred with amosite. The chrysotile used was further studied, first by comparing variation in dosage with the crocidolite and then by comparing physical and chemical characteristics which may account for the difference are being investigated. The reference samples, which were produced as a recommendation of the Union for International Control of Cancer Working Party on Asbestos and Cancer as a basis for further studies, have been inoculated intrapleurally and used in inhalation experiments. Since it was suggested that the reference samples had become contaminated by oils due to being stored in plastic bags, oil-free samples have been used as controls in the intrapleural studies. In addition, silica, which had been used as a control dust in the original experiments, produced a series of tumors, the nature of which required a separate study. A summary of these findings is included.

--Air Pollution Abstracts

MELLON INSTITUTE, PITTSBURGH, PA.

FORM 77

6/70

206

752

AUTHOR:

P. Gross, R.T.P. deTreville, and M.N. Haller

TITLE

Asbestos Versus Nonasbestos Fibers

M. Gross

W.A.

ORIG. REFS.

VOL.

PP.

DATE

ABSTR. REFS.

VOL.

PP.

DATE

Arch. Environ.
Health

20

571
578

May
1970

ABSTRACT:

To classify usefully fibrous dusts inhaled by urban populations, it is suggested that they be categorized initially as asbestos or nonasbestos fibers. This would supply information sufficient for statistical significance and reduce analytical requirements, saving time and money. The ultramicroscopic criteria of asbestos fibers are ends which have profiles characterized by step-like interruptions up or down from each other as seen at a magnification of 20,000 or 25,000 X under the electron microscope, and a surface view (scanning electron microscope at the same magnification) characterized by parallel longitudinal lines that delineate the fibrils. The ultramicroscopic criteria of nonasbestos fibers viewed at 20,000 or 25,000 X magnification are ends which have uninterrupted linear profiles, and a surface view devoid of longitudinal parallel lines.

--Authors' abstr.

CLASSIFIED SUBJECT

9/70

FELLOWSHIP
NUMBER

FILE NUMBER

752

AUTHOR:

J. Bignon and J. Goni

TITLE:

Pulmonary Ferruginous Bodies in France

ORIG. REFS.

VOL.

PP.

DATE

ABSTR. REFS.

VOL.

PP.

DATE

Am. Rev. Resp. Dis. 101

804-

May 1970

805

In his article entitled "Asbestos and Health in 1969," published in the October 1969 issue of the Review, George W. Wright refers to the possibility that the source of ferruginous bodies found in the lungs of almost all Americans could be talc. He inferred that because a great deal of cosmetic talc is used in the United States but not in France, no ferruginous bodies have been found in the lungs of the French population. The author does not believe this evidence is strong enough. In June 1969, preliminary results about the incidence of pulmonary ferruginous bodies in the French population were reported at the Societe Francaise de Pathologie Respiratoire. At present, 58 new cases can be added. In one study ferruginous bodies were found in the lungs of almost all of the 103 persons studied. Only one subject, an 18-year-old girl who lived in the country, did not have ferruginous bodies in the lungs. The youngest patient with ferruginous bodies was 13 years of age. Dust in the lungs of dwellers must be quantitatively nearly the same in Paris as in any great city elsewhere, especially in the United States. The authors are now trying to identify the exact nature of the core of the ferruginous bodies, using the conventional and scanning electron microscopes and the electron microprobe, but the methods of study need to be improved and made safer.

--Cond. from text

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MELLON INSTITUTE, PITTSBURGH, PA.

104

10M
4-64

2/71

FELLOW-MIP
NUMBER

FILE NUMBER
752

AUTHOR T. J. Weeks and A. F. Burns.

TITLE: Performance of Dust Respirators Against A Fibrous Dust.

ORIG. REFS.

VOL. PP.

DATE

ABSTR. REFS.

VOL. PP.

DATE

Am. Ind. Hyg. Assn.

31 290-293

May/June
1970

ABSTRACT

reproducible, easily dispersed, respirable-size fibrous dust was prepared by micropulverizing and air-jet milling a Canadian chrysotile asbestos from the Johns-Manville Jeffrey mine. Three Bureau of Mines approved and five nonapproved respirators were evaluated against this dust, using standard Bureau of Mines techniques. With one exception, all had fiber breakthrough below 1%.

--Authors' abst.

MELLON INSTITUTE, PITTSBURGH, PA.

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CLASSIFIED SUBJECT

8/71

FELLOWSHIP
NUMBER

752

AUTHOR H. Bohlrig

TITLE: Health hazards from asbestos cement

ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Zent. Arbeits med.	20	201-	July 1970	Occ. Safety & Health	9	274(5)	1971
Arbeits sch	211			Abst.			
ABSTRACT							

HEALTH HAZARDS FROM ASBESTOS CEMENT. H. Bohlrig. Zent. Arbeits med. Arbeits sch 20: 201-211, July 1970

An evaluation of the occupational dust hazards to which workers of the asbestos cement industry are exposed in the Federal Republic of Germany. Data are quoted from the literature, and notified and compensated cases are reviewed in tables. The author also discusses the hazards to the general population in areas surrounding asbestos cement factories. --Occ. Safety & Health Abst.

MELLON INSTITUTE, PITTSBURGH, PA.

10M
4-64

12/70

JOURNAL
NUMBER

752

AUTHOR Margaret Turner-Marwick and W. R. Parkes.

TITLE: Circulating Rheumatoid and Antinuclear Factors in Asbestos Workers.

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Brit. Med. J.	3	492-495	Aug. 29, 1970				

ABSTRACT:

In an unselected series of 80 patients with asbestos exposure referred to the London Pneumoconiosis Medical Panel, antinuclear and rheumatoid factors were found in 28 and 27% respectively. This probably represents at least a fourfold increase over their incidence in random populations. The presence of these autoantibodies was not related to the duration of exposure, but was related to the extent of radiographic abnormality.

--Authors' summary

MELAN INSTITUTE, PITTSBURGH, PA.

CONT'D

CLASSIFIED SUBJECT

5/71

515

FELLOWSHIP
NUMBER

752

FILE NUMBER

AUTHOR J. R. Lynch, H. E. Ayer and D. L. Johnson.

TITLE The Interrelationships of Selected Asbestos Exposure Indices.

ORIG. REF.

Am. Ind. Hyg. Assn. J.

VOL.

PP.

DATE

31 598-604 Sept./Oct.
1970

ABSTR. REF.

VOL.

PP.

DATE

ABSTRACT

THE INTERRELATIONSHIPS OF SELECTED ASBESTOS EXPOSURE INDICES. J. R. Lynch, H. E. Ayer and D. L. Johnson. *Am. Ind. Hyg. Assn. J.* 31: 598-604, Sept./Oct. 1970

Based on the assumption that the biological effect of asbestos is related to the concentration of respirable fibers, an index was developed which yields the concentration in numbers of asbestos fibers visible under 430X phase-contrast illumination. Data are presented relating this index to overall dustiness as measured by impinger counts and to absolute fiber concentration and distribution as measured by electron microscopy. The relation between count estimates and gravimetric measures of total dust and chrysotile asbestos deduced from magnesium analyses are given for gross and respirable samples. These relations are developed for use in operations in the manufacture of asbestos test tiles, friction, cement, and insulation products. The most convenient, practical, and direct index of asbestos concentration is the concentration of fibers longer than 5 microns counted on replicate samples of dust by phase-contrast illumination.

3/71

752

AUTHOR

G. K. Sluis-Cremer.

TITLE

Asbestosis in South African Asbestos Miners.

ORIG. REFS

Environ. Res.

VOL.

3

PP.

310-319

DATE

Nov. 1970

ABST. REFS.

VOL.

PP.

DATE

A study was carried out on the fate in 1970 of South African Caucasian miners working on the North West Cape crocidolite mines and the Transvaal amosite mines between 1954 and 1958. It was found that both length of asbestos exposure and length of time of residence of asbestos in the lungs are factors of importance in determining the onset of asbestosis. No person in the study group starting work after 1950 has developed bronchial carcinoma or mesothelioma of the pleura. A high incidence of minimal asbestosis is found in Bantu labourers. These lesions are for the most part of no clinical significance though some, with time and in the absence of further exposure, probably will progress to clinically significant disease.

--Author's abst.

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FORM 77

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3/71

FOLLOWUP
NUMBER

752

FILE NUMBER

AUTHOR
A. Solomon.

TITLE
Radiological features of Diffuse Mesothelioma.

ORIG. REF.
Environ. Res.

VOL. PP. DATE
3 330-338 Nov. 1970

ABSTR. REF.

VOL. PP.

DATE

An association between asbestos and mesothelioma has been claimed, but in a number of cases there is no indication of exposure to asbestos. The inhalation of asbestos results in the formation of ferruginous bodies in the lungs, but these bodies have also been found in patients without known asbestos exposure. Nevertheless, evidence of exposure to asbestos is forthcoming in most cases of mesothelioma of the pleura. Progressive fibrosis of lung tissue may occur as early as 3-6 years after exposure to asbestos. Little or no detectable lung fibrosis need be associated with benign pleural changes or mesothelioma after asbestos dust exposure. In fact, there does not appear to be a relationship between the severity of pleural asbestosis and the development of mesothelioma.

--Cond. from text

3/71

NUMBER

752

AUTHOR
A. Solomon.TITLE
Radiology of Asbestosis.

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Environ. Res.	3	320-329	NOV. 1970				

Asbestos can damage the lung and may cause pulmonary fibrosis, pleurisy with the formation of thick plaques, mesothelioma of the pleura and peritoneum, and carcinoma of the lung. Forty-three cases of deceased asbestos workers who had X-rays of their chests taken during their working lifetime are reviewed. Most of the films available were frontal chest radiographs. The miners, to the best of knowledge, had not engaged in other forms of mining. Care has been exercised in excluding complicating factors such as associated tuberculosis, neoplasms, and any other pathology. The X-rays reviewed are, therefore, concerned with uncomplicated asbestosis. All of the miners had worked in crocidolite or amosite mines. It is important to realize that these minerals occur in banded iron-stone which contains up to 40% free silica and that mill dust may contain up to 20% free silica. The country rock, and to some extent the ore contains important amounts of the iron minerals, magnetite, haematite, and ferric hydrate (40% or more).

--Author's abstr.

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FELLOWSHIP
NUMBERFILE NUMBER
753

AUTHOR J. McEwen, et al.

TITLE Mesothelioma in Scotland.

ORIG. REFS.

Brit. Med. J.

VOL.

PP.

DATE

4 575-578 Dec. 5, 1970

ABSTR. REFS.

VOL.

PP.

DATE

ABSTRACT

In a retrospective study of the incidence of mesothelioma in Scotland for 1950-67 80 cases were traced from pathological reports and biopsy material of malignant tumours invading the pleura and peritoneum. These cases were matched with two sets of controls. Detailed histories of residence, occupation, and degree of exposure to asbestos confirmed that the incidence of mesothelioma in Scotland is similar to that in other parts of Britain.

--Authors' summary

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FELLOWSHIP
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FILE NUMBER

752

AUTHOR

J. Bignon, et al.

TITLE

Incidence of Pulmonary Ferruginous Bodies in France.

ORIG. REF.

VOL. PP.

DATE

ABST. REF.

VOL. PP.

DATE

Environ. Res.

3 430-442 Dec. 1970

ABSTRACT

INCIDENCE OF PULMONARY FERRUGINOUS BODIES IN FRANCE. J. Bignon, et al. Environ. Res. 3: 430-442, Dec. 1970

A method of chemical digestion and microfiltration of lung tissue has shown that ferruginous bodies, with a transparent central fiber or invisible core, were present in the lungs of all cases in a series of 100 French people dwelling either in Paris or in the country. The youngest subject was a 13-year-old boy. The ferruginous bodies were counted and cases classified in respect to the frequency of ferruginous bodies per cm³ of lung. The number of ferruginous bodies seemed to increase with age. Moreover, the percentage of cases with high density of ferruginous bodies was greater in the Paris area than in the country. While no significant relationship has found according with either sex or occupational history, a greater frequency of ferruginous bodies was found in cases with primary lung cancer than with other causes. The significance of these findings requires more accurate epidemiological study.

--Cond. from authors' abstract.

MILLER INSTITUTE, PITTSBURGH, PA.

CLASSIFIED SUBJECT

6/71

FELLOWSHIP
NUMBER

753

FILE NUMBER

AUTHOR: M. C. Godwin and J. Jagatic.

TITLE: Asbestos and Mesotheliomas.

ORIG. REF.:

VOL. 3

DATE

ABSTR. REF.:

VOL. 3

D.

Environ. Res.

391-416 Dec. 1970

ASBESTOS AND MESOTHELIOMAS. M. C. Godwin and J. Jagatic. *Environ. Res.* 3: 391-416, Dec. 1970

MELION INSTITUTE, PITTSBURGH, PA.

104
244

Seven selected cases with asbestos in the lungs and a mesothelioma in the pleura or peritoneum were studied intensively using routine methods, polarized light, incineration technique, and acid digestion. The authors found that asbestos bodies, fragments, particles, and dust could be found in hilar and mediastinal nodes regularly; asbestos bodies in lymphatics being transported to the nodes; asbestos bodies in the spleen, abdominal tumor, and small bowel wall; and dust and particles in abdominal nodes and peritoneum; a small mesothelioma arising in the pleura in a case of peritoneal mesothelioma; a squamous cell carcinoma in the right lung and a mesothelioma of the left pleura. They concluded that asbestos is irritating mechanically and chemically and that it is distributed widely in the body by the lymphatics and blood resulting in malignancies of various types with pleura and peritoneum being especially susceptible.

--Authors' abst. modify
The authors, obviously, have not studied any controls; the reliability of the article as a whole is, perhaps, best epitomized by an illustration (Fig 17) which purports to show asbestos dust in splenic tissue but pictures luminescent ~~asbestos~~ particles by polarized light. --P.G.

MELION INSTITUTE, PITTSBURGH, PA.

AUTHOR H. J. Moitowitz

12/71

FELLOWSHIP
NUMBER

FILE NUMBER

752

TITLE Occupational exposure to asbestos and obstructive respiratory disorders

ORIG. REFS:	VOL.	PP.	DATE	ABSTN. REFS.	VOL.	PP.	DATE
Int. Arch. Occ.	27	244-	Dec. 31,	Occ. Safety & Health	9	514	1971
Health	256		1970	Absts.	No. 9		

ABSTRACT

OCCUPATIONAL EXPOSURE TO ASBESTOS AND OBSTRUCTIVE RESPIRATORY DISORDERS. H. J. Moitowitz. *Int. Arch. Occ. Health* 27: 244-256, December 31, 1970

The purpose of this study was to determine the relationship between chronic obstructive respiratory disorders and occupational exposure to asbestos. The results presented (forced expiratory volume for 1 sec., airway resistance) are based on examinations carried out on 465 active and 31 retired workers with a history of exposure to measurable concentrations of asbestos, and on the findings made in 69 cases of asbestosis. They provide no clear evidence that exposure to asbestos contributes to obstructive respiratory disorders.

--Occ. Safety & Health Absts.

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Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR J. Bignon

TITLE Epidemiological Studies on Accumulation of Ferruginous, Asbestos or Other

EXCISE REFS Exogenous Substances in Human Lungs

Air Conservation

VOL.	PP.	DATE	ABSTR.	REFS.	VOL.	PP.	DATE
5	38-42	(1) 1971					

ABSTRACT

In view of the fact that bodies are formed not only of asbestos, the frequency of occurrence of "ferruginous bodies" in human lungs has been investigated. At the same time, an epidemiological study was performed with reference to sex, age, residence, etc.

Digest Date	Digest Number	PAGE NUMBER
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8/71

FELLOWSHIP
NUMBER

FILE NUMBER

752

AUTHOR M. Sheinbaum

TITLE Recommended Safe Practices for Spraying Asbestos

ORIG. REFS :

VOL.

PP.

DATE

ORIG. REFS.:

VOL.

PP.

DATE

Ind. Hyg. Review

13

3-5

Jan. 1971

ABSTRACT

RECOMMENDED SAFE PRACTICES FOR SPRAYING ASBESTOS. M. Sheinbaum. *Ind. Hyg. Review* 13: 3-5, Jan. 1971

Wetted mixtures of asbestos and other materials are widely used by the construction industry as insulation in fireproofing building components and in coating surfaces to deaden sound. The mixtures are applied by spraying, which may result in the release of high airborne concentrations of fibers. In cases where asbestos must be sprayed, recommendations are given which should be followed to safeguard the health of those who may be exposed to respirable airborne fibers.

--Cond. from text

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MELLON INSTITUTE, PITTSBURGH, PA.

7/71

752

AUTHOR D. R. Gracey, et al.

TITLE Pulmonary Complications of Asbestos Exposure

ORIG. REF.

VOL. 59 PP. 77-81 DATE Jan. 1971

ABSTR. REF.

VOL. PP.

DATE

ABSTRACT:

PULMONARY COMPLICATIONS OF ASBESTOS EXPOSURE. D. R. Gracey, et al. *Chest* 59: 77-81, Jan. 1971

The patient described in this article developed a malignant pleural mesothelioma more than 25 years following brief employment in an asbestos processing plant. The authors discuss the relationship between asbestos exposure and neoplasm, the intriguing subject of co-carcinogenesis and the potential hazard to urban dwellers from the increasing industrial usage of asbestos. Pleural and parenchymal fibrosis are common radiologic features of pulmonary asbestosis but are by no means unique to this disorder. Similarly, pulmonary function abnormalities may include the entire gamut of physiologic changes, depending upon the stage of the disease, complications and associated pathologic lesions. Unfortunately, no treatment is possible for this type of mesothelioma other than temporary palliation of the pleural effusion.

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FELLOWSHIP
NUMBER

752

AUTHOR L. Lopez-Areal

TITLE: Clinical Observations and Bibliographical Summary of the Hazards Involved
with Asbestos

ORIG. REFS.

VOL.

PP.

DATE

ABSTR. REFS.

VOL.

PP.

DATE

Med. Trabajo

19 21-40

Jan./March
1971

ABSTRACT

CLINICAL OBSERVATIONS AND BIBLIOGRAPHICAL SUMMARY OF THE HAZARDS INVOLVED WITH ASBESTOS. L. Lopez-Areal.

Med. Trabajo 19: 21-40, Jan/March 1971(Spanish)

The author gathers the 18 cases of lung asbestosis and the one case of pleural mesothelioma observed by him. Of the asbestosis cases, 3 have died of lung cancer. He describes the histories of the cases observed: date, age, dust exposure time, clinical and radiological examination, respiratory functional tests, sputa, pleural or lung biopsy, evolution, condensing these histories into tables. He insists upon the need to make early diagnosis for which he advises weekly radiographies of the personnel exposed to the hazards of handling the asbestos mineral. He feels that the search and discovery of the pleural radiological signs are important. He mentions the radiological differences found when the inhalation of asbestos dust is accompanied by that of other inert materials (talcum, kaolin, etc.), or silicious earths (diatom earth), in which case pulmonary fibrosis is not linear, but mixed with nodulations and even with more or less confluent shadows. Respiratory functional tests are necessary for the diagnosis and specification. 120 references

--Cond. from authors summary

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MELIION INSTITUTE, PITTSBURGH, PA.

5/71

FELLOWSHIP
NUMBER

752

FILE NUMBER

AUTHOR: L. J. Cralley.

TITLE: Identification and Control of Asbestos Exposures.

ORIG. REF:

VOL. PP.

DATE

ABST. REF.

VOL. PP.

DATE

Am. Ind. Hyg. Assn. J. 32 82-85 Feb. 1971

ABSTRACT

IDENTIFICATION AND CONTROL OF ASBESTOS EXPOSURES. L. J. Cralley. *Am. Ind. Hyg. Assn. J.* 32: 82-85, Feb. 1971

Asbestos can be used safely in modern industrial technology if adequate precautions are taken to prevent excessive and unsuspected exposures. To distinguish between asbestos and other fibers, new techniques must be applied to electron microscopy and diffraction, emission and atomic absorption spectrophotometry, electron microprobe, and neutron activation analytical procedures. Standards and evaluation techniques should be based on air-borne fibers and the use of the membrane filter and phase contrast microscopy for sampling and counting. Controls should include procedures for the safe transport of asbestos; exhaust ventilation and personal protection at work sites; the safe disposal of waste dusts, and the prevention of community contamination.

--Author's cont.

MELIAX INSTITUTE, PITTSBURGH, PA.

AUTHOR

E. A. Gaensler and A. I. Kaplan.

TITLE

Asbestos Pleural Effusion.

ORIG. REF.

Ann. Int. Med.

VOL. PP.

74 178-191 Feb. 1971

DATE

ABST. REF.

VOL. PP.

DATE

ASBESTOS PLEURAL EFFUSION. E. A. Gaensler and A. I. Kaplan. Ann. Int. Med. 74: 178-191, Feb. 1971

The differential diagnosis of pleural effusion is large but has not included asbestos exposure. For 1 to 9 years we followed 12 patients with "idiopathic" effusions that were frequently recurrent, usually bilateral, and often followed by continued chest pain. The fluid was a sterile, serous, or blood-tinged exudate. Physical findings were limited to clubbing, dry rales, and signs of effusion. Asbestos exposure was from 3 to 38 years, but often this history was elicited only with difficulty. Usually, mechanics of breathing were normal, lung diffusing capacity reduced, and alveolar-arterial PO_2 differences elevated. Decortication and lung biopsy specimens in seven patients and post-mortem examination in one showed nonspecific pleuritis with rare asbestos bodies and fibers; all had various degrees of chronic interstitial pneumonitis with asbestos bodies. One case of mesothelioma was recognized 9 years after the first documented effusion. With better understanding of the dangers of asbestos and better surveillance of workers, asbestos pleural effusion will be recognized oftener. It occurred in 21% of all patients with asbestosis seen at our laboratory. 35 references.

--Authors' abstr.

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2/72

NUMBER

174

FILE NUMBER

752

AUTHOR

B. Pernis and P. Castano

TITLE

The effect of Asbestos on Cells in Vitro.

ORIG. REF.
Med. Lavoro

VOL.

62

DATE

Feb. - May (Italian)

ABSTR. REF.

VOL.

PP.

DATE

ABSTRACT

120-
129

1971

MELION INSTITUTE, PITTSBURGH, PA.

The Effect of Asbestos on Cells in Vitro. B. Pernis and P. Castano. Med. Lavoro. 62: 120-129.
Feb.-Mar. 1971 (Italian)

Experiments have been carried out to investigate the effect of different asbestos dusts (crocidolite and chrysotile) on long term cultures (more than 6 weeks) of mouse peritoneal macrophages. Some cultures were treated with ferritin with the aim of testing the possible formation of asbestos bodies in vitro. Finally trials with silica in the same culture conditions have been made as controls. The preliminary results indicate that in optimal culture conditions asbestos is not cytotoxic. Such data are discussed with reference to the contrasting results previously obtained, and to the effect of silica. Moreover the problem of the effect of asbestos in vivo and the problem of asbestos body formation is briefly discussed.

--Authors' summary

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FORM 77
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AUTHOR

A. H. Langer, I. J. Selikoff and A. Sastre.

TITLE

Chrysotile Asbestos in the Lungs of Persons in New York City.

ORIG. REFS

VOL. PP.

DATE

ABSTR. REFS.

VOL. PP.

DATE

Arch. Environ. Hlth. 22 348-361 March 1971

ABSTRACT

CHRYSTOLE ASBESTOS IN THE LUNGS OF PERSONS IN NEW YORK CITY. A. M. Langer, I. J. Selikoff and A. Sastre. *Arch. Environ. Health* 22: 348-361, March 1971

When inhaled, chrysotile tends to split into unit fibrils 200 to 400 Angstroms in diameter, invisible with optical microscopy. Further, it is altered chemically and physically in vivo. Therefore, attempts to identify unaltered chrysotile in the core of "asbestos bodies" have many pitfalls, especially when such attempts are limited by optical microscopy. High-magnification electron-microscopic examination of representative small samples of lung unequivocally showed chrysotile asbestos to be present in 24 to 28 consecutive New York city autopsy cases. Our data demonstrate that chrysotile fibers and fibrils are present in the lungs of New York city residents. Similar observations have been made in London. We anticipate that what is now known for New York and London will be found in other cities as well. 33 references.

--Authors' abst.

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MELION INSTITUTE, PITTSBURGH, PA.

5/72

FELLOW NUMBER

518

FILE NUMBER

752

AUTHOR: J. M. G. Davis

TITLE: Epithelial Outgrowths from Lung Tissue Following Intrapleural Injection of Asbestos Dust in Experimental Animals.

ORIG. REFS.	VOL.	PP.	DATE	ABSTN. REFS.	VOL.	PP.	DATE
Int. J. Cancer	7	238	Mar 15, 1971	J. Occ. Med.	14	162	Feb. 1972

ABSTRACT:

Epithelial Outgrowths from Lung Tissue Following Intrapleural Injection of Asbestos Dust in Experimental Animals. J. M. G. Davis. Int. J. Cancer 7: 238, March 15, 1971

Granulomas developed following intrapleural injection of asbestos dust in experimental animals, and large areas of the pleural surface became thickened with fibrous tissue. In guinea pigs injected with chrysotile dust, alveolar epithelial cells migrated through the lung surface and were found lining spaces in the areas of pleural fibrosis. Initially, these cells exhibited the exact structure of the surfactin-secreting type of alveolar cell, but later many of the cells lost the surfactin granules from their cytoplasm and became ciliated. Cystic formation occurred in the lung tissue of some animals, and groups of cysts grew out from the lining to invade the areas of pleural fibrosis. These cysts were also lined with surfactin-secreting alveolar cells. The possible association of these epithelial outgrowths and the well-known difficulties of diagnosing pleural mesotheliomas are discussed.

--J. Occ. Med. Abstracts

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MELLON INSTITUTE, PITTSBURGH, PA.

MELIADON INSTITUTE, PITTSBURGH, PA.

Author: B. Castleman and Betty U. McNeely.
Title: Case Records of the Massachusetts General Hospital.

Orig. Refs. Vol. 284 Pp. 778-786 Date April 8, 1971
Abstracts

Date Examined: 81
Purpose of Search: Abstract Blank for General Use

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CLASSIFIED SUBJECT

8/71

FELLOWSHIP
NUMBER

752

AUTHOR: J. S. Harrington, Klara Miller, and Gwen Macnab

TITLE: Hemolysis by Asbestos

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Environ. Res.	4	95-117	April 1971				

HEMOLYSIS BY ASBESTOS: J. S. Harrington, Klara Miller, and Gwen Macnab. *Environ. Res.* 4: 95-117, April 1971

Chrysotile asbestos hemolyzes erythrocytes within 10 minutes and over a wide range of pH. Other forms of asbestos show varying hemolytic activities which are related to the magnesium:silicon ratio of each form studied. Erythrocytes from different species of animals show different degrees of hemolysis when exposed to chrysotile, amosite, and crocidolite. The length of time during which erythrocytes are exposed to relatively inactive forms of asbestos should also be considered. Amosite and crocidolite show greater hemolytic activities when allowed to react with erythrocytes over 4 hours instead of 1. Ethylenediaminetetraacetic acid (EDTA) effectively prevents hemolysis by chrysotile and other asbestos materials containing magnesium as a formal part of the lattice. This prevention is pH dependent, however. Sialic acid is even more effective as a preventive agent than EDTA, suggesting that it may contribute the main anionic groups which react with the positively charged magnesium ions on the surface of chrysotile during hemolysis. Poly-2-vinylpyridine-1-oxide, an effective inhibitor of hemolysis by silica powder, has little effect on hemolysis by chrysotile. This again accords with the suggestion that magnesium is the principal agent in hemolysis by asbestos. An association exists between

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cytotoxicity and hemolytic activity of various forms of asbestos and other minerals although the
significance of this is not yet clear. 63 references
--Authors' abst.

CLASSIFIED SUBJECT	9/71	FELLOWSHIP NUMBER	FILE NUMBER
		963	752

AUTHOR: A. Holmes, A. Morgan, and F. J. Sandalls

TITLE: Determination of Iron, Chromium, Cobalt, Nickel, and Scandium in Asbestos by Neutron Activation Analysis

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Amer. Ind. Hyg. Assn. J.	32	281-286	May 1971				

ABSTRACT:

DETERMINATION OF IRON, CHROMIUM, COBALT, NICKEL, AND SCANDIUM IN ASBESTOS BY NEUTRON ACTIVATION ANALYSIS.

A. Holmes, A. Morgan, and F. J. Sandalls. Amer. Ind. Hyg. Assn. J. 32: 281-286, May 1971

Iron, chromium, cobalt, nickel, and scandium were determined by neutron activation analysis (1) in the five UICC standard reference samples of asbestos, (2) in the individual samples of Canadian chrysotile which were blended to produce the reference sample chrysotile B, and (3) in a number of samples of chrysotile from both the North West Cape and Transvaal deposits in South Africa. High resolution gamma spectroscopy was used to show that milling did not produce any significant change in the composition of the UICC standard reference samples.

6/71

752

AUTHOR P. Gross, J. Tuma and R.T.P. deTreville.

TITLE Unusual Ferruginous Bodies: Their Formation From Nonfibrous Particulates and From Carbonaceous Fibrous Particles.

ORIG. REF. Arch. Environ. Hlth. 22 534-537 May 1971

ABSTRACT

UNUSUAL FERRUGINOUS BODIES: THEIR FORMATION FROM NONFIBROUS PARTICULATES AND FROM CARBONACEOUS FIBROUS PARTICLES. P. Gross, J. Tuma and R. T. P. deTreville. Arch. Environ. Health 22: 534-537, May 1971

Reprints available from Industrial Health Foundation, 5231 Centre Avenue, Pittsburgh, Penna. 15232

Among the ferruginous bodies isolated from the lungs of people not occupationally exposed to asbestos dust are those which have a nonfibrous core. These bodies are generally round or ovoid, 4 μ to 30 μ in diameter, and vary in color from translucent light yellow to semitranslucent red-gold. Their central core may be composed of a single large, or multiple small, particles which may be colorless and translucent or black and opaque. Ferruginous bodies with black fibrous cores are believed to owe their origin to inhaled smoke particles from burning leaves, paper, wood, or coal.

--Authors' abstr.

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9/71

STUDY NUMBER

PAGE 4-4687

752

AUTHOR: E. A. Gaensler and A. I. Kaplan

TITLE: Asbestos Pleural Effusion

ORIG. REFS:

VOL.

PP.

DATE

ABSTR. REFS:

VOL.

PP.

DATE

Amer. Rev. Resp. Dis. 103 872 June 1971

ASBESTOS PLEURAL EFFUSION. E. A. Gaensler and A. I. Kaplan. Amer. Rev. Resp. Dis. 103: 872, June 1971

Thirteen patients with "idiopathic" pleural effusions, which were frequently recurrent, often bilateral, and usually followed by continued chest pain, were followed from two years to ten years. Their asbestos exposure ranged from 3 years to 38 years, but in some cases this history was elicited only with difficulty and in retrospect. Excluded from this series were another 12 patients with asbestosis in whom effusion occurred in relation to bronchogenic carcinoma, mesothelioma, or congestive heart failure. The fluid always was a sterile exudate and sometimes was blood-tinged. Physical findings were limited to clubbing, dry rales, and signs of effusion. Mechanics of breathing were normal in most cases, but all patients had reduced diffusing capacities and increased alveolar-arterial differences for oxygen tension. The diagnosis of asbestos effusion was confirmed by decortication and lung biopsy, sometimes bilaterally, in 8 patients, and by postmortem examination in one patient. In each case there was a nonspecific pleuritis with rare asbestos bodies and fibers seen only close to the original pleura; all patients had varying degrees of chronic interstitial pneumonitis with asbestos bodies. In one patient a mesothelioma was recognized certainly 9 years and possibly 11 years after his first documented effusion. It is believed that, with increasing appreciation of the dangers of asbestos and with better surveillance of workers,

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asbestos pleural effusion will be recognized more often. Among patients referred to the writers' laboratories with asbestosis or asbestos exposure, 21 per cent were thought to have "asbestos pleural effusion."

--Cond. from Abstracts Papers Ann. Mtg. Amer. Thoracic Soc.

7/71

752

AUTHOR: J. C. McDonald, et al.

TITLE: Mortality in the Chrysotile Asbestos Mines and Mills of Quebec

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Arch. Environ. Health	22	677-686	June 1971				

ABSTRACT:

MORTALITY IN THE CHRYSOTILE ASBESTOS MINES AND MILLS OF QUEBEC. J. C. McDonald, et al. Arch. Environ. Health 22: 677-686, June 1971

Of 11,788 persons born between 1891 and 1920 employed in the Quebec asbestos mining industry, 88.4% were traced. Of these 2,457 (23.6%) had died. Exposure indexes for each worker were calculated from job dust levels and duration of employment. The overall mortality was lower than expected for the population of Quebec but in the highest dust category, comprising 5% of the cohort, the age-standardized rate was 20% higher than in the other groups. Respiratory, cardiovascular, and malignant diseases in equal proportions accounted for the excess. There were 101 deaths from respiratory cancer including three from malignant mesothelioma, an estimated excess of about 15 deaths. The difference in rates for respiratory cancer between those maximally and minimally exposed was fivefold and, though perhaps exaggerated, was apparently determined by accumulated dust exposure and duration of employment.

--Authors' abst.

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MELION INSTITUTE, PITTSBURGH, PA.

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11/71

NUMBER

752

FILE NUMBER

AUTHOR: J. H. M. Langlands, W. F. M. Wallace and Marion J. C. Simpson

TITLE: Insulation workers in Belfast. 2. Morbidity in men still at work

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Brit. J. Ind. Med.	28	217-225	July 1971				
INSULATION WORKERS IN BELFAST: MORBIDITY IN MEN STILL AT WORK. J. H. M. Langlands, W. F. M. Wallace, and Marion J. C. Simpson. <u>Brit. J. Ind. Med.</u> 28: 217-225, July 1971							

Two hundred and fifty-two (93%) of the insulation workers in Belfast were examined by chest x-ray, questionnaire, clinical examination, and tests of respiratory function. The frequency of chest x-ray abnormality lung field or pleural, increased from 13% in men who had worked for less than 10 years to 85% in men who had worked for 30 or more years in the industry. Pleural calcification was found in 15 x-rays. There was evidence suggesting that some men had pleural fibrosis or calcification due to exposure to asbestos in childhood. Rates were present in 61% and clubbing in 11% of men with lung field abnormality. But these were not common when the x-rays showed only pleural abnormality. Where the lung fields were involved there was a restrictive defect with impairment in lung function most marked in the forced vital capacity and single breath carbon monoxide transfer factor, but where the pleura was involved without lung field involvement there was a tendency to impairment of ventilatory function with a normal transfer factor. Cigarette smoking was associated with a greater impairment of lung function than was x-ray abnormality.

--Authors' abstr.

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MELLON INSTITUTE, PITTSBURGH, PA.

FORM 77

CLASSIFIED SUBJECT

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FOLLOWING
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FILE NUMBER

752

AUTHOR: W. F. M. Wallace and J. H. M. Langlands

TITLE: Insulation workers in Belfast. 1. Comparison of a random sample with a control population

ORIG. REF.:

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ABSTR. REF.:

VOL.

PP.

DATE

Brit. J. Ind. Med. 28

211-216

July 1971

ABSTRACT:

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

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

--Authors' abstr.

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752

Author: P. C. Elmes and Marion J. C. Simpson

Title: Insulation workers in Belfast. 3. Mortality 1940-66.

ORIG. REF.	VOL.	PP.	DATE	ABST. REFS.	VOL.	PP.	DATE
Brit. J. Ind. Med.	28	226-236	July 1971				
INSULATION WORKERS IN BELFAST: MORTALITY 1940-66. P. C. Elmes and Marion J. C. Simpson, Brit. J. Ind. Med. 28: 226-236, July 1971							

One hundred and seventy men were identified as making up the total population of insulation workers in Belfast in 1940. This is an analysis of all the information about deaths that has emerged from tracing these men up to the end of 1966. Five remain untraced, and the mortality experience of the remainder is compared with that of other men in Northern Ireland over the period. There were 92 cases when only 37 were expected. The number of deaths occurring exceeded those expected throughout the period 1940-66 and the increase was statistically significant during the period 1950-55 and onwards. There was an especially high mortality (compared with other Northern Ireland males) due to cancer of the lung, mesothelioma of the pleura and peritoneum, cancer of the gastrointestinal tract, and fibrotic lesions of the lungs. The ratio of observed over expected deaths was 2.6 for all causes, 3.9 for all cancers, and 17.6 for cancers of the lower respiratory tract and pleura. Those men finally classified as dying from lung cancer showed evidence of lung fibrosis whereas those classified as dying from mesothelioma did not. Comparisons within the group failed to show any relationship between age at first exposure or duration of exposure and the excessive mortality. There were too few non-smokers to show the significance of smoking.

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--Authors' add.

MELION INSTITUTE, PITTSBURGH, PA.

12/71

752

AUTHOR W. Weiss

TITLE Cigarette Smoking, Asbestos, and Pulmonary Fibrosis

ORIG. REFS.

VOL.

PP.

DATE

ABSTR. REFS.

VOL.

PP.

DATE

Am. Rev. Resp. Dis. 104 223-227 Aug. 1971

ABSTRACT:

CIGARETTE SMOKING, ASBESTOS, AND PULMONARY FIBROSIS. W. Weiss. Am. Rev. Resp. Dis. 104: 223-227, August 1971

A group of 100 asbestos textile workers was examined by chest roentgenogram and a questionnaire concerning age, sex, smoking habits, and duration of occupational exposure to asbestos. The roentgenograms were examined for evidences of pulmonary fibrosis without knowing the results of the questionnaire. Seventy-five workers were cigarette smokers and 25 were nonsmokers. The prevalence of pulmonary fibrosis was 40 per cent in the smokers and 24 per cent in the nonsmokers. The factors of age, sex, and duration of exposure to asbestos did not account for this difference. The prevalence of pulmonary fibrosis increased with increasing amount and duration of cigarette smoking and with increasing duration of exposure to asbestos.

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--Author's summary

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FELLOWSHIP
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FILE NUMBER

752

AUTHOR P. G. Harries

TITLE A comparison of mass and fibre concentrations of asbestos dust in shipyard insulation processes

ORIS. REFS

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ABSTN. REFS.

VOL.

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DATE

Ann. Occ. Hyg.

14

235-

Sept. 1971

240

ABSTRACT:

A COMPARISON OF MASS AND FIBRE CONCENTRATIONS OF ASBESTOS DUST IN SHIPYARD INSULATION PROCESSES.

P. G. Harries, Ann. Occ. Hyg. 14: 235-240, Sept. 1971

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

--Author's abst.

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752

FILE NUMBER

AUTHOR P. G. Harries

TITLE Asbestos dust concentrations in ship repairing: A practical approach to improving asbestos hygiene in naval dockyards

ORIG. REF.

VOL.

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DATE

ABST. REF.

VOL.

PP.

DATE

Ann. Occ. Hyg.

14

241-254

Sept. 1971

ABSTRACT:

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

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

--Author's abstr.

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Electromotive Phenomenon in Metal and Mineral Particulate Exposures: Relevance to Exposure to Asbestos and Occurrence of Cancer

ORIG. REF.	VOL.	PP.	DATE	ASSN. REF.	VOL.	PP.	DATE
Am. Ind. Hyg.	32	653-	Oct. 1971				
Assn. J.		661					

Electromotive Phenomenon in Metal and Mineral Particulate Exposures: Relevance to Exposure and Occurrence of Cancer. L. J. Cralley, Am. Ind. Hyg. Assn. J. 32: 653-661, Oct. 1971

Exposures to metallic particulates, individually and in alloys, along with mineral particulates may give rise to an electromagnetic phenomenon wherein high levels of biologically active cations are produced at localized tissue sites. The relative position of the involved metals in the electromagnetic series along with the nature of the associated metals and other minerals will influence the nature and concentration of the reactions. This phenomenon may account for otherwise unexplained exacerbations of diseases, sensitization reactions, carcinogenicity, latency periods, and other responses. The potential role of the frequency of exposure to metals in asbestos is recognized, and supporting data are presented. 26 references.

--Author's abstract

--Author's address:

CLASSIFIED SUBJECT

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FELLOWSHIP
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FILE NUMBER

752

AUTHOR: J. E. H. Milne

TITLE: Developmental Changes in Asbestos Bodies and their Significance

ORIG. REF:

VOL.

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ABST. REF:

VOL.

PP.

DATE

Trans. Soc. Occ. 21 118- Oct. 1971
Med. 121

ABSTRACT

Developmental Changes in Asbestos Bodies and Their Significance. J. E. H. Milne. Trans. Soc. Occ. Med. 21: 118-121, October 1971

When industrial fibres are inhaled they may become "ferruginous bodies" by being coated with a segmented iron-protein envelope. A few ferruginous bodies are demonstrable in almost every human lung using tissue digestion techniques. When large numbers are found they probably arise from industrial exposure to asbestos fibres. That is, they are "asbestos bodies." Electron microscope studies can point to whether the central fibre of a ferruginous body is asbestos. Asbestos fibres have longitudinal striation and stepped ends. The asbestos body matures from a thin yellow beaded object to a shorter thicker dark-brown segmented shape, whose coating becomes granulated; fragmentation and phagocytosis then occur. Asbestos bodies found in sputum signify only asbestos exposure. With histological sections, the finding of more than one ferruginous body in each slide of a random series indicates that they are probably asbestos bodies. Large numbers of asbestos bodies in lung plus diffuse fibrosis would indicate asbestosis and where neoplasia is involved, occupational exposure to asbestos may be causative. Asbestos bodies may pass unrecognized with resultant failure to establish their relationship to mesothelioma, and the importance is stressed of recognition of the post-mature degenerating granulated asbestos body.

--Author's summary

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FILE NUMBER

752

AUTHOR: S. G. Luxon

TITLE: The Use of Dust Respirators Against Asbestos Dust Hazards in the United Kingdom

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Am. Ind. Hyg. Assn. J.	32	723-725	Nov. 1971				

ABSTRACT:

The Use of Dust Respirators Against Asbestos Dust Hazards in the United Kingdom. S. G. Luxon. Am. Ind. Hyg. Assn. J. 32: 723-725, November 1971

Practice in the United Kingdom concerning the use of respirators for protection against asbestos dust restricts the application of specific types of respirators. Simple dust respirators are limited to use in concentrations not exceeding 40 fibers per cubic centimeter of air for chrysotile and amosite asbestos and 4 fibers per cubic centimeter of air for crocidolite asbestos. Positive-pressure dust respirators are restricted to use in concentrations not greater than 200 fibers per cubic centimeter of air for chrysotile and amosite asbestos and 20 fibers per cubic centimeter of air for crocidolite asbestos. Ultra-high-efficiency dust respirators may be used in concentrations up to 800 fibers per cubic centimeter of air for chrysotile and amosite asbestos and 80 fibers per cubic centimeter of air for crocidolite

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AUTHOR

J. Simmcock

TITLE

Dust Investigations in an Asbestos-Processing Plant and Its Surroundings

ORIG. REF.

VOL. PP.

DATE

ABSTR. REF.

VOL. PP.

DATE

Staub Reinhalt.

31

26-31

Dec. 1971

Luft

ABSTRACT:

In an asbestos processing plant dust concentrations were determined at working places and also in the plant surroundings. The individual working places can be assessed on the basis of results obtained by measurements carried out from 1965 to 1969. The measurements effected outside the plant buildings have shown that the maximum value of 0.15 mg/m³ was exceeded in the summer months in 20% of the cases, and in the winter months in 50% of the cases. The asbestos particles present in samples are detected under the electron microscope. The particle size distribution and concentration (1.7 particles/cm³), and also the asbestos content (<1 weight %) were determined.

--Author's summary

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Library of Science and Technology

1971

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EXCERPT
NUMBER

FILE NUMBER

AUTHOR: M. Tomasini and E. Sartorelli

TITLE: Frequency of Electrocardiographic Signs of Chronic cor pulmonale in Asbestosis.

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Med. Lavoro	62	549-553	Dec. 1971				

ABSTRACT:

Frequency of Electrocardiographic Signs of Chronic Cor Pulmonale in Asbestosis. M. Tomasini and E. Sartorelli. Med. Lavoro 62: 549-553, Dec. 1971

A study has been carried out on the frequency of electrocardiographic signs of chronic cor pulmonale among 181 asbestosis patients, divided into three groups according to severity of pulmonary fibrosis, judged on the basis of radiologic criteria (U.I.C.C. classification of pneumoconioses, Cincinnati): 85 cases with slight asbestosis, 86 cases with moderate asbestosis, 10 cases with severe asbestosis. In each electrocardiogram the presence of P pulmonale, of right axial deviation of QRS, of patterns of right ventricular hypertrophy, and of right branch block (RBB) was searched for. Nine cases with slight asbestosis showed a right axial deviation of QRS; among the subjects with moderate asbestosis, five showed right axial deviation of QRS and one showed RBB; one case with severe asbestosis presented a P pulmonale with right axial deviation of QRS, and another case showed a RBB. A comparison between electrocardiographic signs and CO diffusion capacity (steady-state method) (a respiratory functional index often modified in asbestosis) showed a lack of correlation. The conclusion is drawn that the electrocardiogram is inadequate in the early diagnosis of chronic cor pulmonale in asbestosis. Therefore it is hoped that more valuable tests, such as right cardiac catheterism with microcatheter, might be used for the detection of an eventual early pulmonary artery hypertension.

--Authors' summary

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MELTON INSTITUTE, PITTSBURGH, PA.

4/72

378

752

AUTHOR: R. F. Hounam

TITLE: The Konimiser - A Dispenser for the Continuous Generation of Dust Clouds from Milligram Quantities of Asbestos

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Ann. Occ. Hyg.	14	329-335	Dec. 1971				

ABSTRACT:

The Konimiser - A Dispenser for the Continuous Generation of Dust Clouds from Milligram Quantities of Asbestos. R. F. Hounam. Ann. Occ. Hyg. 14: 329-335, December 1971

The dispenser described was designed for use in inhalation experiments in which rats are exposed to airborne asbestos. By using radioactive asbestos produced by irradiation with thermal neutrons in a reactor, it was planned to study the deposition patterns produced by different types of fibre and the clearance of material from the respiratory tract. The dispenser was designed to generate dust clouds from any sample of asbestos with a high proportion of fibres in the respirable range and to be operated in conjunction with an exposure chamber holding four rats. This was similar in design to a chamber used at the Medical Research Council Pneumoconiosis Unit. As the dispenser works by a process analogous to atomisation and disperses quite small amounts of asbestos into an air stream with reasonable efficiency to provide respirable airborne dust, it is called a "Konimiser."

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MELLON INSTITUTE, PITTSBURGH, PA.

8/72

NUMBER
453

752

AUTHOR: A. Morgan, A. Holmes and C. Gold

TITLE: Studies of the Solubility of Constituents of Chrysotile Asbestos in Vivo
Using Radioactive Tracer Techniques

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Environ. Res.	4	558-570	Dec. 1971				

ABSTRACT:

Studies of the Solubility of Constituents of Chrysotile Asbestos in Vivo Using Radioactive Tracer Techniques. A. Morgan, A. Holmes and C. Gold. Environ. Res. 4: 558-570, December 1971

Radioactive tracer techniques were used to study the solubility of certain minor constituents (iron, chromium, cobalt and scandium) of chrysotile asbestos following administration to rats by intrapleural injection. For chrysotiles in which the cobalt substitutes magnesium in the brucite layer, the excretion of cobalt-60 can be used to measure the rate at which structural magnesium dissolves in vivo. The distribution of asbestos in the thoracic cavity was determined from measurements of the associated radioactivity. Similar measurements showed that in the case of one particular chrysotile, a significant fraction of the administered asbestos had migrated to the liver. Additional experiments were performed with this material and examination of the relevant tissues by electron microscopy confirmed that migration to the dome of the liver occurred via adjacent diaphragmatic lesions. 12 references.

--Authors' abst.

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752

T. Berittic, et al.

Asbestos and Ferruginous Bodies

ORIG. REF.	VOL.	PP.	DATE	AUTHOR	REF.	VOL.	PP.	DATE
Arh. Hig. Rada	22	317-	1971					
(4)	322							

Asbestos

Asbestos body-like structures ("ferruginous bodies") found in some of the smears prepared from lungs of 450 consecutive necropsies in Zagreb were studied with particular reference to the morphological features of the iron-staining reaction of ferruginous coating. From this study it appears that there are no differences in iron staining properties of the coating which would serve to distinguish between ferruginous bodies of asbestotic and those of nonasbestotic origin. The colour pictures of the unstained (native) and the corresponding stained ferruginous bodies are presented.

--Authors' abst.

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AUTHOR: H. Nizze

TITLE: Frequency of So-called Asbestos Bodies in Human Lungs

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Intern. Arch. Arbeitmed.	28	71-82	1971	Air Poll. Absts.		13947	Oct. 1971

Frequency of So-called Asbestos Bodies in Human Lungs. H. Nizze. Intern. Arch. Arbeitmed. 28: 71-82, 1971

Lung tissue obtained by necropsy from 234 men and women aged 30 to 88 years old was examined for the occurrence of so-called asbestos bodies. In only 22 cases typical asbestos bodies were found. The quantity of asbestos bodies was calculated and was about 1600 to 1800/gram dried lung tissue in the positive cases. In the preserved lung tissue of a 58-year-old man, the only case of asbestosis among 27,562 consecutive necropsies, nearly 100,000 to 120,000 so-called asbestos bodies were found. In the lungs of necropsies coming from the vicinity of asbestos mines, much higher quantities of asbestos bodies were found than in material coming from rural areas. Comparison with the necropsy data on asbestos bodies in lungs found in the literature reveals a great variation, which may be due to the different economical structure of the examined district and to different examination methods. Attention is given to the fact that morphologically identical asbestos bodies can also be induced by inhalation of filamentous materials other than asbestos. 56 references. --Air Pollution Abstracts

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FELLOWSHIP
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FILE NUMBER
752

AUTHOR
Davis, J. M. G.

TITLE

ORIG REFS

ABSTRACT

97. DAVIS, J. M. G. (Dep. Pathol., Cambridge Univ., Cambridge, Engl., U.K.) Epithelial outgrowths from lung tissue following intra-pleural injection of asbestos dust in experimental animals. INT J CANCER 7(2): 233-244, illus, 1971. [Fr. sum.]--After the intra-pleural injection of asbestos dust in experimental animals, granulomas were produced and large areas of the pleural surface became thickened with fibrous tissue. In guinea-pigs injected with chrys erler dust, alveolar epithelial cells often migrated through the lung surface and were found lining spaces in the areas of pleural fibrosis. Initially these cells exhibited the exact structure of the surfactin-secreting type of alveolar cell, but later many of the cells lost the surfactin granules from their cytoplasm and became ciliated. In some animals cystic formation occurred in the lung tissue and groups of cysts grew out from the lung to invade the areas of pleural fibrosis. These cysts were also lined with surfactin-secreting alveolar cells. The possible association of these epithelial outgrowths and the well-known difficulties of diagnosing pleural mesotheliomas are discussed.

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FELLOWSHIP
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FILE NUMBER

752

AUTHOR K. Ahlman and E. Siltanen

TITLE Exposure of insulation workers to asbestos dust

ORIG. REF.

VOL.

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VOL.

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DATE

Work. Environ-
Health

(8)

1-5

1971

EXPOSURE OF INSULATION WORKERS TO ASBESTOS DUST. K. Ahlman and E. Siltanen. *Scand. J. Work. Environ. Health*

8: (1) 1-5, 1971

FORM 77

MELIION INSTITUTE, PITTSBURGH, PA.

It has been shown that there is a highly increased risk of lung cancer occurring in persons exposed to dusts containing asbestos in insulation work. The Institute of Occupational Health carried out a field investigation in 1962-1963 which included all actively working laggers in the three largest Finnish cities. This investigation was continued after an interval of a few years. The total number of workers examined during the period 1962 through 1968 was 452, nearly three-fourths of all insulators still working in this country. In spite of these examinations, no reliable, current data regarding the true incidence of laggers' pneumoconiosis are available, and even less is known concerning the morbidity of former years. Work producing the hazardous dust has been performed in this country for several decades. According to the newly revised law relating to the safety of working environments, however, all workers must nowadays submit to a periodical examination at least once every 3 years. The main criterion for accepting a case as asbestosis was the presence of typical radiological manifestations in the lungs, such as interstitial or focal fibrosis, especially in the middle or lower areas. This was not regarded as sufficient for diagnosis, however, unless it was clearly proved that the patient had a sufficiently long duration of exposure. Pleural calcifications or thickenings as the only noticeable radiological findings, without a

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Typical occupational history, were not enough to classify the case as anything but suspected asbestosis. According to American findings concerning asbestos dust particle concentration, a threshold limit of 175 particles per cubic centimeter (≈ 5 mppcf) has been recommended as a ceiling value below which all concentrations should fluctuate, and a threshold limit of 70 particles per cubic centimeter (≈ 2 mppcf) has been recommended as a time-weighted average concentration as counted by the impinger light-field count technique. The same values have also been recommended in Finland.

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FELLOWSHIP
NUMBERFILE NUMBER
752

AUTHOR

Sub-Committee on Asbestosis

TITLE

Evaluation of Asbestos Exposures in the Working Environment

ORIG. REFS.

VOL. PP.

DATE

ABST. REFS.

VOL. PP.

DATE

Ind. Med. Surg.

41

28-30

Jan. 1974

ABSTRACT

Evaluation of Asbestos Exposures in the Working Environment. Sub-Committee on Asbestosis of the Permanent Commission and International Association on Occupational Health. Ind. Med. Surg. 41: 28-30, January 1972

The Sub-Committee on Asbestosis of the Permanent Commission and International Association on Occupational Health recommended procedures for collecting, enumerating, and characterizing respirable asbestos fibers in the working environment on the following: fiber exposure evaluation procedures; chemical characterization of fibers; physical characterization of fibers; and alternative exposure evaluation procedures.

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FORM 32

MELLON INSTITUTE, PITTSBURGH, PA.

12/72

752

AUTHOR: W. B. Reitze, et al.

TITLE: Application of Sprayed Inorganic Fiber Containing Asbestos: Occupational Health Hazards

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Am. Ind. Hyg. Assn. J.	33	178-191	March 1972				

ABSTRACT

1346 Application of Sprayed Inorganic Fiber Containing Asbestos: Occupational Health Hazards. W. B. Reitze, et al. Am. Ind. Hyg. Assn. J. 33: 178-191, March 1972

Over 40,000 tons of inorganic fibrous insulation containing asbestos were used in 1970 by the construction industry as a fireproofing material in the erection of multistoried buildings. The application of this material by a spraying technique produces serious contamination of the working environment. Asbestos fiber concentrations may range from 30 f/cc to more than 100 f/cc. Some early observations of the exposures and health of the workmen in this comparatively new occupation are given with photographs of the working areas. Nearby workers may be indirectly exposed. Such concentrations were found to be 70 f/cc ten feet from the spraying and 46 f/cc seventy-five feet away. Control measures are discussed.

--Authors' abst.

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6/72

752

AUTHOR

G. W. Gibbs and M. Lachance

TITLE

Dust Exposure in the Chrysotile Asbestos Mines and Mills of Quebec

ORIG. REFS.

VOL.

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ABST. REFS.

VOL.

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DATE

Arch. Environ.
Health24 189-
197

March 1972

Dust Exposure in the Chrysotile Asbestos Mines and Mills of Quebec. G. W. Gibbs and M. Lachance.
Arch. Environ. Health 24: 189-197, March 1972

Past and present features of the Quebec chrysotile mining and milling environment and methods used to establish indices of exposure for epidemiological studies are described. Environmental dust concentrations used for calculation of dust exposure indices were derived mainly from systematic midlevel-impinger samples taken since 1948, and from field surveys made in 1968, using impinger and a variety of other techniques. Though dust levels within the industry fluctuated widely, there was a steady fall from an average of approximately 75 million particles per cubic foot (MPCF) in 1918 to less than 10 MPCF in 1968. Considerable variation in the fiber content of airborne dust in this industry suggests that any safety standard should probably take account of fibrous and non-fibrous components. 27 references.

--Authors' abst.

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FELLOWSHIP
NUMBER

FILE NUMBER

752

AUTHOR: Anon.

TITLE: Inhalation of Low Concentrations of Asbestos

ORIG. REF.

VOL.

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ASST. REF.

VOL.

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Med. J. Austral

1

839-

April 22,

1972

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ABSTRACT

Inhalation of Low Concentrations of Asbestos. Anon. Med. J. Austral. 1: 839-840, April 22, 1972

New uses for asbestos in industry are constantly being found with the result that many workers may be exposed to low concentrations of asbestos unknown to them or their doctors. This has been investigated in shipyard pipe covers. At the same time, an evaluation was made of the methods of detecting asbestosis at the earliest possible stage and also of the safety of the recommended threshold limit value of 5 million particles of asbestos per cubic foot of air (MPPCF). The authors conclude that the assessment of the prevalence of asbestosis in workers is difficult because the length of exposure necessary for the development of the disease is long (at least 10 years at moderate levels of dust exposure), and because in most trades in which the hazard exists the levels of exposure vary widely according to work shop practice. However, prevalence increased with the age of the workers and with duration of exposure. Prolonged exposure to dust concentrations which exceed only marginally the accepted safe level appears to be hazardous.

--Cont. from prev.

11/12

752

AUTHOR D. C. Braun and R. T. P. deTreville
TITLE Comment on McDonald et al's Study on Mortality in Asbestos Industry

ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Arch. Environ. Health	24	294	April 1972				
ABSTRACT							

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FOLLOW-UP
NUMBER

VOLUME NUMBER

252

752

AUTHOR. M. L. Newhouse, et al.

TITLE. A Study of the Mortality of Female Asbestos Workers

ORIG. REF.

VOL.

PP.

DATE

ABST. REF.

VOL.

PP.

DATE

Brit. J. Ind.

29

134-

April 1972

Med.

141

A Study of the Mortality of Female Asbestos Workers. M. L. Newhouse, et al. Brit. J. Ind. Med. 29: 134-141, April 1972

A cohort study of over 900 women employed at an asbestos factory making both textiles and insulation materials is described. It extends the information about asbestos-related disease at this factory which was previously available only for male workers. The cohort was defined as all the women who started employment at the factory between 1936 and 1942 and the main analysis was of mortality up to the end of 1968. This analysis was made in relation to job, length of exposure, and age at first exposure. Compared with national rates there was excess overall mortality among those who worked in jobs with low to moderate exposure partly accounted for by deaths from cancer. In the group with severe exposure, who had worked in the factory for less than two years, there was an excess of cancer of the lung and pleura. However, the most marked increased mortality was in those with severe exposure who had worked for more than two years in the factory; in this group there were excess deaths from cancer of the lung and pleura, from other cancers, and from respiratory diseases. There were no significant trends of excess mortality with age at first exposure. The smoking habits of some of the deceased women were obtained and the indications were that the proportion of smokers in the cohort was higher than the national rate. This could account for some of the excess mortality but the trend of this excess with exposure indicated the role of asbestos. Necropsy reports and/or histological material were obtained for 43% of those who had died. Three deaths registered as cancer of the pleura were identified as pleural mesothelial tumours; in all there were 11 mesotheliomas, six of pleural and five of peritoneal origin. 32 references.

--Authors' abst.

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8/72

NUMBER
850PAGE NUMBER
752

AUTHOR: J. C. McDonald, et al.

TITLE: Respiratory Symptoms in Chrysotile Asbestos Mine and Mill Workers of Quebec

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Arch. Environ. Health	24	358-363	May 1972				

ABSTRACT:

Respiratory Symptoms in Chrysotile Asbestos Mine and Mill Workers of Quebec. J. C. McDonald, et al. Arch. Environ. Health 24: 358-363, May 1972

A Standard questionnaire was administered to an age-stratified random sample of 1,015 current male employees in the Quebec chrysotile asbestos mines and mills. The prevalence of persistent cough and phlegm (bronchitis) was related to age and smoking habits and perhaps, in nonsmokers and light smokers, also to dust exposure. Breathlessness on exercise was related to age and dust exposure but not to smoking. 13 references.

--Authors' abst.

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FELLOWSHIP
NUMBER

921

FILE NUMBER

752

AUTHOR: Margaret R. Becklake, et al.

TITLE: Lung Function in Chrysotile Asbestos Mine and Mill Workers of Quebec

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Arch. Environ. Health	24	401-409	June 1972				

ABSTRACT:

Lung Function in Chrysotile Asbestos Mine and Mill Workers of Quebec. Margaret R. Becklake, et al. Arch. Environ. Health 24: 401-409, June 1972

Lung function tests were carried out on an age-stratified random sample of 1,015 Quebec asbestos workers whose dust exposure had been estimated from their work history and available dust levels in the industry. In nonsmokers, several function tests distinguished the lower two dust-exposure groups. These were inspiratory capacity, forced vital capacity, and forced expiratory volume in 0.75 second and in 1.0 second. In smokers the same tests were somewhat less sensitive. Any of the tests mentioned appear to be suitable for health surveillance of asbestos-exposed workers, whatever their smoking habits. 15 references.

--Authors' abst.

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8/28/72PURPOSE
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ASBESTOS, MINE AND MILL WORKERS, QUEBEC

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9/72

NUMBER

752

FILE NUMBER

AUTHOR C. E. Rossiter, et al.

TITLE Radiographic Changes in Chrysotile Asbestos Mine and Mill Workers of Quebec

ORIG. REFS.

VOL.

PP.

DATE

ABSTR. REFS.

VOL.

PP.

DATE

Arch. Environ.

24

388-

June 1972

Health

400

ABSTRACT

Radiographic Changes in Chrysotile Asbestos Mine and Mill Workers of Quebec. C. E. Rossiter, et al.
Arch. Environ. Health 24: 388-400, June 1972

Radiographic changes in 13,021 employees were assessed in 6,529 men aged 36 to 65. The prevalence of rounded small opacities (category 1/0 or more) rose with increasing dust exposure from 0.5% to 3.4%; that of irregular small opacities (category 1/0 or more), from 2.2% to 17.0%; and that of pleural thickening (grade 1 or more), from 1.4% to 12.3%. Small opacities or pleural changes were seen in 17% of men, but 3.2% had both. At present dust exposure levels, much lower rates can be expected. The prevalence of radiologic changes was higher in the Thetford Mines area than in the Asbestos area. This was shown by pleural changes more than parenchymal changes, and the difference was extreme with pleural calcification which was common in Thetford Mines but virtually absent in Asbestos, 15 references.

--Authors' abst.

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10/72

FOLLOWUP
NUMBER
752AUTHOR
M. Navratil and F. TrippeTITLE
Prevalence of Pleural Calcification in Persons Exposed to Asbestos Dust
and in the General Population in the Same District

ORIG. REF. VOL. PP. DATE ABSTR. REF. VOL. PP. DATE

Environ. Res. 5 210- June 1972

216

ABSTRACT:

Prevalence of Pleural Calcification in Persons Exposed to Asbestos Dust, and in the General Population in the Same District. M. Navratil and F. Trippe. Environ. Res. 5: 210-216, June 1972

It is of interest whether pleural calcification is primarily the result of long years of exposure to asbestos dust or whether there are factors other than exposure to dust. Persons working for a long period in a plant processing asbestos products (chrysotile), persons without occupational exposure to dust but living in the vicinity of the plant, and consanguineous relations of patients with pleural calcifications were investigated. The authors also studied a large population above the age of 40, in the district in which the plant is situated. Comparison of the groups disclosed that prevalence of pleural calcifications was closely related to opportunity for exposure to asbestos dust either occupationally or by family or neighborhood contact, as contrasted with the unexposed population. The prevalence in the group with direct or indirect asbestos exposure was 5.3, 5.8, 3.5%; whereas in the unexposed population it was 0.34%. These results indicate that asbestos is primarily responsible for pleural findings, but that some pleural disease may be the result of the other factors, still not known. The identification of other causes is hampered by the long period which need elapse from the onset of the process to the radiological appearance of the pleural change. 21 references.

--Authors' abstr. modified

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12/72

752

AUTHOR: E. G. Beck, P. F. Holt and N. Manojlovic

TITLE: Comparison of Effects on Macrophage Cultures of Glass Fibre, Glass

Powder, and Chrysotile Asbestos

ORIG. REF.:

VOL. PP.

DATE

ABST. REF.:

VOL. PP.

DATE

Brit. J. Ind. Med. 29 280-286 July 1972

ABSTRACT:

1350

Comparison of Effects on Macrophage Cultures of Glass Fibre, Glass Powder, and Chrysotile Asbestos.
E. G. Beck, P. F. Holt and N. Manojlovic. Brit. J. Ind. Med. 29: 280-286, July 1972

The effects on macrophage cultures of glass fibre, glass powder, and chrysotile asbestos are compared. Glass fibre behaves like chrysotile in producing an increase in cell membrane permeability in cultured macrophages. This is demonstrable by the increase in lactic dehydrogenase activity in the supernatant fluid. The metabolism, measured by lactate production, is not reduced as it is when quartz is phagocytosed. Glass powder behaves like the inert dust corundum, producing little change in the number of cells stained by erythrosin B and a small increase in lactate dehydrogenase activity, both being in the range of the control. There is an increase in lactate production as a result of higher metabolism due to phagocytosis. Dusts may produce two basic effects, namely a toxic effect and change in cell membrane permeability. A non-specific effect on the cell membrane due to the slow and sometimes incomplete process of ingestion of long fibres is probably a function of the morphology, particularly the length of the fibres. A primary specific effect induced by some dusts immediately follows contact with the cell membrane. References.

--Authors' abst.

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FELLOWSHIP
NUMBER

FILE NUMBER

752

AUTHOR: I. J. Selikoff, W. J. Nicholson and A. M. Langer
TITLE: Asbestos Air Pollution

ORIG. REFS.	VOL.	PP.	DATE	ABST. REFS.	VOL.	PP.	DATE
Arch. Environ. Health	25	1-13	July 1972				
ABSTRACT							

Asbestos Air Pollution. I. J. Selikoff, W. J. Nicholson and A. M. Langer. Arch. Environ. Health 25: 1-13. July 1972

Findings of mesothelioma among individuals living in the vicinity of asbestos plants suggested that asbestos air pollution might occur. Measurement of asbestos (chrysotile) content of ambient air in New York City and other locations showed levels of 10 to 50 x 10⁻⁹ gm/cu m. and lungs of New York residents examined at autopsy regularly showed chrysotile fibrils. Occurrence of asbestos air pollution is now established. What have not yet been defined, however, are the dimensions of disease hazard which may be associated. Epidemiological considerations suggest that it is improper to equate the several kinds of asbestos exposure: direct occupational, indirect occupational, exposure in family circumstances, neighborhood contamination, and general community asbestos air pollution. Since most urban air pollution is derived from commercial and industrial sources, the asbestos industry has with important responsibility and opportunity for its control. 38 references.

--Authors' abstr.

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12/72

NUMBER

752

FILE NUMBER

AUTHOR P. G. Harries, et al.

TITLE Radiological Survey of Men Exposed to Asbestos in Naval Dockyards

BURGH, PA.

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Brit. J. Ind. Med.	29	274-	July 1972				
		279					

ABSTRACT

1347 Radiological Survey of Men Exposed to Asbestos in Naval Dockyards. P. G. Harries, et al. Brit. J. Ind. Med. 29: 274-279, July 1972

Asbestos related abnormalities were found in 3% of a 10% sample population in radiological surveys of the naval dockyards at Portsmouth, Chatham, and Rosyth. The prevalence of these abnormalities was related to the type of occupation and duration of exposure to asbestos. The results confirm the findings of an earlier survey at Devonport dockyard. No association between smoking, or the amount smoked, and the incidence of parenchymal or pleural disease due to asbestos was detected. Pleural abnormalities were found 10 times more frequently than parenchymal disease, and concern is felt over the uncertainty of the prognosis in men with pleural abnormalities, especially as 37 men have developed pleural mesothelioma at Devonport since 1965. More work is required to establish the true significance of pleural abnormalities caused by asbestos and to explore possible methods of treatment. 12 references.

--Authors' abstr.

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CLASSIFIED SUBJECT		10/72		FELLOWSHIP NUMBER 1075		FILE NUMBER 752	
AUTHOR: W. J. Nicholson, C. J. Maggione, I. J. Sellkoff TITLE: Asbestos Contamination of Parenteral Drugs							
ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Science	177	171-173	July 14, 1972				
ABSTRACT: Asbestos Contamination of Parenteral Drugs. W. J. Nicholson, C. J. Maggione, I. J. Sellkoff. Science 177: 171-173, July 14, 1972							
Appropriate filtration procedures for sterilization and removal of foreign matter from parenteral solutions became necessary several decades ago. The pharmaceutical industry found asbestos filters useful and effective for this purpose, and they have become widely used. Unfortunately, such filters add a contamination of their own to the filtrate and, at least in the past 3 years, parenteral solutions used for intravenous, intramuscular, and intraperitoneal therapy in the United States have often contained measurable amounts of asbestos. The drugs sampled represent only a small fraction of those on the market. On the other hand, the finding of asbestos in one third of the single vials that were examined in this investigation over a 1-year period indicates significant asbestos contamination of some parenteral drugs at this time. 13 references. --Cond. from text							
DATE RECEIVED	BY	PURPOSE OF RESEARCH	CONT'D				
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Digest Date 6/73 Digest Number 44 FILE NUMBER 752

AUTHOR G.F. Rubino and G. Scarselli
 TITLE Epidemiological Studies on Asbestosis in the Asbestos Manufacture Industry

ORIG. REFS. Med. Lavoro VOL. 63 PP. 282-298 DATE Jul./Aug. 1972 (Ital.) ABSTR. REFS. VOL. PP. DATE

ABSTRACT This study concerns 635 subjects exposed to the risk of asbestosis in the three principal manufacture sections of Piedmont: asbestos-cement, friction materials for car brakes and clutches, textiles. About two thirds of the subjects examined had presented a claim for assessment of occupational disease, the remainder had been dismissed from the factories for different reasons. The clinical, radiological and functional data were analyzed both for sections and for decades of exposure time, and for type of work: this last considered, for the sake of simplicity and in each section, as working phase, respectively initial, intermediate or final of the entire working cycle. The chest X-rays were classified according to the "extended" scheme of BLT (1968). More than one half of the cases presented a radiological type of opacity "s", a little more than 10% a type "v", while about one third of the cases did not present radiological lung changes diagnostic for asbestosis. The time of exposure necessary for the appearance of opacities "s" or "v" was much shorter for the textile workers than for the workers of the other two sections. The same was true for the workers engaged in the initial working phases, compared to those engaged in the intermediate and final phases; moreover, for the same exposure time, the workers of the initial (over)

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showed a more diffuse pattern than the workers of the intermediate and especially the final phases. The pleural alterations (thickening and pleural calcifications) were found only in the subjects with no history of other diseases which can usually produce pleural changes. Pleural alterations were found in more than one fifth of all the subjects investigated, the fourth if one considered only the textile workers, where the incidence was higher than the appearance was more precocious; an early occurrence was observed also for the subjects engaged in the initial working phases in general. The most frequent change was the parietal thickening, followed by the costo-phrenic obliteration, the diaphragmatic calcifications and the parietal calcifications. The first two types of change were prevalent in the workers of the initial working phases, the calcifications in the workers of the final ones. The calcifications seemed to be more related to the duration of exposure and to the time from first exposure, than to the severity of exposure. As functional parameters, only the vital capacity and VEMS, as percentages of the standard values established by CECA, were taken into consideration. Particularly a correlation has been observed between decreased parameters and working phase and manufacture section; with similar X-ray patterns or duration of exposure, the decrease was significantly greater for workers of the initial phases, and respectively, among textile workers. For the same type of radiological lesion, the lesser or greater degree of opacity diffusion was paralleled both by vital capacity and by VEMS; the lesser or greater extension was paralleled mostly by VEMS. The relative rarity of right heart impairment, at least at ECG, was confirmed; only 2-3% cases showed a "pulmonale" P wave or changes of right intraventricular conduction. The importance and also the frequent occurrence of asbestosis among workers of asbestos-cement is emphasized. Finally it is remarked that from the point of view of insurance, the assessment of a compensable disablement seems often to prescind from the working phase in which the subject had been engaged; this is in contrast both with the logical expectancy and with the data presented, which on the contrary point to a progressive decrease of the risk from the initial to the final phases of the working cycle. --Authors' abst. in English.

E. Sartorelli *et al.*
 Respiratory Physiopathology of Asbestosis

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Med. Lavoro	63	269-281	Jul/Aug. 1972 (Ital.)				

Abstract
 A study of the respiratory function was carried out in 724 male subjects exposed to inhalation of asbestos dust (workers of a mining company of chrysotile in Piedmont; insulators; workers engaged in the production of asbestos-cement, of asbestos textiles or of car brakes and friction clutch discs). In all subjects the vital capacity, VEMS and DLCO at rest (steady state method) were determined. In some cases the residual volume was measured, the resistances of the airways (body plethysmography), of respiratory dead space, of arterio-alveolar CO₂ gradient and also of DLCO at work on a cycleergometer. The subjects were subdivided into 5 groups on the basis of the chest X-ray pattern (UICC classification, Cincinnati): 1st group with X-ray pattern 0/0 or 0/1 and with asbestos exposure less than 10 years (average exposure 5.7 years); 2nd group with X-ray pattern 0/0 or 0/1 and with asbestos exposure longer than 10 years (average exposure 21.2 years); 3rd group with X-rays 1/0 or 1/1; 4th group with X-rays 1/2, 2/1 or 2/2; 5th group with X-rays 2/3, 3/2 or 3/3. The results obtained can be summarized as follows. A ventilation insufficiency restrictive in type was (over)

Author: E. Sartorelli, *et al.*
Title: Respiratory Physiopathology of Asbestosis

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Med. Lavoro	63	269-281	Jul/Aug. 1972 (Ital.)				

A study of the respiratory function was carried out in 724 male subjects exposed to inhalation of asbestos dust (workers of a mining company of chrysotile in Piedmont; insulators; workers engaged in the production of asbestos-cement, of asbestos textiles or of car brakes and friction clutch discs). In all subjects the vital capacity, VEMS and D_{LCO} at rest (steady state method) were determined. In some cases the residual volume was measured, the resistances of the airways (body plethysmography), of respiratory dead space, of arterio-alveolar CO_2 gradient and also of D_{LCO} at work on a cycloergometer. The subjects were subdivided into 5 groups on the basis of the chest X-ray pattern (UICC classification, Cincinnati): 1st group with X-ray pattern 0/0 or 0/1 and with asbestos exposure less than 10 years (average exposure 5.7 years); 2nd group with X-ray pattern 0/0 or 0/1 and with asbestos exposure longer than 10 years (average exposure 21.2 years); 3rd group with X-rays 1/0 or 1/1; 4th group with X-rays 1/2, 2/1 or 2/2; 5th group with X-rays 2/3, 3/2 or 3/3. The results obtained can be summarized as follows. A ventilation insufficiency restrictive in type was (over)

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observed in 5.6% subjects of the 1st group, in 10.1% subjects of the 2nd group and in 31.1%, 41.9% and 69.2% subjects of the 3rd, 4th and 5th group respectively. The finding of a ventilation insufficiency restrictive in type in a non-neglectable percentage of subjects exposed to asbestos but with chest X-ray findings normal or dubious, seems to indicate the existence in these cases of pulmonary lesions still not detectable radiologically, but that nonetheless have already determined a change in lung elasticity. A ventilatory insufficiency obstructive in type, due to chronic bronchitis with or without lung emphysema, was observed in percentages varying from 11.2% to 24.2% according to the group considered.

In subjects with a chest X-ray pattern diagnostic of a severe asbestosis, evident changes of the rate ventilation/perfusion (increased respiratory dead space and a-A CO₂ gradient) were often present. A reduction of DLCO at rest and/or at work, below the lowest normal limits (defined from the study of 91 normal male subjects), was observed in 4.6 to 6.4% subjects of the 1st group, in 9.6 to 19.2% subjects of the second group and in percentage higher than 20% (up to

100%) in the subjects of the 3rd, 4th, and 5th group. The finding of pathological values of D_{LCO} both at rest and at work, in a certain number of subjects exposed to asbestos, but with radiological changes or with X-ray changes insufficient for a clear-cut diagnosis of asbestosis, indicated that the pulmonary lesions induced by asbestos can determine evident functional changes of the alveolar-capillary gas exchanges also in a pre-radiological phase. In conclusion, the study of the respiratory function in workers exposed to asbestos offers useful data not only for an evaluation of the functional damage present in the subjects with an asbestosis evident at X-ray, but also for an early diagnosis, and therefore for the prevention of advanced stages.

--Authors' abstract in English--

Digest Date	Digest Number	FILE NUMBER
8/73		752

AUTHOR:

K. Koshi and H. Sakabe

TITLE

Effect of Asbestos Busto on the Cultured Macrophages

ORIG. REF.

VOL.

PP.

DATE

ABSTR. REF.

VOL.

PP.

DATE

Ind. Health

10

16-23

Aug. 1972

ABSTRACT:

Experiments were performed in order to investigate the cellular damage when asbestos particles were added to rat peritoneal macrophages in vitro. At short time after the addition of naked chrysotile, amosite or crocidolite to the cell culture the considerable amounts of lactic dehydrogenase (LDH) were released into the medium lacking serum and the content of acid soluble nucleotide in the cells decreased. Also C^{14} -leucine incorporation into the cell protein was decreased by the addition of chrysotile, crocidolite or amosite. Naked crocidolite and amosite decreased the lactic acid production after 24 hr incubation. But, when serum coated chrysotile, crocidolite or amosite were added to the macrophages the lactic dehydrogenase in the medium increased in small amount only after more prolonged incubation. Serum coated asbestos had no effect on the lactic acid production and C^{14} -leucine uptake into cell protein of macrophages in the medium lacking serum, nor naked asbestos had any effect in the medium containing serum.

--Authors' abst.

CLASSIFIED SUBJECT

5/73

NUMBER

752

AUTHOR

K. Koetzing

Medical Colloquium of the Professional Association of the Ceramic and Glass Industry 23 October 1971, at Bad Reichenhall

ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Staub Reinhalt. Luft	32	28-29	Aug. 1972				

ABSTRACT

The following papers were read: 1. H. Bohlig: X-ray-diagnostic problems in the supervision of persons exposed to asbestos dust; 2. E. Hain: Topical problems of exposure to asbestos (technology, diagnosis, clinic, epidemiology); 3. E. Hain: Occupational malignomas in the thoracic region; 4. H. Otto: Asbestosis and occupational carcinomas, viewed from the standpoint of pathological anatomy. In the first paper H. Bohlig pointed out that asbestos cement cannot be considered harmless. Asbestos dust, asbestos fibers, or both constitute a hazard. It is to be assumed that at least 20 years are necessary for chaliocotic plaques to develop. Interesting and impressive examples of faulty radiographs were presented. In X-raying, it is not advisable to use screen images for the early detection of pathological changes in the lungs, and they are even to be rejected where early detection of asbestosis is involved. Hard rays provide far better information. Reference is made to the new classification

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of pneumo-

coniosis by the International Labor Organization (ILO) in Geneva (United Nations Classification of Radiographs of Pneumoconiosis). In the second paper, E. Hain reported that asbestos plays a part in the anamnesis of 60 to 70% of pneumoconiosis. Because of its particular noxiousness, crocidolite should no longer be used. In the third paper, E. Hain expressed the opinion that nickel cancer of the thoracic organs does not exist. Iron is not considered perfectly harmless. Scars in the lungs may constitute a basis for carcinoma development. E. Hain's explanations are based on vast material on asbestoses in the Hamburg basin, carefully collected and evaluated for many years. In the fourth paper H. Ott reported that on the basis of pathological and anatomical data concerning silicoses with earning ability reduced by more than 50%, a causal correlation with lung carcinoma (bronchial carcinoma) is to be assumed. From the practice of handling crocidolite-kimberlite, it was found that an average of 25 years is necessary for asbestosis mesothelioma to develop. The lecturer stressed that, in the detection of asbestoses in correlation with lung cancer or mesothelioma, the darkness index plays an important role.

--Cond. from text

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR		K. Koeltzine		5/73		Digest Date	Digest Number	FILE NUMBER
TITLE		Medical Colloquium of the Professional Association of the Ceramic and Glass Industry 32 October 1971, at Bad Reichenhall						
ORIG. REFS.	VOL.	PT.	DATE	ABSTR. REFS.	VOL.	PT.	DATE	
	32	28-28	Aug. 1972					
Luft								
ABSTRACT The following papers were read: 1. H. Bohl: X-ray-diagnostic problems in the supervision of persons exposed to asbestos dust; 2. E. Hain: Topical problems of exposure to asbestos (technology, diagnosis, clinic, epidemiology); 3. E. Hain: Occupational malignomas in the thoracic region; 4. H. Otto: Asbestosis and occupational carcinomas, viewed from the standpoint of pathological anatomy. In the first paper H. Bohl pointed out that asbestos cement cannot be considered harmless. Asbestos dust, asbestos fibers, or both constitute a hazard. It is to be assumed that at least 20 years are necessary for chalcocitic plaques to develop. Interesting and impressive examples of faulty radiographs were presented. In X-raying, it is not advisable to use screen images for the early detection of pathological changes in the lungs, and they are even to be rejected where early detection of asbestosis is involved. Hard rays provide far better information. Reference is made to the new classification								

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correlation with lung carcinoma (bronchial carcinoma)

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CLASSIFIED SUBJECT

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FELLOWSHIP
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FILE NUMBER

752

AUTHOR: D. Magner and Alison D. McDonald

TITLE: Malignant Mesothelial Tumors - Histologic Type and Asbestos Exposure

ORIG. REF.

VOL. PF.

DATE

ABSTR. REF.

VOL. PF.

DATE

New Engl. J. Med.

287

570-

Sept. 14,

1972

ABSTRACT:

PITTSBURGH, PA.

1319

Malignant Mesothelial Tumors - Histologic Type and Asbestos Exposure. D. Magner and Alison D. McDonald. New Engl. J. Med. 287: 570-571, September 14, 1972

Primary mesothelial tumors may not easily be distinguished from metastatic tumors histologically, and, for assured diagnosis, full autopsy to eliminate other primary tumors has been advocated. In keeping with the multipotentiality of mesothelial cells, the histologic pattern of mesotheliomas is variable. Three histologic types have been described - epithelial, mesenchymal and mixed. The findings suggest that mixed mesothelial tumors were especially associated with asbestos exposure. If confirmed, this observation would help differentiate asbestos-related tumors from others of unknown etiology. 12 references.

--Cond. from text

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NUMBER

752

AUTHOR: A. L. Richards

TITLE: Estimation of Trace Amounts of Chrysotile Asbestos by X-Ray Diffraction

ORIG. REF.:

VOL.

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ABSTR. REF.:

VOL.

PP.

DATE

Anal. Chem.

44

1872-

Sept. 1972

1873

ABSTRACT:

Estimation of Trace Amounts of Chrysotile Asbestos by X-Ray Diffraction. A. L. Richards. Anal. Chem. 44: 1872-1873. September 1972

X-ray diffraction techniques have been used for both qualitative identification and quantitative determination of different types of asbestos minerals, notably chrysotile, crocidolite, and amosite. A method has been described based on the measurement of the area under a primary diffraction peak and comparison with an external calibration curve, to measure quantities of chrysotile in the 1-10 mg range. In the course of a detailed study of the chrysotile content of urban atmospheres, it became necessary to develop more sensitive techniques. It is the purpose of this paper to show that with suitable equipment and experimental precautions, the X-ray technique can be extended to detect much smaller quantities, of the order of 10 µg on membrane filters, when no gross interferences are present. Even when interference is present, the changes in intensity of a chrysotile diffraction peak as a result of known additions of chrysotile to the sample, relative to the intensity of an unknown line, can be used to detect amounts of 10-100 µg.

--Author's abstr.

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FELLOWSHIP
NUMBER

FILE NUMBER

752

AUTHOR

I. J. Selikoff, C. Hammond and J. Churg

TITLE

Carcinogenicity of Amosite Asbestos

ORIG. REF.

VOL. PP.

DATE

ABSTR. REF.

VOL. PP.

DATE

Arch. Environ.

25

183-

Sept. 1972

Health

186

ABSTRACT

Carcinogenicity of Amosite Asbestos, I. J. Selikoff, E. C. Hammond, and J. Churg. Arch. Environ. Health 25: 183-186, September 1972

Few data exist concerning the comparative neoplastic potential in man of the several kinds of asbestos. In particular, there has been no evidence concerning whether the amosite variety is carcinogenic. The matter is of practical importance, since amosite use in the United States has sharply increased. The mortality experience of a group of 230 men previously employed in an amosite asbestos factory was studied during the years 1960 through 1971. Total deaths were more than twice the number anticipated to have been expected, and 105 occurred. Some 14 deaths were due to asbestosis. Both lung cancer and mesothelioma were found in considerable excess. Two or three deaths from lung cancer were expected, and 25 occurred. There were five deaths from mesothelioma. Occupational exposure to amosite asbestos can be associated with serious cancer hazard; its continued industrial use requires rigorous control.

--Authors' abst.

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BURGH, P.A.

CLASSIFIED SUBJECT		12/72		FELLOWSHIP NUMBER		FILE NUMBER	
				1348		752	
AUTHOR: R. L. H. Murphy, et al. TITLE: Low Exposure to Asbestos: Gas Exchange in Ship Pipe Coverers and Controls							
ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Arch. Environ.	25	253-	Oct. 1972				
Health	264						

1348 Low Exposure to Asbestos: Gas Exchange in Ship Pipe Coverers and Controls. R. L. H. Murphy, et al. Arch. Environ. Health 25: 253-264, October 1972

In a previous survey of shipyard pipe coverers and controls; clinical criteria were used to define pulmonary asbestosis. This second survey focused on physiologic abnormalities. Pipe coverers had significantly reduced vital capacities (FVC) as well as single breath (DL_{SB}) and exercise steady state (DL_{SS-Ex}) diffusing capacities. Resting steady state diffusing capacity (DL_{SS-R}), fraction carbon monoxide removed (F_{CO}), and the diffusing constant (K) differed from selected normals but not from all controls. Airways resistance, specific conductance, minute ventilation, arterial carbon dioxide pressure (P_{CO₂}) and dead space were not significantly abnormal. Obstructive disease was equally common in both groups. All workers with clinical "asbestosis" also had severely reduced DL and F_{CO}. The significance of isolated reduction of DL requires further study. However, in a third survey three years later, DL in exposed workers had deteriorated more rapidly than FVC; some with initially isolated reduction of DL had developed other signs of disease. 41 references.

--Authors' abst.

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12/72

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FILE NUMBER

752

AUTHOR P. Cross, et al.

TITLE Asbestos: Identification of Fibrous Particles in Lungs

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
J. Occ. Med.	14	757-	Oct. 1972				
		759					

ABSTRACT:

1345 PITTSBURGH, PA.
 Asbestos: Identification of Fibrous Particles in Lungs. * P. Cross, et al. J. Occ. Med. 14: 757-759.
 October 1972

Because of proven nonspecificity, ferruginous bodies are not necessarily indicative of inhaled asbestos fibers. Of the methods useful in identifying asbestos fibers, electron diffraction and microprobe analysis, while more definitive, have proved excessively laborious and expensive. A newly developed, rapid screening method for asbestos vs nonasbestos fibers has proved to be practical and economical. In addition, with this method the form of asbestos, chrysotile, which represents 95% of the asbestos used in this country, can be identified; it is recognized readily by the unique tubular structure of its fibrillar

* Reprint may be requested from Industrial Health Foundation, 5231 Centre Avenue, Pgh. Pa. 15232.

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units. Besides asbestos, inorganic fibers found in human lungs may consist of glass, rock wool, or ceramic aluminum silicate. Fibrous fragments of diatoms have also been identified. The ashes of plants and their derivatives - leaves, wood, paper, and coal - contain mineral fibers of respirable size which find their way into and remain in the lungs. Methods of quantitating the fibers in lung sediments are described and results in a small series of lungs are summarized. On the average, 75% of all fibers were shorter than $5\text{ }\mu\text{m}$ and about 14% of the short fibers were chrysotile. The biological significance of the asbestos content in lungs of people not occupationally exposed to asbestos is briefly discussed.

--Authors' summary modified

13 references.

CLASS. NO. SUBJECT

3/73

FELLOWSHIP
NUMBER

752

AUTHOR: R. Barnes

TITLE: Asbestos and Malignant Disease

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Med. J. Austral.	2	1107-1112	Nov. 11, 1972				

ABSTRACT: The Workers' Compensation (Dust Diseases) Act was introduced by the Government of New South Wales in 1942. One of the objects of the Act was to eliminate litigation and the costs, delay and frustration that accompany it, while still protecting the rights of workers. The Act was widened in 1967 to include a total of 25 scheduled diseases, including silicosis covered by the original Act in 1942. One of the diseases then becoming compensable was asbestosis. From the implementation of the new Act in February, 1968, up to the end of December, 1971, 51 claims for asbestosis have been recognized by the Dust Diseases Medical Authority, and of these patients 13 have since died, 11 of them from malignant disease of the lung or pleura. Given in this report are the brief clinical histories of these 13 patients.

--Cond. from text

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ABSTRACTS GROUP FOR CHS/MSH, INC.

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FELLOWSHIP
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FILE NUMBER

752

AUTHOR

G.K. Sluis-Cremmer and I. Webster

TITLE

Acute Pleurisy in Asbestos Exposed Persons

ORIG. REF.

VOL.

PF.

DATE

ABSTR. REF.

VOL.

PF.

DATE

Environ. Research 5 380- Dec. 1972

392

ABSTRACT It has been clinically observed that pleural effusion occurs, not infrequently, in asbestos exposed persons with or without evidence of asbestosis. Nine such cases are presented, in seven of these, pleural biopsy has been carried out by needle or by open thoracotomy. The histological features are described. The suspicion of mesothelioma of the pleura necessarily arises in such cases. This problem is discussed. It is well known that a chronic pleural reaction of both the visceral and parietal pleura is common in asbestosis and frequently the dominating clinical feature. Webster (1970) for instance has found a very high incidence of chronic pleurisy (that is, fibrous thickening of the visceral pleura--usually diffuse--sometimes localised) in asbestos exposed persons.

--Authors' abst.

MELLEN INSTITUTE, PITTSBURGH, PA.

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Author F. D. Pooley

Asbestos Bodies, Their Formation, Composition and Character

ORIG. REF. VOL. 363- DATE Dec. 1972
Environ. Research 5 379

ABSTRACT Asbestos bodies extracted from human lungs have been examined under the electron microscope to determine their morphology and diffraction characteristics. The asbestos bodies were extracted from the lungs of persons exposed to the four types of commercial asbestos fiber, namely crocidolite, amosite, anthophyllite and chrysotile. Asbestos bodies were rarely formed on fibers less than 10 μ m in length and practically always on straight fibers. They were found to occur on all the four commercial varieties of asbestos but less frequently on chrysotile fibers. The characteristics of the individual fibers were found to play a large part in determining the range and frequency of body shapes observed. There appears to be no evidence to suggest stepwise formation of asbestos bodies. Asbestos bodies were found to have a major crystalline component which is structurally similar to extracts of ferritin produced from animal and human organs. The material forming the asbestos body is definitely biological in origin and corresponded closely to the material defined in the medical literature as ferritin.

Author's abstract

MILLON INSTITUTE, PITTSBURGH, PA.

National Health Foundation, Pittsburgh, Pa.

AUTHOR

K. Koshi and H. Sakabe

TITLE

Effects of Asbestos or Quartz Particles on the Mixed Cultures of Macrophage and 3T6 Cell

Digest Date

11/73

Digest Number

752

FILE NUMBER

ORIG. REF.

Ind. Health

VOL.

10 125-127

PP.

DATE

Dec. 1972

ABSTR. REF.

VOL.

PP.

DATE

ABSTRACT

Study of pathogenesis of pneumoconiosis at cellular level has been hindered by the lack of a suitable model system. It may be assumed that the first reaction of cells to inhaled dust particles in alveolar cavity is phagocytosis by alveolar macrophages. The way in which this is followed by fibrosis is obscure. The cytotoxic effect of silica on macrophages is documented, and may well lead to the release of factors responsible for stimulation in fibrosis. There is a correlation between the toxicity of various silica particles to macrophages in culture and the capacity of these particles to stimulate fibrosis in vivo, but this relation is not clear in other particulate matter. In this report the authors have tried to observe the effects of various dusts on the model system at cellular level.

--Cond. from text

2/73

NUMBER

AUTHOR

P. Finterline, P DeCoufle, and Vivian Herderson

TITLE

Mortality in Relation to Occupational Exposure in the Asbestos Industry

ORIG. REF.

VOL.

PP.

DATE

ABSTR. REF.

VOL.

PP.

J. Occ. Med.

14

897-903

Dec. 1972

ABSTRACT

This is a report on a follow-up study of 1,464 men who completed their lifetime as production or maintenance-service workers in the asbestos industry and retired with an industry pension during the period 1941 to 1967. These men were observed for deaths through 1969. The average length of employment in the asbestos industry for these men was 25 years and nearly all had exposure to asbestos dust. In some instances these exposures were very high and occurred for many years. Mortality for this cohort of men was 14.5% higher than for the entire population of US white males living at the same ages and time periods. This excess was due to cancer and respiratory disease. The cancer excess was chiefly due to respiratory cancer where mortality was 2.5 times the expected. The respiratory disease excess was entirely due to pneumoconiosis and pleural fibrosis, including asbestosis.

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FELLOWSHIP
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AUTHOR M. Nurminen

TITLE A Study of the Mortality of Workers in an Anthophyllite Asbestos Factory
in Finland

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Work-Env.-Health	9(3)	112-118	1972				

ABSTRACT

A cohort study of 1030 workers employed at an anthophyllite asbestos mining factory is described. It extends the information about asbestos related disease at this factory which was previously available only for workers with severe exposure. The cohort was defined as the workers with a minimum exposure of three months who had started employment at any time between 1936 and 1966 and the main analysis was of mortality up to the end of 1968. The hazards of exposure to anthophyllite asbestos dust are indicated by the main results of this mortality study: 1. The cohort of workers was found to have excess overall mortality accounted for by cancer of the lung, bronchus and trachea, respiratory tuberculosis, and other respiratory diseases. 2. Asbestosis (as an underlying or contributing cause) was mentioned on the death certificate of every fifth deceased member of the cohort. 3. The mortality from lung cancer among anthophyllite asbestos workers with a minimum exposure of three months was in certain age groups over three times that expected.

--Author's abst.

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Industrial Health Foundation, Inc.

5/72

Author: P. Brodeur

Title: Asbestos and Enzymes

Available from: Ballantine Books, 101 Fifth Avenue., New York, N.Y. 10003

153 pp.

Date of Pub. 1972 Price: \$1.25

Review

Asbestos and Enzymes. P. Brodeur. Available from: Ballantine Books, 101 Fifth Ave., New York, N.Y. 10003. 153 pp. (1972) Price: \$1.25.

The threat of health hazards from asbestos and enzymes used in laundry products is discussed. Details are given of scientific procedures that were required before the toxic effects of these products could be determined. Public health studies and social policies are suggested prior to release for wholesale use of technological innovations.

--Pollution Abstracts

Author: Pooley, F.D.

Title:

Orig. in:

Abstract:

Pooley, F. D. (1972). *Brit. J. Industr. Med.*, 29, 146-153. Electron microscope characteristics of inhaled chrysotile asbestos fibre. Specimens from 300 lungs have been examined under the electron microscope to determine the morphology and diffraction characteristics of any chrysotile asbestos they contained. In 120 cases, material was prepared by alkali digestion and the residual dust was examined. In all cases standard 6-micron histological slides were partially ashed before the residue was transferred to the electron microscope grids. Of the 300 specimens examined, 20 came from men with prolonged industrial exposure to chrysotile, 87 from cases of mesothelioma, and the remainder from control groups drawn from rural and industrial populations.

Chrysotile fibres were readily identified by the characteristic polycrystalline diffraction pattern. The hollow appearance of the single fibres and their shape and arrangement also help in the identification. Specimens from men without industrial exposure contained either single short fibres or aggregates scattered throughout the lungs. In specimens from industrially exposed men, fibres were very numerous and found as strands of single fibres mainly grouped together in discrete locations. Ferruginous bodies were found rarely and only on straight fibre bundles of over several micrometers in length.

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5/73

AUTHOR

Anon. (Med. J. Austral.)

TITLE

Asbestos as an Industrial Health Hazard

GRID. REF.

FELLOWSHIP
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samples were taken of the outside air and in buildings containing no asbestos as fireproofing. The results showed that in those buildings in which fibrous asbestos spray fireproofing had been used, contamination was present in approximately half the samples analyzed. On the other hand, there was no significant difference in the distribution of air concentrations between buildings using cementitious fireproofing and the outside air. In those cases where high asbestos levels were measured, it was not possible to ascertain the origin of the contamination. However, maintenance activities within plenum spaces could have been a cause. Among the recommendations of the Mount Sinai Study was the development of procedures for use during maintenance activities that may be required in asbestos-lined plenum spaces. Here, system isolation, area enclosure, localized wetting, and cleanup by vacuuming were suggested.

5/73

752

AUTHOR L.J.Cralley and W.S. Lainhart

TITLE Are Trace Metals Associated with Asbestos Fibers Responsible for the Biologic Effects Attributed to Asbestos?

ORIG. REF. J. Occ. Med. VOL. 15 PP. 262-266 DATE Mar. 1973 ABSTN. REF. VOL. PP. DATE

ABSTRACT: There is no definitive evidence that relates the fibrogenic properties of asbestos fibers or their potential to form asbestos bodies to trace metals associated with the fibers. Such a relation would be largely speculative. Bits of evidence are available, however, which could explain how the presence of trace metals may play a modifying role in these biologic responses to asbestos. Further research is recommended to determine the acutality of such a relationship. A considerable body of evidence exists relating trace metal contents associated with asbestos fibers with the carcinogenicity of asbestos. Evidence is presented supporting the hypothesis that the electromotive interactions of the metals and minerals present are important determinants in the carcinogenic action of asbestos. Research is continuing on this inter-relationship.

--Authors' summary

MELDON INSTITUTE PITTSBURGH, PA.

CLASSIFIED SUBJECT

5/73

JELLOWMAN
NUMBER

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FILE NUMBER

AUTHOR: G. Chiappino and G. Briatico-Vangosa

TITLE: The Early Pulmonary Lesions from Asbestos. Possibility of a Pre-Radiological Diagnosis of Asbestosis

ORIG. REF.: Med. Lavoro VOL. 63 PP. 85-92 DATE Mar/Apr. 1973 (Ital.)

ABSTRACT: A morphological study was performed on a lung surgically removed

for carcinoma from a subject who had been exposed to a moderate risk

of asbestosis, and who did not present clear-cut radiological signs of pneumoconiosis.

It was observed that, before the occurrence of evident changes in the radiological pattern, the lung presents fibrotic changes along the lymphatic net, that is in the interlobular septa and in the peribronchial and perivascular areas.

Besides these fibrotic phenomena consequent to the transport of the shortest fibers in the lymphatic vessels, foci of "asbestotic alveolitis" are present, with microhaemorrhages, very numerous siderocytes and localized foci of oedema, as a consequence of direct microtraumas by fibers on the alveolar walls. These lesions are responsible for the early deficiencies of the respiratory function characteristic of asbestosis, as well as of the finding of fine basal rales at auscultation and of the appearance of siderocytes in sputum. Therefore,

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the presence of siderocytes in sputum of subjects exposed to asbestos represents a sign of asbestotic alveolitis. On the basis of anamnestic data, the clinical finding of fine rales, the presence of a respiratory insufficiency restrictive in type, and of the findings in the sputum, it seems possible to make the diagnosis of asbestosis in a pre-radiological stage. The comparison between morphological findings obtained in the subject with early asbestosis with those obtained in the experimental animals and with those characteristic of severe asbestosis leads the authors to think that further evolution of asbestosis manifests itself with an increase of fibrosis along the lymphatic vessels, and with the organization of foci of oedema and of alveolitis in the shape of irregular fibrotic nodules and of fibrotic thickening of interalveolar septa. The observations reported indicate that severe asbestotic fibrosis has a mixed origin, that is represents the final result of various phenomena which follow each other in time; it also seems likely that, when clear radiological signs appear, the pneumoconiotic lesions have already become so severe that any means of medical prevention are ineffective.

--Authors' summary in English

Industrial Health Foundation, Pittsburgh, Pa.

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AUTHOR P.M. Stell and T. McGill

TITLE Asbestos and Cancer of Head and Neck

ORIG. REFS. VOL. PP. DATE ABSTR. REFS. VOL. PP. DATE

Lancet 1 678 Mar. 24, 1973

ABSTRACT:

One hundred male patients with carcinoma of the head and neck were compared to 100 matched controls to determine the effects of asbestos exposure. From the results of this limited study, exposure to asbestos is most likely to be of importance in laryngeal carcinoma. A more detailed study is underway.

--J.F.B.

AUTHOR:		M.L. Shin and H. I. Firminger		Digest Date	Digest Number	FILE NUMBER
TITLE:		Acute and Chronic Effects of Intraperitoneal Injection of Two Types of Asbestos in Rats with A Study of the Histopathogenesis and Ultrastructure of Resulting Mesotheliomas		7/73	7/73	753
ORIG. REF.:	DATE	ABST. REF.:	VOL.	PP.	DATE	
Am. J. Pathology	70	291-314	Mar. 1973			

ABSTRACT:

Malignant mesotheliomas were induced in the rat peritoneum by a single injection of chrysotile or crocidolite asbestos fibers. The immediate toxicity of the fibers was noted in both groups of animals, producing approximately 40% mortality, within 8 days after the injection associated with acute peritonitis. Tissue reactions to these two types of asbestos were significantly different. Crocidolite fibers were easily seen by light microscopy, in the tissue sections throughout the period of study, and they produced foreign-body giant cell granulomas. However, giant cells were not seen in chrysotile granulomas, and the asbestos fibers were only seen by electron microscopic study. They appeared to be coated by a protein-like substance. During earlier stages of tumorigenesis, the epithelioid and/or mixed cell type mesotheliomas seemed to have no specific relationship to granulomas, but pure spindle cell tumors were seen to develop in close relationship to granulomas, and they appear to be fibrosarcomas. Electron microscopic and histochemical methods were

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used to define the morphologic characteristics of the tumor cells. The formation of hyaluronic acid was found in cells of the epithelioid type, contrasted with extracellular accumulation in the spindle cell tumors.

--Authors' abst.

Digest Date 7/73
Digest Number 714/13
752

AUTHOR J. Glover, et al.

TITLE Hygiene Standards for Airborne Amosite Asbestos Dust

ORIG. REF. Ann. Occ. Hyg. VOL. 16 PP. 1-5 DATE Apr. 1973
ABST. REF. VOL. PP. DATE

ABSTRACT

The sub-committee on hygiene standards has reviewed the information on the results of human exposure to airborne amosite dust and animal experiments. The sub-committee believes it has insufficient knowledge of the relationship between airborne amosite dust exposure and the risk of asbestosis to permit an accurate statement of the degree of protection afforded by a specified hygiene standard. Nevertheless, on the basis of comparisons between the effects of amosite and chrysotile dust on men and animals it is recommended that the standards for amosite should be no less stringent than those for chrysotile. The sub-committee believes that a proper and reasonable objective would be to reduce the risk of contracting asbestosis to 1 per cent of those who have a lifetime's exposure to the dust. By 'asbestosis' this sub-committee means the earliest demonstrable effects on the lung due to asbestos. An accumulated exposure of 100 fibre years per cm^3 is therefore recommended for amosite. It is further recommended that exposures to amosite asbestos which lie in certain

ranges of dustiness be designated by categories according to the scheme recommended in the hygiene standards for chrysotile asbestos dust. The levels are expressed in terms of the number of fibres per cubic centimetre greater than 5 μ m in length, as determined with the standard membrane filter method described in "Hygiene Standards for Chrysotile Asbestos Dust". When it is necessary to work intermittently in a "high dust" area an approved mask should be worn, provided that the concentration is no more than 40 fibres/cm³ and the mask has been shown by test to be a good fit prior to entering the area. Should the concentration exceed 40 fibres/cm³ a higher standard of respiratory protection should be provided, such as a pressure-fed breathing apparatus. It is recommended that where practicable an up-to-date employment record card be kept of every person, which indicates, every calendar quarter, the category or categories in which he or she has been employed and in which he or she is recommended to work. All employees exposed to risk should be medically examined before employment. Periodic examinations should be made thereafter, at intervals not exceeding 2 years.

--Authors' abst.

Industrial Health Foundation, Pittsburgh, Pa.

Digest Date	Digest Number	FILE NUMBER
7/73	425/12	752

AUTHOR: Report of the Advisory Committee on Asbestos Cancers to The Director of the
International Agency for Research on Cancer
TITLE: "Biological Effects of Asbestos"

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Ann. Occ. Hyg.	16	9-17	Apr. 1973				

ABSTRACT:

A meeting was held at the World Health Organisation International Agency for Research on Cancer, Lyon, France, on 5 and 6 October 1972. The Committee consisted of three panels--Epidemiology, Pathology, and Physics and Chemistry. The panels met in a separate session and at the final session (Chairman Dr. J.C. Gilson) prepared this report to the Director of the International Agency for Research on Cancer.

--Cond. from text

Industrial Health Foundation, Pittsburgh, Pa.

Digest Date

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FILE NUMBER

AUTHOR

British Soc. Hygiene Society Committee on Hygiene Standards

TITLE

Review of the Hygiene Standard for Chrysotile Asbestos Dust

ORIG. REF.

VOL.

PP.

DATE

ABSTR. REF.

VOL.

PP.

DATE

Annals of Occ. Hyg. 16

7

Apr. 1973

ABSTRACT

The sub-committee on chrysotile asbestos has reviewed the Hygiene Standard first published in June 1968, and has taken into account the following points: (a) New information on the mortality and morbidity following exposure to chrysotile in mining and milling of the fibre in Quebec has recently been published. This in general shows that despite heavy dust exposures in the past, the damage to health has been considerably less than shown by surveys in other parts of the asbestos industry. However, the reports of the Quebec Survey have not yet all been published. Also an analysis of the data from Quebec in a form which can be directly compared with that used in the B.O.H.S. standard has not yet been made. It is therefore considered premature to comment in detail on the relevance of this new evidence in relation to the existing standard. Work is in progress to do this at a later date. Appropriate literature references are given. (b) The 1968 B.O.H.S. Standards were followed by the 1969 Asbestos Regulations and the associated Technical Data Note No. 13 of the Department (over)

of Employment. Changes in standards would be premature at this time when the regulations are just coming into force. (c) Since publication of the B.O.H.S. Standards other countries have formulated or amended standards for asbestos in such a way as to be equal or close to the British Standards. (d) The Department of Employment has begun a prospective survey in asbestos-related diseases in those exposed to the improved conditions following the 1969 Regulations. Full results will not be available for a number of years. (e) No adverse comments on the Standard have been received from any source. (f) The sub-committee is preparing a review of information about the characteristics of air-borne dust in a variety of different processes in which asbestos is used. It is therefore recommended that no change be made at the present time, but that the Standard be kept under review.

--Review

AUTHOR

M.H.A. Beverley

TITLE

A Study of Discernible Changes in a Group of Asbestotics Before and After Certification

ORIG. REF.

J. Soc. Occ. Med. 23

VOL.

61-65

PP.

DATE

Apr. 1973

ABSTR. REF.

VOL.

PP.

DATE

ABSTRACT

From an analysis of data on discernible lung changes in a group of 32 asbestotics, it was concluded that early detection of deviations from normal depends on:
1) Good X-rays; 2) clinical signs; 3) deterioration of gas transfer factor.
Data are tabulated.

--J.F.B.

Digest Date

7/73

Digest Number

767/2

FILE NUMBER

752

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR

P. Enterline, P DeCoufle, and V. Henderson

TITLE

Respiratory Cancer in Relation to Occupational Exposures Among Retired Asbestos Workers

ORIG. NEWS

Brit. J. Ind. Med.

30

162-166

Apr. 1973

VOL. PP.

DATE

ABST. REFS.

VOL. PP.

DATE

7173

Number

753

FILE NUMBER

ABSTRACT

A cohort of 1348 men who completed their working lifetime in the asbestos industry and retired with an industry pension during the period 1941-67 was observed through 1969 for deaths. The average length of employment in the asbestos industry for these men was 25 years and all had exposures to asbestos dust. In some instances these exposures were very high and continued for many years. Mortality for this cohort of men after age 65 was 14.7% higher than for the entire population of United States white men living at the same ages and time periods. This excess was due almost entirely to cancer and respiratory disease. The cancer excess was chiefly due to respiratory cancer where mortality was 2.7 times the expected. The respiratory disease excess was entirely due to asbestosis. A time-weighted measure of asbestos dust exposure at the time of retirement was calculated for each man. This was made up of the summed products of dust levels for each job (expressed in mppcf) and years at each level. This measure was directly related to the respiratory (over)

cancer excess at ages 65 and over, ranging from 1.7 times expected for men with less than 125 mppcf-years exposure to 5.6 times expected for men with 750 or more mppcf-years exposure. There appeared to be no direct relationship between asbestos dust exposure and respiratory cancer below 125 mppcf-years. Important increments in respiratory cancer mortality apparently occurred somewhere between 100 and 200 mppcf-years exposure. Separation of the effects of time from the effects of average dust level on respiratory cancer mortality showed that the contribution of each was about the same and that a time-weighted measure of asbestos dust appears to be an appropriate method for predicting respiratory cancer effects.

--Authors' abst.

Journal Health Foundation, Pittsburgh, Pa.

Digest Date	Digest Number	FILE NUMBER
6/73	160/14	753

AUTHOR: Anon. (Lancet)

TITLE: Asbestos--Lung Cancer--Mesothelioma

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
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Lancet	1	815-816	Apr. 14, 1973				
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ABSTRACT: Even if current standards of dust suppression are effective and asbestosis and associated primary lung cancer disappear with the death of the population already exposed, we still have to face the problem of mesothelioma. The association between this tumour and asbestos exposure was first described in 1960. Epidemiological work indicates that at least 80% of these tumours arise in people with some exposure to asbestos, and the consensus is that crocidolite is the most likely cause, although cases have been reported in men exposed only to amosite. On epidemiological evidence, crocidolite from the mines in Western Australia and in Northern Cape Province of South Africa seems to be the most potent producer of mesotheliomas, Transvaal crocidolite being less potent. The latent period is very long (43 years), and exposure need be neither prolonged nor heavy compared with current standards.

--Cond. from text

Industrial Health Foundation, Pittsburgh, Pa.

Digest Date

6/73

Digest
Number

6457

FILE NUMBER

753

AUTHOR
S. Holmes

TITLE
Asbestos and Cancer of Head and Neck

ORIG. REF.

Lancet

VOL.

1

PP.

839

DATE

Apr. 14,
1973

ABST. REF.

VOL.

PP.

DATE

ABSTRACT

In reply to a letter to the editor (Lancet, March 24, 1973), the Secretary of the Asbestos Research Council suggests that although the three occupational groups (identified by the authors) may have been exposed to environmental carcinogens, it would be necessary to prove the cause and effect relationship between cancers of the head and neck by identifying the presence of asbestos fibers at the tumor site and replicating these findings with animal experiments. He also suggests that they match their patients and controls for age, sex and smoking habits.

--Cond. from text

Industrial Health Foundation, Pittsburgh, Pa.

Digest Date
7/73

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Number
11422

753

AUTHOR

J.C. Gilson

TITLE

Report of the Advisory Committee on Asbestos Cancers to the Director
of the International Agency for Research on Cancer

ORIG. REF.

VOL.

PP.

DATE

ABSTR. REF.

VOL.

PP.

DATE

Brit. J. Ind. Med.

30

180-
186

Apr. 1973

In 1964 the Geographical Pathology Committee of the International Union against Cancer (UICC) set up a working group on asbestos and cancer and later issued a Report and Recommendations (1965). A further meeting was held at the International Agency for Research on Cancer (IARC), Lyon, France, on 5 and 6 October 1972. This was organized jointly with the Medical Research Council Pneumoconiosis Research Unit. The report and recommendations given here will also be published by IARC in 1973, together with the complete proceedings of the meeting. The Committee consisted of three panels--Epidemiology, Pathology, and Physics and Chemistry.

--Author's abst.

Industrial Health Foundation, Pittsburgh, Pa.

Digest Date	Digest Number	FILE NUMBER
10/73	1223/122	753

AUTHOR: W.E. Smith

TITLE: Industrial Hygiene Summary Reports. Asbestos, Talc and Nitrites in Relation to Gastric Cancer

ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Am. Ind. Hyg. Assn. J.	34	227-229	May 1973				

ABSTRACT: An experiment in which the hamster-intrapleural method was used to test for carcinogenicity of a sample of talc containing asbestos. The negative results of the test and the earlier test on feeding asbestos to hamsters do not offer support to the view that asbestos-containing talc contributes to the incidence of gastric cancer in Japan. Although death rates for gastric cancer are high in Japan, the highest rate comes from Chile. Studies from the health Research Institute Laboratory have been reported with an hypothesis that the high rates for esophageal and gastric cancer may be due to the conversion of nitrates to nitrites by soil bacteria with subsequent synthesis of nitrosamine carcinogens in plants used as food, or through interaction in the stomach with secondary amines in food.

--Cond. from text

AUTHOR P.F. Holt and D.K. Young
 TITLE Asbestos Fibres in the Air of Towns

Digest Date

Digest Number

FILE NUMBER

752

ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Atmospheric Env.	7	481-483	May 1973				

ABSTRACT: Many observers have reported that asbestos bodies are present in the lungs of town dwellers who have had no industrial exposure to asbestos, suggesting that asbestos may be a normal contaminant of the urban atmosphere. The air of several cities--London, Reading, Rochdale, Bochum, Dusseldorf, Prague, Pilsen, Johannesburg and Reykjavik--has been sampled using millipore filters. The samples were transferred to carbon film on a grid and they were examined by electron microscopy. Asbestos fibres were found in samples from every town. They were mostly present as single fibrils but some were in agglomerates that contained many fibres.

--Authors' abstr.

FILED IN

DATE

Digest Date	Digest Number	FILE NUMBER
6/73	112	753

AUTHOR

A. K. Roy-Chowdhury, T.F. Mooney, A.L. Reeves

TITLE

Trace Metals in Asbestos Carcinogenesis

ORIG. REFS.	VOL.	PF.	DATE	ABSTR. REFS.	VOL.	PF.	DATE
Arch. Env. Health	26	253-255	May 1973				

ABSTRACT

Concentrations of trace metals judged potentially carcinogenic were determined in samples of amosite, crocidolite, and chrysotile. The samples included commercial material as shipped, milled and processed material as collected in animal exposure chambers, and International Union Against Cancer (IICC) reference samples. The metals determined were cobalt, nickel, chromium, manganese, and iron. The samples were treated with hydrofluoric acid, the residue taken up with hydrochloric acid, and the determination made by atomic absorption spectrometry. Substantial enrichment of the dusts in nickel and chromium during milling and dissemination was found. Cobalt and nickel content was different from that in IICC samples. --Authors' abst.

Industrial Health Foundation, Pittsburgh, Pa.

Industrial Health Foundation, Pittsburgh, Pa.

		Digest Date		Digest Number		FILE NUMBER	
		11/73		12/1/73		752	
AUTHOR L. Bartosiewicz TITLE Improved Techniques of Identification and Determination of Airborne Asbestos ORG. REFS. AIHA Jnl. VOL. 34 PP. 252-259 DATE June 1973 ABSTR. REFS. VOL. PP. DATE							

ABSTRACT Collection, identification and data analyzing techniques are presented for airborne mineral fibers. The limitations of the techniques are discussed. It is shown that the adaption of a plenum 1 3/4 inches long for sample collection is important since it leads to a much more uniform particle collection and distribution. Separation of the asbestos particles from other solid airborne pollutants with the refractive index liquid method is shown to be accurate, convenient and useful in distinguishing asbestos from other fibrous material. For analysis of this type the image analyzing microscope is a very valuable tool.

--Author's abst.

Digest Date	Digest Number	FILE NUMBER
8/73	1101	752

AUTHOR: P. K. Chew, et al.

TITLE: Asbestos Workers in Singapore

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Arch. Env. Health	26	290-293	June 1973				

ABSTRACT

A survey of 114 employees exposed to asbestos in a Singapore plant revealed no subjects with major disability or advanced radiographic changes. Basal crepitations in nine subjects were found to have no association with indices of chronic bronchitis such as history of cough and sputum, productive cough upon request, and smoking. These indices tended to be related to the presence of other adventitious sounds, recorded in 14 patients. Ventilatory capacity changes occurred in the direction of a restrictive ventilatory defect in the group with crepitations, and an obstructive defect in the group with other adventitious sounds. Simple clinical and functional studies can be used to define three groups within the total population of exposed asbestos workers: (1) normal (2) presumptive diagnosis of chronic bronchitis, and (3) presumptive diagnosis of mild respiratory abnormality consistent with "mild" or "early" asbestosis, deserving at least close surveillance.

--Authors' abst.

... Foundation, Pittsburgh, Pa.

	Digest Date	Digest Number	FILE NUMBER
	11/73	12. 113	752

AUTHOR: M. Governa and C. Rosanda Vadala

TITLE: Histochemical Study of Asbestos Fibre Coating in Experimental Carrageenin Granulomas

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Brit. J. Ind. Med.	30	248-252	July 1973				

ABSTRACT To study the composition of asbestos body coating, asbestos particles present in experimental carrageenin granulomas were tested histochemically for mucopolysaccharides, ferric and ferrous iron, haemoglobin, and haematoxin. The stains were applied on microscopical sections both untreated and treated with iron-extracting solutions and/or enzymes. The results indicate that asbestos is rapidly coated with haematoxin, ferric iron, and hyaluronic acid.

--Authors' abst.

Industrial Health Foundation, Pittsburgh, Pa.

Digest Date	Digest Number	FILE NUMBER
9/73	148/14	753

AUTHOR I. J. Selikoff and H. E. Stokinger
TITLE Cancer Risk to Allergy Patients from Syringes with Asbestos-Wound Plunger

ORIG. REFS.	VOL.	PF.	DATE	ABSTR. REFS.	VOL.	PF.	DATE
J. Am. Med. Assn.	225	423	Jul. 23, 1973				

ABSTRACT: Some patients receive their allergy desensitization treatments from syringes that have an asbestos winding about the plunger tip. These windings appear to disintegrate with prolonged use of the syringe, and it is possible that minute fragments of the asbestos winding break off into the allergy extract that is being injected. Since asbestos has been implicated in carcinogenesis, do these asbestos windings constitute a hazard to allergy patients after prolonged exposure? - This question was referred to two consultants, I.J. Selikoff, M.D. and H.E. Stokinger, Ph.D., whose discussions are as follows: Selikoff: The Cooke syringe, found widely useful for allergy management, was constructed with an asbestos-tipped plunger. Such syringes are still sold, albeit in smaller numbers in these disposable-syringe days. The chrysotile-asbestos thread, wound around the plunger, helped insure a tight fit and was considered to be nonreactive due to its mineral nature. This latter is not necessarily true, since asbestos has a reactive surface and adsorbs many substances (over)

readily. As long ago as 1913, asbestos filters were found to adsorb proteins and, more recently, the use of asbestos in gas masks and cigarette filters was based on its adsorptive property. Contamination with antigenic material is therefore possible. A more serious disadvantage is associated with the tendency of loose fibers and fibrils to contaminate the fluid being injected; asbestos would then be injected with the material being used for treatment. While there are no data which document a carcinogenic risk with such contaminated solutions in humans, parenteral and subcutaneous injections of asbestos in experimental animals have produced neoplasms. However, the amounts used were considerably greater than would presumably be the case with asbestos-wound syringes. Stokinger: Your concern for the possible hazard to allergy patients from injections of allergy extracts from a plunger wound with asbestos is well taken. I have no knowledge of a study relating to a higher incidence of neoplasia occurring in recipients of allergy desensitization. There are occasional reports in the literature of mesotheliomas both pleural and peritoneal, of unknown origin, as well as reports in which there has been a presumed exposure to asbestos, judging by the notation frequently seen in them to the effect that the amount of asbestos "must have been extremely minute." In view of this, it is recommended that the practice of injecting solutions from syringes with asbestos-wound plungers be abandoned.

--Cond. from text

Digest Date	Digest Number	FILE NUMBER
10/73	1323/73	753

AUTHOR: P.M. Stell and T. McGill

TITLE: Asbestos and Laryngeal Carcinoma

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Lancet	2	416-417	Aug. 25, 1973				

ABSTRACT: One hundred male patients with squamous carcinoma of the larynx and one hundred matched controls with various non-malignant diseases were questioned about their exposure to asbestos. Thirty-one patients and three controls had experienced an important degree of exposure to asbestos. The difference between the two groups was statistically highly significant. The average latent interval between first exposure and development of laryngeal carcinoma was 30 years, and the average duration of exposure was 27 years.

--Authors' summary

Industrial Health Foundation, Pittsburgh, Pa.

Digest Date
9/73

Digest
Number

FILE NO-814
752

AUTHOR

Anon. (Natl. Safety News)

TITLE

Asbestos

ORIG. REF.

Natl. Safety News

VOL.

108 54-60

PP.

Aug. 1973

DATE

ABSTR. REF.

VOL.

PP.

DATE

ABSTRACT

This material, used extensively for protection against fire and heat hazards, ironically is a recognized hazard to health when asbestos dust is inhaled excessively, causing asbestosis, bronchogenic (lung) cancer, and mesothelioma. The industry's many problems and its far-reaching response to OSHA regulations are presented.

--Authors' abstr.

Author: D. H. Wegman, G. P. Theriault, J. M. Peters
Title: Worker-Sponsored Survey for Asbestosis

Arch. Env. Health 27 105-109 Aug. 1973

A local union initiated a survey to assess the possibility of asbestosis in a wall board manufacturing operation. Fifty-seven workers were examined by questionnaire, pulmonary function tests, and limited physical examination. Definite evidence of an excess of pulmonary disease was found. The prevalent respiratory syndrome was compatible with asbestosis, was highly correlated with length of asbestos exposure, and could not be explained by smoking or other known environmental factors. Through the use of prediction equations and stepwise regression analysis, disease was proved without a control group. The company's refusal to release the x-ray films did not prevent the demonstration of excessive disease in this population.

--Authors' abst.

11/73

Number

752

AUTHOR: M.L. Newhouse

TITLE: Asbestos in the Work Place and the Community

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Ann. of Occ. Hyg.	16	97-102	Aug. 1973				

ABSTRACT:

The fibrogenic properties of asbestos dust were detected early, later knowledge accumulated about the carcinogenic properties of the mineral and a hazard of bronchial carcinoma and mesothelial tumours was recognised. Mortality studies have measured the effect of exposure on working populations. Recent analysis of data from a cohort of asbestos factory workers shows that even with low to moderate exposure there is excess mortality from cancer of the lung and pleura and other cancers, after more than 25 years' observation. The mesothelioma rate increases both with severity and length of exposure. Occurrence of these and other tumours appears to be dose-related. The markers of a community effect of asbestos dust in the environment are the occurrence of mesothelial tumours in neighbourhoods of a source of asbestos dust, and the presence of asbestos bodies or calcified asbestos pleural plaques in the general population. Conditions giving rise to neighbourhood mesothelial tumours may not now occur, but the importance of adequate control in all countries where asbestos is mined or manufactured is stressed.

--Author's abst.

Digest Date 12/73
Digest Number 753
FILE NUMBER

AUTHOR A.D. McDonald, and J. C. McDonald

TITLE Epidemiologic Surveillance of Mesothelioma in Canada

ORIG. REF. VOL. PP. DATE ABST. REF. VOL. PP. DATE
Can. Med. Assn. J. 109 359- Sept. 1, 1973 362

ABSTRACT The number of fatal malignant mesotheliomas was ascertained for the period 1960-70 by contacting all pathologists in Canada. The annual incidence was steady between 1966 and 1970 at 1.4 per million population. Of 71 cases registered in 1968-70 and not previously reported, 66% were pleural, 24% peritoneal and the remainder in both sites; 45% of tumours were in women. The diagnosis of mesothelioma was approved by the Canadian Mesothelioma Panel in 59%. Sixty-nine cases were successfully investigated epidemiologically. A history of definite or probable occupational asbestos exposure was found in 30% of male cases compared with 11% of controls, but in none of the female cases or controls. However, among cases, four women and one man had had domestic exposure to dusty clothing of an asbestos worker. Most of the excess occupational exposure was in the manufacture of asbestos products or insulation and little in mining or milling. No case other than those occupationally or domestically exposed had lived within 20 miles of asbestos mines or mills.

--Author's abstract--

Industrial Health Foundation, Pittsburgh, Pa.

Author	M.L. Newhouse na G. Berry	Digest Date	12/73	Digest Number	123710	Page	753
Title	Asbestos and Laryngeal Carcinoma						

Orig. Refs.	Vol.	Pg.	Date	Abstr. Refs.	Vol.	Pg.	Date
Lancet	2	615	Sept. 15, 1973				

Abstract The mortality experience from carcinoma of the larynx among workers at an asbestos, textile, and cement factory was studied. Among a cohort of over 4000 workers followed since 1933 there have been 2 deaths from cause: one in a man employed making sections of asbestos cement pipes for 13 months starting in 1939, who died in 1963; the other in a disintegrator employed for 1 month in 1949 and dying 13 years later in 1962. In both jobs there was severe exposure to asbestos dust. The smoking habits of neither man is known but it may be presumed they were smokers, since a survey in 1972 showed approximately 90% of the male workers at this factory did smoke. The observed mortality from cancer of the larynx and of the lung and pleura contrasted with the expected mortality calculated from the rates of the male population of England and Wales was:

(over)

Mortality of 1327 workers with severe exposure to asbestos dust

Ca of larynx
(ICD 161))
Ca of lung and pleura
(ICD 162-163)

Length of exposure	Obs.	Exp.	Obs.	Exp.
Less than 2 years in job	2	0.17	20	6.6
More than 2 years in job	0	0.20	36	6.4
Total	2	0.37	56	13.0

There were 2 deaths from cancer of the larynx and the expected number was only 0.37, but the association is difficult to test by a prospective study because of the rarity of this tumour. The ratio of the observed number to the expected number in this study is 5.4, whilst the approximate relative risk in the retrospective Liverpool study may be calculated as 14.5. However, these two values do not differ significantly. The 2 deaths reported are of men with short exposures to asbestos, contrasting with cancer of the lung and pleura, where the excess increases with length of exposure. The cohort is still being followed and more information will become available.

--Substantially entire text

Digest Date
12/73
Digest
Number
752
FILE NUMBER

AUTHOR

S.H. Zaidi, R. Shanker, and R.K.S. Dogra

TITLE

Experimental Infective Pneumoconiosis: Effect of Asbestos Dust and
Candida albicans Infection on the Lungs of Rhesus Monkeys

ORIG. REF.

VOL.

PP.

DATE

ABSTR. REF.

VOL.

PP.

DATE

Environ. Res.

6

274-286

Sept. 1973

ABSTRACT

The combined effect of Candida albicans, a facultative pathogen in the normal physiological condition in the throat of miners, and amosite dust produces after intratracheal inoculation extensive collagenous fibrosis at 330 days in rhesus monkeys. The lesions produced by amosite dust alone comprise fine reticular fibrosis around bronchioles and blood vessels and moderate interstitial fibrosis. The C. albicans infection alone caused acute inflammatory reaction in the early stages while at the termination of experiment (330 days) the only evidence of pulmonary candidiasis was a few small fibrotic foci of compactly arranged reticular fibers.

--Authors' abst.

AUTHOR R. J. Snider

TITLE The Asbestos Industry Struggles to Comply with a Tough, New Standard

ORIG. REF. Occ. Hazards

VOL. 35 | 87-88

DATE Oct. 1973

OSTR. REF.

VOL.

DATE

Digest Date 12/73

Digest Number

752

FILE NUMBER

ABSTRACT

Under the OSHA asbestos standard, 8-hour exposure to asbestos dust will drop from the present limit of 5 fibers longer than 5 microns long per cubic centimeter of air to 2 fibers in 1976. The asbestos industry's leading company which operates 55 of the 400 asbestos manufacturing plants in the United States, is already only a whisper away from meeting the 2-fiber standard in most of its plants. "Efforts to meet the standard in advance of the 1976 deadline are vigorously underway in the entire industry," Clifford Scheckler, currently a consultant, told an Occupational Hazards editor. The Asbestos Information Association estimates the asbestos industry will spend \$100 million in the next 3 years to meet the OSHA standard. The efforts combine engineering controls to limit worker exposure to asbestos dust and safety educational programs beamed to asbestos workers and customers.

--Cond. from text

... Health Foundation, Pittsburgh, Pa.

		Digest Date	Digest Number	FILE NUMBER
		12/73	15772	752

AUTHOR P. Gross, R. A. Harley

TITLE The Locus of Pathogenicity of Asbestos Dust

ORIG. REFS	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Arch. Env. Health	27	240-242	Oct. 1973				

ABSTRACT

Documented experimental evidence, as well as the results of preliminary experiments, are presented which indicate a reduction in pathogenicity as the polyfilamentous arrangement of asbestos dust particles is replaced by a nonfilamentous structure. On the basis of this evidence, it is proposed that the locus of pathogenicity of asbestos dust particles resides in their polyfilamentous structure.

--Authors' abst.

Digest Date
12/73

Digest
Number

752

FILE NUMBER

AUTHOR Anon. (Occ. Hazards)

TITLE Asbestos Dust is Linked to Disease

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Occ. Hazards	35	93	Oct. 1973				

ABSTRACT

The diseases associated with asbestos dust are asbestosis, lung cancer and mesothelioma. Scientists have also found some evidence linking asbestos exposure to gastrointestinal cancer. Scientists also don't know how asbestos causes cancer. Some scientists think that somehow the structure of the asbestos fibers themselves causes cancer. Others think that trace metals in the asbestos are the cause. Nickel and chromium, known carcinogens, are common impurities in asbestos. One school of scientists hold that asbestos may work as a cocarcinogen, and, with another agent such as cigarette smoking bring on cancer. The mystery that most divides scientists is the reported high rate of asbestos-related disease among workers employed in manufacturing and among a comparably exposed group of workers employed in construction.

--Cond. from text

Author: Anon. (Brit. Med. J.)

Title: Asbestos Hazard

2/74

Number

752

Orig. Refs. br. Med. J. 4 312-313 Nov. 10, 1973 DATE

ABSTRACT

In all epidemiological studies the message is the same: the inhalation of asbestos dust is dangerous. It may give rise to pulmonary fibrosis leading to respiratory insufficiency and death; carcinoma of the bronchus; mesothelioma of the pleura or peritoneum; and cancer of the gastrointestinal tract. The hazard appears to be a continuing one, and some risk exists outside the asbestos industry as well as within it. What is not yet sufficiently clear is how much exposure is required in terms of concentration, time, and pattern, to what forms of asbestos fibre, and what the characteristics are of those people who are particularly vulnerable to its ill effects. Measurements have shown that the amount of asbestos fibre in the lungs of population samples is very small compared with the amount in the lungs of people who have had occupational exposure. But important positive evidence comes from an accumulation of data showing that cigarette smoking enhances the risk of lung cancer in workers exposed to asbestos, and therefore these groups have especially strong reasons for giving up smoking. In contrast, there is no evidence to show trace metals, waxes, or oils have any similar enhancing effect.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR J.A. Styles and J. Wilson

TITLE Comparison between in Vitro Toxicity of Polymer and Mineral Dusts and Their Fibrogenicity

ORIG. REFS.

Ann.Occ.Hyg.

VOL.

16

PP.

241-250

DATE

Nov. 1973

ABSTR. REFS.

VOL.

PP.

DATE

ABSTRACT

The cytotoxicity of a variety of polymer dusts to suspensions of rat alveolar and peritoneal macrophages in culture was measured using trypan blue as an indicator of cell death. Suspensions of the same dusts were administered to rats by intraperitoneal injection and the tissue reaction examined at 1 month and 3 months. A good correlation was found between the cytotoxicity of the dusts to macrophages in culture and the degree of fibrosis caused by them in the animals.

--Authors' abstr.

2/74

Number

752

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR R.R. Adee and J.J. Laidler

TITLE Subcellular Identification of Exogenous Particles by High-Voltage Electron Microscopy

Digest Date

2/74

Digest Number

567/74

FILE NUMBER

752

ORIG. REF.

VOL.

PP.

DATE

ABSTR. REF.

VOL.

PP.

DATE

Am. Ind. Hyg. Assn. J.

34

507-511

Nov. 1973

ABSTRACT

239 Animals were exposed to particles of asbestos, Cr_2O_3 , NiO , and PuO_2 by either aerosol inhalation or injection. High-voltage electron microscopy was used to obtain diffraction images, and stereopairs of electron micrographs were used to identify and localize specific particles in cells.

--Authors' abst.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR

M. BOROW, et al.

TITLE

Mesothelioma Following Exposure to Asbestos: A Review of 72 Cases

Digest Date

1/74

Digest
Number

753

ORIG. REFS.

Chest

VOL.

64

PP.

641-646

DATE

Nov. 1973

ABSTR. REFS.

VOL.

PP.

DATE

ABSTRACT

In 1967, the authors reported 17 patients with mesothelioma, of which nine cases were pleural and the remainder, peritoneal. Since then, they have treated 56 additional cases, making a total of 53 patients. A search through the medical records of neighboring hospitals brought to light another 19 cases, making the total number 72. Fifty-one of these were pleural (71 percent) and 21 were peritoneal (29 percent). Sixty-four (89 percent) of these patients were men, and information of occupational exposure was present for all but nine, where no history was available. Eight of the patients were women, three of whom had a history of occupational exposure to asbestos, two had environmental exposure to asbestos, and the remaining three had an inadequate history in their medical records. Of this group of 72 patients, there were 68 deaths with autopsies. Four are still living, but with disease. As has been documented before, their patients were exposed to asbestos 20 or more years before the malignancy appeared. Although most of these

subjects smoked two or more packs of cigarettes per day, three were nonsmokers. Apparently, the incidence of this malignancy is increasing. Since a nearby asbestos mill has been in operation for half a century and has been the source of all their case material, the authors wondered if there had been other cases of mesothelioma in which a correct diagnosis had not been made in earlier years. They reviewed all the autopsy records from 1948 to 1963 and found only two cases which now must be considered as mesothelioma. Inasmuch as it has been only a few years since the asbestos industry has instituted measures to reduce the incidence of pulmonary asbestosis, they expect to see increasing numbers of patients with mesothelioma for the next 20 to 30 years. Then, providing that these health measures are sufficient, there should be a dramatic reduction in the incidence of this malignancy.

--Cond. from text

2/74

Number

752

AUTHOR: A. Morgan, A.E. Lally and A. Holmes

TITLE: Some Observations on the Distribution of Trace Metals in Chrysotile Asbestos

ORIG. REFS.	VOL.	PP.	DATE	ABSTN. REFS.	VOL.	PP.	DATE
Ann. Occ. Hyg.	16	231-240	Nov. 1973				

ABSTRACT

The distribution of iron, chromium, nickel, cobalt and scandium in a number of samples of chrysotile asbestos, including the standard reference samples prepared under the auspices of the International Union Against Cancer (IARC) was investigated. The composition of material separated magnetically from chrysotile was examined, using radioactive tracer methods. The solubility of these elements was measured by leaching samples of chrysotile in N hydrochloric acid at 25° C and compared with the solubility of the structural magnesium. These investigations show that all the metals considered can replace magnesium in the brucite layer of chrysotile. In addition, however, with the possible exception of scandium, they are also present in accessory minerals associated with the fibre.

--Authors' abst.

Digest Date
1/74

Digest
Number
1077

FILE NUMBER

753

AUTHOR: P.E. Enterline, and V. Henderson

TITLE: Type of Asbestos and Respiratory Cancer in the Asbestos Industry

ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Arch. Env. Hlth.	27	312-317	Nov. 1973				

ABSTRACT:

Differences in the physical properties and chemical composition of the various types of asbestos indicate that there should be differences in their carcinogenic potentials. This study of the mortality experience of 1,348 retirees from the asbestos industry shows that, after adjustment for cumulative dust exposure, men exposed only to chrysotile asbestos had a respiratory cancer mortality rate 2.4 times the expected, whereas men exposed to a combination of chrysotile and crocidolite asbestos had a mortality rate 5.3 times the expected. Since crocidolite was used largely in the asbestos cement industry, this was studied separately. Men who manufactured asbestos cement shingles and sheets containing only chrysotile asbestos had a respiratory cancer risk 1.4 times the expected, whereas men who manufactured asbestos cement pipe containing both chrysotile and crocidolite asbestos had a respiratory cancer risk 6.1 times the expected.

--Authors' abst.

Industrial Health Foundation, Pittsburgh, Pa.

Digest Date	Digest Number	FILE NUMBER
10/74	12001	752

AUTHOR M. Musti and F. Vimercati

TITLE Laryngeal and pulmonary neoplasia in asbestosis

ORIG. REF.	VOL.	PF.	DATE	ABSTR. REFS.	VOL.	PF.	DATE
Med. Lavoro	64	423-	Nov/Dec				
	431		1973	29 refs. (Italian)			

ABSTRACT:

A case history is given which shows that pulmonary and laryngeal neoplasms develop independently in asbestos exposures.

F.A. El-Shobaki and A.Z. El Sewefy

The Effect of Exposure to Asbestos Dust on Iron Metabolism in Egyptian Workers

ORIG. REF.	VOL.	PP.	DATE	ABSTN. REF.	VOL.	PP.	DATE
Med. Lavoro	64	417-	Nov/Dec				

422 19/3 20 refs.

A number of 42 workers exposed to asbestos dust (chrysotile, amosite and crocidolite) & periodically exposed to silica and cement dust for a period ranged from 10-39 years having clinical and radiological evidence of asbestosis and or mixed pneumoconiosis were randomly selected for this study. Ten non-exposed workers were used as controls. Haematological studies showed that the haemoglobin concentration was not affected by exposure to asbestos dust; however, the Mean Corpuscular Hemoglobin concentration and Mean Corpuscular Volume % were higher than normal. Fasting serum iron and the percentage of transferrin saturation were low. It was found that the rate of iron absorption from the gut was enhanced in workers exposed to asbestos dust for long periods. The serum transferrin level was also increased in exposed workers. A state of polycythemia is suggested to exist due to anoxia among those workers. A haemolytic action of asbestos dust may be operating as evidenced by the relatively

high values of serum total bilirubin.

AUTHOR: Anon. (Lancet)

TITLE: Asbestos in Water

Digest Date	Digest Number	FILE NUMBER
2/74		752

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Lancet	2	1256-1257	Dec. 1, 1973				

ABSTRACT The environmentalists are a potent force on the contemporary U.S. scene. Several months ago the Federal Government's Environmental Protection Agency, encouraged by various vocal groups, served an injunction on a mining company in Minnesota. The company mines iron ore and has for some years dumped a portion of its waste on a deep shelf on the bottom of Lake Superior. Early this year a routine examination of the Duluth water-supply disclosed the presence of a few asbestos fibres. Repeat examinations were performed and again the fibres were noted. The city's water is taken from Lake Superior, at not too great a distance from where the company dumps its waste. A little detective work traced the fibres to the waste products that the mining company dumps in the lake. It was shown that, although most of the dumped material plummeted straight to the bottom--the lake being over 500 feet deep at the site--some smaller particulates remained suspended indefinitely. On the surface, E.P.A.'s action seemed to be justified, since the ingestion of asbestos has been associated with an increased incidence (over)

of gastrointestinal cancer. E.P.A.'s decision to try and close down the company was given additional weight by the arrival in Duluth of a well-known environmental expert with his entourage. Within a few days he had demonstrated the presence of fibres in the mesenteric nodes of several Duluth residents who came to routine necropsy. The case seemed proven, but the mining company, on the advice of their medical consultants, appealed the decision to close the company down. The court hearings started three months ago and still continue. Firstly, the significance of the presence of the asbestos fibres in the mesenteric nodes was completely destroyed by a pathologist from the Mayo Clinic who asked: "From where did you obtain the water which you used to prepare the histological sections?" The answer was from a Duluth tap; in short, a source that was known to be contaminated with asbestos fibres. Secondly, a survey showed a slightly reduced death-rate from carcinoma of the rectum and colon in Duluth compared with the remainder of Minnesota. Thirdly, the water-supplies of seven Canadian cities, including Toronto, were shown to contain many more asbestos fibres; indeed Duluth lagged badly behind. Fourthly, seven Canadian beers and four American beers, not to mention many imported wines, were shown to be similarly replete with asbestos fibres. And finally it was demonstrated that the average construction worker, working under satisfactory conditions in which the asbestos-fibre count in the ambient air conforms to the recommended standard, swallows fifty times more fibres than does the water-drinking inhabitant of Duluth. Since the ingested fibres in the construction worker have to be deposited first in the respiratory tract, and then later carried to the pharynx by the muco-ciliary escalator and swallowed, some doubts about the validity of E.P.A.'s charges now exist. The judge shut down the company until all the evidence had been heard. As a result, the company employees remain at work, while the trial and arguments continue.

5/74

Number

626/74

752

AUTHOR

S. T. Beckett

TITLE

The Evaluation of Airborne Asbestos Fibres Using A scanning Electron Microscope

ORIG. REF.

Ann. Occ. Hyg.

VOL.

16

PP.

405-

DATE

Dec. 1973

ABSTR. REFS.

VOL.

PP.

DATE

ABSTRACT

Asbestos fibres sampled on Nucleopore filters can be directly examined by scanning electron microscope in much greater detail than is possible using the conventional optical microscopy/membrane filter technique. Results obtained by the two methods for fibres $> 5 \mu\text{m}$ in length were in good agreement. The new technique could facilitate the development of automatic counting methods for asbestos fibres.

--Author's abst.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR

I. Harness

TITLE

Airborne Asbestos Dust Evaluation

Digest Date

5/74

Digest
Number

625/74

FILE NUMBER

752

ORIG. PERS.

VOL.

PP.

DATE

ABSTR. REFS.

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PP.

DATE

Ann. Occ. Hyg.

16

397-

Dec. 1973

404

ABSTRACT

The membrane filter method for the measurement of airborne asbestos dust has been in use for over ten years in the United Kingdom. The method has changed little but several improvements in technique have been introduced. This article reports on several of the developments, including the possibility of using the Quantimet 720 image analyser for the automatic evaluation of the asbestos fibre counts. --Author's abst.

Digest Date
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Number
34111.1

PAGE NUMBER

752

AUTHOR
M. Navratil and J. Dobias

TITLE
Development of Pleural Hyalinosis in Long Term Studies of Persons Exposed to Asbestos Dust

ORIG. REF.	VOL.	PP.	DATE	ABSTN. REF.	VOL.	PP.	DATE
Environm.	6	455-	Dec. 1973				
Res.		472					

ABSTRACT: Radiological signs of pleural hyalinosis were found in 50 former and present employees previously exposed to asbestos dust; in 25 of them asbestosis was present simultaneously. Periods of exposure, periods elapsed since onset of exposure and mortality rate, were ascertained until August 1, 1972, in long term studies. The mean values in the group with asbestosis amounted to 22.4 years, 33.7 years, and 40%, and in the group without asbestosis: 21.0 years, 27.6 years, and 12%. The difference in mortality rate was statistically significant. Bronchogenic carcinoma took first place as the cause of death. The regular follow-up allowed differentiation of two stages in the chronologic course of pleural hyalinosis: hyalinosis simplex and hyalinosis complicata. The characteristic pattern of hyalinosis simplex lies in its long term course with progressive calcification of the pleura without any striking response to the clinical state and respiratory function. In hyalinosis complicata acute exudative inflammation of the pleura occurs without any proof of the etiology, and in the (over)

subsequent period this stage develops into extensive pachypleuritic reaction, which differs from the usual adhesive postpleuritic processes. Development in some of our patients disclosed general disease of the pleura affecting both sides. The restrictive disturbance of pulmonary ventilation was stressed simultaneously. Both our cases of pleural mesothelioma, one verified by autopsy the other clinically diagnosed (without autopsy) were from the group hyalinosi complicata. We did not find complicated hyalinosi in any of the patients without exposure to asbestos with radiological signs of pleural calcification. --Authors' abst.

AUTHOR: H. Hayashi

TITLE: Quantitative Determination of Airborne Asbestos Dust in the Occupational

Environment by X-Ray Diffraction using Conventional and Rotating Anode X-Ray Tube

ORIG. REFS:

VOL.

PP.

DATE

ADDITIONAL REFS:

VOL.

PP.

DATE

Ind. Health

11

225-December
236 1973

17 refs.

ABSTRACT: X-ray diffraction is used as an analytical tool for crystalline substances

which are hazards in occupational and natural environments. This paper describes a method for qualitative and quantitative determination of asbestos in airborne dust in the occupational environment. Airborne asbestos collected on a glass fiber filter by means of a high volume air sampler can be analyzed without removal of the dust from the filter and also without addition of internal standard material. For determination of the amounts of total dust, the filter is weighed before and after the collection of the sample. For estimation of mass per unit volume of air, the total volume of air that passed through the filter is recorded. In order to obtain asbestos content in airborne particulates, two types of X-ray generators are used in this study. One is equipped with conventional sealed anode X-ray tube. It is applicable to the determination quantitatively of 1 to 5 mg of asbestos with this method. The other is equipped with a rotating anode X-ray tube in

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order to generate high power X-rays. This procedure can be carried out routinely in a laboratory and in an occupational environment when the total amount of sample is of the order of 0.01 mg of glass fiber filter of 3.8 cm² in area. The results of a field survey indicate very high concentration of both asbestos and total dust in the working area of the asbestos industry, especially of sprayed mineral fiber containing asbestos.

Cancer and Asbestos. Technical Prevention of Asbestos Hazards by A. Wilkie.

- (1) Assessment of the Exposure. (2) Methods of Protection. (3) Problems Areas Remaining. Survey of Statutory Provisions relating to the Prevention of Health Risks due to Asbestos. (1) Introduction. (2) General. (3) Scope of the Problems. (4) National Technical Provisions relating to Asbestos. (5) Medical Supervision. (6) Information and Training.

AUTHOR I. Kalacic

TITLE Chronic Obstructive Pulmonary Disease in Female Asbestos Workers

Digest Date	Digest Number	FILE NUMBER
5/74	627/74	752

ORIG. PETS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Arhiv Hig. Rada Toksikol.	24	3-9	1973				
	(1)						

ABSTRACT The symptoms and syndromes characteristic of chronic obstructive pulmonary disease were studied in a group of female asbestos workers and in a group of control women by means of the British Medical Research Council's examination technique. The prevalence rates of all the symptoms and syndromes were higher in exposed women. The differences related to the prevalence of wheezing, dyspnoea of grade 1 and obstructive ventilatory impairment were statistically significant ($P < 0.05$). Taking into account a fair comparability of the contrasted groups with regard to the relevant characteristics these results were considered as suggesting a possible causal relationship between occupational exposure to asbestos dust and chronic obstructive pulmonary disease. Further studies, however, are needed to clarify better the nature of the observed association.

--Author's abst.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR

R. A. Green and D. G. Dimcheff

TITLE

Massive Bilateral Upper Lobe Fibrosis Secondary to Asbestos Exposure

Digest Date

3/74

Digest
Number

241/11

752

FILE NUMBER

ORIG. REF.

Chest

VOL.

65

PT.

52-55

DATE

Jan. 1974

ABST. REF.

VOL.

PT.

DATE

ABSTRACT

Three patients with massive bilateral upper lobe fibrosis due to asbestos exposure are presented. This pattern of involvement is unusual in asbestosis. Asbestosis should be considered as a possible cause of such roentgenographic changes, especially if the etiology of the upper lobe fibrosis is otherwise unclear.

--Authors' abst.

Digest Date	Digest Number	FILE NUMBER
7/74	440/74	752

AUTHOR
H.C. Lewinson

TITLE
Health Hazards of Asbestos: A Review of Recent Trends

ORIG. REFS.	VOL.	PP.	DATE	ABST. REFS.	VOL.	PP.	DATE
J.Soc.Occup.Med.	24	2-10	Jan. 1974	52 refs.			

ABSTRACT

In his 1966 Myers Memorial Lecture Dr. J. C. Gilson emphasized the main areas where further research was needed into the health hazards of asbestos. Since 1966 many of his recommendations have been carried out. This review attempts to examine recent trends in the study of asbestos and its effects on health by comparing them with the points made by Gilson and the action points documented by the Working Group on Asbestos Cancer (UICC, 1965). The relationship of the physical-chemical properties of asbestos fibres to the epidemiology of mesothelioma is discussed. The role of fibre shape and size is also referred to with regard to carcinogenesis. The main facts established by means of epidemiological investigation of exposed workers are examined. The theme throughout is that in the investigation of this problem the major achievements have been accomplished by a multi-disciplinary approach. The important role of the industrial medical officer as an epidemiologist and the practical application of his

observations in the future control of the hazard are emphasized.

National Health Foundation, Pittsburgh, Pa.

AUTHOR: G.W. Gibbs and M. LaChance

TITLE: Dust-Fiber Relationships in the Quebec Chrysotile Industry

Digest Date

4/74

Digest Number

752

FILE NUMBER

ORIG. REFS: Arch. Environm. Health 28 69-71 Feb. 1974

VOL.

PF.

DATE

ABSTR. REFS.

VOL.

PF.

DATE

ABSTRACT:

Epidemiological studies of Quebec chrysotile miners and millers have related various indices of health to dust exposure, as measured with the midjet impinger. The interpretation of these relationships in terms of fiber necessitates the conversion of midjet impinger (particle + fiber) counts to membrane filter (fiber) equivalents. An investigation in which 87 side-by-side midjet impinger-membrane filter samples were taken at five mines and mills showed that the correlation was poor and no single conversion factor was justified. Until more detailed information on the relationships between midjet impinger and membrane filter counts can be obtained, it is recommended that safety standards, at least in this industry, should continue to be based on dust counts, for which there is considerable epidemiologic support, rather than on fiber counts, for which there is no direct evidence.

AUTHOR J.C. McDonald, et al.

TITLE The Health of Chrysotile Asbestos Mine and Mill Workers of Quebec

Digest Date	Digest Number	FILE NUMBER
4/74	77777	752

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Arch. Environm. Health	28	61-68	Feb. 1974				

ABSTRACT The results of studies of respiratory symptoms and function, roentgenographic changes, and mortality in relation to dust exposure in the Quebec chrysotile industry, which has employed some 28,000 workers, are brought together and their implications for control examined. Breathlessness on exercise, diminished inspiratory capacity, parenchymal and pleural changes, and respiratory disease mortality were related to dust exposure and to each other. Respiratory cancer was also related to dust exposure. The overall excess of deaths from respiratory cancers, including five with malignant mesothelioma, was at most 50% above expectation, based on age-specific rates for Quebec and the mining region. If safety standards are set, they should be based on epidemiological evidence. From these data for the chrysotile producing industry of Quebec, a reasonable figure, based on a 1% risk of acquiring clinically significant disease, would lie between 2 to 4 million particles per cubic foot, calculated for a working life of 50 years. In the absence of epidemiological findings based on fiber counts and lack of a satisfactory means of conversion, particle counts should continue to be used for control in this industry. --

Author's Note

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR I.J. Selikoff

TITLE Asbestos Criteria Document Highlights

ORIG. M.F.S.
ASSE Jnl.

VOL. 19
PP. 26-33

DATE Mar. 1974

ABST. REFS.

VOL.

PP.

DATE

ABSTRACT

Environmental research indicates that exposure to asbestos may be a

significant hazard beyond that long recognized by the manufacturing and processing industry. Recent data supports the concern of environmental health specialists that asbestos may adversely affect workers in construction, maintenance, and other occupations far removed from asbestos manufacturing. Criteria standards calling for engineering controls and substitution of less hazardous materials should reduce the threat of pulmonary disease attributable to exposure to asbestos.

--Author's abst.

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Author: P. Gross, et al.

Title: Mineral Fiber Content of Human Lungs

Orig. Refs.: Am. Ind. Hyg. Assn. J.

Vol. 35, pp. 148-151

Date: Mar. 1974

Abst. Refs.: 8 refs.

Vol. , pp. ,

Date

Abstract

Mineral fibers in the lungs of 13 Pittsburghers and 10 Charlestonians as well as of 7 workers exposed to asbestos dust have been quantitated, and the methodology had been described in some detail. Although wide variations in fiber concentration were found in people of the same sex and of the same community, the average concentration of optically visible pulmonary mineral fibers of Pittsburghers was about seven times as high as that of Charlestonians. The average pulmonary concentration of optically visible fibers in people not occupationally exposed to asbestos was about 0.7% of the average concentration of optically visible fibers in asbestotic lungs. From 54 to 71% of the EM-size fibers were less than 5 μ m long. Of the EM-size mineral fibers in the lungs of people not occupationally exposed to asbestos, an average of 6.8% were identifiable as chrysotile.

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Digest Date	Digest Number	FILE NUMBER
8/74	1024	753

AUTHOR: L.O. Neuman, et al.

TITLE: Mortality and morbidity among the working population of anthophyllite

asbestos miners in Finland.

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Brit.J.Ind.Med.	31	105-112	April 1974	30 refs.			

ABSTRACT:

A study has been made in Finland of the effects of anthophyllite asbestos on mortality and morbidity of 1 092 asbestos workers first employed at two mines between 1936 and 1969; 95% of workers were traced, 248 of whom had died. A similar number of age-sex-matched controls was selected from a township 60 km from the mines. The causes of death included an excess due to lung cancer and asbestosis, but cancers of the digestive system occurred in equal frequency, and neither the cases nor controls had any confirmed mesotheliomas. Assuming a multiplicative effect of asbestos and smoking, the relative risk of lung cancer was 17 for an asbestos worker who smokes in terms of a non-exposed non-smoker. The corresponding figures were 12 for a smoker without asbestos exposure and 1.4 for an asbestos worker who did not smoke. More heavy smokers were found among the asbestos workers than among the controls. A threefold excess of dysphagia and a twofold excess of coughs were recorded for the asbestos workers compared with the controls after adjustment for smoking.

Digest Date 6/74
Digest Number 75511
FILE NUMBER 752

AUTHOR: R. Thomson, I. Webster and T.A. Kilroe-Smith

TITLE: The Metabolism of Benzo(a)Pyrene in Rat Liver Microsomes: The Effect of Asbestos-Associated Metal Ions and pH.

ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Environm. Res.	7	149-159	Apr. 1974	25 refs.			

ABSTRACT

Experimental evidence is presented to support the hypothesis that trace metals and other factors associated with asbestos mined in different areas play a more critical role in the development of "asbestos tumours" than the actual fibre itself. In vitro experiments were performed to investigate the effect of these associated factors on the metabolism of benzo(a)pyrene, a carcinogen introduced into the lung as a result of smoking and atmospheric pollution. The amount of benzo(a)pyrene metabolized by the enzyme in rat liver microsomes was measured in the presence of increasing amounts of trace metal ions. Copper, zinc, lead, nickel, chromium, ferrous, ferric, and magnesium ions were found to inhibit enzyme activity to an increasing extent as their concentration increased; manganese was an exception in that it activated the enzyme at lower concentrations and inhibited it at higher concentrations. Enzyme activity was also considerably affected by changes in pH, with a great loss of activity in the high pH values measured for aqueous suspensions of crocidolite and of tremolite. The effect of manganese ions differed at various pH values, the enzyme-activating effect of these ions being restricted to a much smaller concentration range at a high pH.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR M. Greenberg and T.A. Lloyd Davies
TITLE Mesothelioma Register 1967-68

Digest Date 8/74
Digest Number 1023/74
FILE NUMBER 753

ORIG. REFS. 31 91- April 1974
104
ABSTR. REFS. 22 refs.
VOL. .
PF. .
DATE .

ABSTRACT A register of mesothelioma cases is maintained by the Department of Employment Medical Services Division (now Employment Medical Advisory Service). This paper describes an investigation of 413 notifications to the Register in 1967-68 from England and Wales and Scotland. Cases were regarded as 'definite' when histological confirmation of diagnosis had been obtained, either by hospital pathologist or by the UICC Panel of Pathologists, to whom pathological material was submitted whenever possible. Two hundred and forty-six cases were accepted as 'definite' and 76 cases were regarded as 'definitely not' mesothelioma. The remainder were classified as 'undecided' or 'insufficient pathological material'. Thirty-five of the 76 cases definitely not mesothelioma had nevertheless been so described on death certificates. The investigation carried out covers clinical aspects, survival, and evidence of exposure to asbestos. Twelve per cent of definite mesotheliomata were of peritoneal origin. The age range was 21 to 87 years, but, in general, mesothelioma occurred at an earlier age than carcinoma of

bronchus and lung' or 'all malignant tumours' in the Registrar General's statistical mortality tables. Concomitant asbestosis and the finding of asbestos bodies or pleural plaques occurred as frequently in those cases classified as definitely not mesothelioma as in confirmed cases. Occupational exposure to asbestos was found in 68% of definite cases, apparently significantly more frequently than in those definitely not mesothelioma, but there was observer bias. The interval between first exposure and death from mesothelioma exceeded 25 years in 85% of cases but was only three and a half years in one case. The duration of exposure varied widely: in 12% of cases it was under five years. The type of asbestos could be ascertained in so few cases that it was impossible to assess the role of crocidolite in aetiology. There were 38 definite cases in which no history of any exposure to asbestos could be obtained. Definite mesotheliomata showed marked cl in areas where there is substantial industrial use of asbestos. Whether this should be interpreted as evidence of causation or an effect of heightened awareness in these areas cannot be deduced from this study. Evidence is quoted suggesting that the observed annual incidence of approximately 120 definite mesotheliomata in England, Scotland, and Wales may considerably understate the true prevalence.

Industrial Health Foundation, Pittsburgh, Pa.

		Digest Date		Digest Number		FILE NUMBER	
		6/74		223/174		752	
AUTHOR: B.W. Levine and H.B. Eisenstadt TITLE: Pleural Effusion in Asbestosis							
ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
New Engl. J. Med.	290	1025	May 2, 1974				
ABSTRACT:							

Pleural effusion can result from asbestos exposure and may be far more common than anticipated. Practicing physicians in areas where there is a high exposure rate to asbestos should therefore be aware of this possibility. The fact that several patients with predisposition to rheumatoid disease or with high circulating levels of rheumatoid factor may be more prone to inflammatory lung lesions in asbestosis is intriguing. Other forms of pneumoconiosis in the presence of rheumatoid factor can do this, as in Caplan's syndrome, for example.

Digest Date 7/1/74
Digest Number 753
FILE NUMBER

AUTHOR

T.J. Masson, et al.

TITLE

Asbestos-Like Fibers in Duluth Water Supply

ORIG. PERS.

VOL.

PP.

DATE

ABSTR. REFS.

VOL.

PP.

DATE

Jama

228

1019-1020

May 20, 1974

6 refs.

ABSTRACT

Asbestos-like fibers in industrial waste first entered the water supply of Duluth in 1955. In the next 14 years, no carcinogenic effect was apparent in the patterns of cancer mortality among persons of all ages, nor among children. The period of observation is short relative to the latent period for occupationally induced carcinogenesis from asbestos. To determine if the fibers present in the drinking water of Duluth were related to cancer mortality, the authors studied data abstracted from death certificates for all persons who died of cancer in the United States, from 1950 to 1969.

--Cond. from text

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR: T.H. LOCKWOOD

TITLE: The Analysis of Asbestos for Trace Metals

Digest Date

9/74

Digest Number

1261724

FILE NUMBER

752

ORIG. REFS.

VOL.

PP.

DATE

ABSTR. REFS.

VOL.

PP.

DATE

A.I.H.A. Journal

35

245-

May 1974

251

13 refs.

ABSTRACT

An atomic absorption method for the determination of beryllium, cadmium, chromium, cobalt, copper, manganese, nickel, and thallium in asbestos materials is described. Samples are solubilized in 6N HCl after a digestion procedure using 48% HF on a low temperature (130°C) hotplate. Recovery data from metal salts indicate a quantitative determination for all eight metals. Metal assay data are reported for Canadian chrysotile samples from nine localities. Results (in micrograms of metal per gram of asbestos) are as follows: Be 2-14 micrograms per gram of asbestos, Cd 3-10, Cr 202-771, Co 36-78, Cu 9-26, Mn 325-1065, Ni 299-1187, Ti 20-71.

Industrial Health Foundation, Pittsburgh, Pa.

		Digest Date		Digest Number		FILE NUMBER	
		5/75		631/115		752	
AUTHOR: A.Z. El-Sewefy, et al. TITLE: Bone Marrow Changes in Asbestosis							
ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Med. Lavoro	65	168-	May/June	12 refs.			
		173	1974				

ABSTRACT:

Seventeen workers from an Egyptian asbestos-cement pipe factory exposed to asbestos dust and seldom exposed to silica and cement dust for a period of 10-26 yrs. of age range from 30-57 yrs. were examined clinically, radiologically and hematologically including bone marrow puncture. The result showed a state of leucopenia, increased sedimentation rate, the bone marrow showed a marked to extreme degree of generalised hyperplasia, the outstanding feature is the marked increase in the number of reticulum cells, some are binucleated. Also an increase in the number of plasma cells, some of them are immature and binucleated. These results are discussed in the text.

ABSTRACT Number	DATE	FILE NUMBER
AUTHOR: W. T. MARR		
TITLE: Asbestos Exposure During Naval Vessel Overhaul.		
ORIG. SERIAL	VOL.	DATE
Am. Ind. Hyg. Assn. J. 25	264-268	May - June '64
ABST. SERV.	VOL.	DATE

NFC 752

ABSTRACT:

The Long Beach Naval Shipyard has several men on disability compensation and one death due to asbestosis. Many of these employees have more than 20 years' experience as pipecoverers and insulators working primarily aboard ship. Asbestos exposure during ship overhaul and repair varies extensively giving an entirely different problem from exposure in mining and manufacturing operations. The maximum allowable concentration for pipe covering operations or for short duration massive exposures is unknown. There still remains a difference of opinion among medical authorities on a MAC and the effects of long-fiber and short-fiber asbestos. Chest x-ray examinations of employees exposed to asbestos can be misleading as it usually takes a minimum of 7 years for cases of asbestosis to develop. Shipboard pipecovering and insulating during overhaul and repair is a hazardous trade. Employees in this trade should wear respirators when exposed to dry insulation material containing asbestos.

-- Author's summary

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR: B. Goldstein, et al.

TITLE: The Use of Nonhuman Primates in Pneumoconiosis and Other Industrial Disease Research

ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Environ. Research	7	320-329	June 1974	7 refs.			

Digest Date	Digest Number	FILE NUMBER
9/74	1205/174	752

ABSTRACT:

In South Africa, monkeys and baboons have been freely available for research, but the health of new animals must be investigated prior to use. Mean values for right atrial, systemic arterial and pulmonary artery pressures were found to be 2, 43, 132, and 18.3 mm Hg, respectively. Many of the experiments such as the assessment of dose response to asbestos, the effects of asbestos country rock and asbestos-cement and the evaluation of prophylactic and therapeutic drugs for silicosis have been of a long-term nature. The only serious disease encountered so far in these long-term experiments was an outbreak of tuberculosis which was difficult to control.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR:

C.H. Gorski and L.E. Stettler

TITLE

The Surface Energetics of Asbestos Minerals

Digest Date

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Number

1200174

FILE NUMBER

752

ORIG. REFS.

VOL.

PP.

DATE

ABSTR. REFS.

VOL.

PP.

DATE

A.I.H.A. Journal

35

345-

June 1974

353

14 refs.

ABSTRACT:

Nitrogen and argon isotherms were determined on amosite and on chrysotile asbestos at -183° and -195°C , and in three states of subdivision. BET surface area determinations showed that milling increased the amosite surface area from 1.3 to 11.0 m^2/g , and the chrysotile from 15.3 to 48.4 m^2/g . Changes in hysteresis of the adsorption isotherms indicated that the increased surface area after milling was mostly external for amosite and the increase for chrysotile was primarily caused by the greater availability of micropores. Measurements of pore size showed averages of 58.5 $\text{\AA}$ for amosite and 80.5 $\text{\AA}$ for chrysotile. Heat of adsorption determinations, calculated from the Clausius-Clapeyron equation, showed only minor differences between the two minerals.

Author H.I. Libshitz, et al.

Title Asbestosis and Carcinoma of the Larynx

8/74

753

Orig Refs:

Vol. PP.

Date

Abstr. Refs.

Vol. PP.

Date

J. Amer. Med. Assn. 228 1571- June 17, 1974

1572 1974

3 refs.

Abstract:

Increased incidence of various malignant neoplasms has been related to exposure to asbestos. The association between asbestosis and pulmonary and pleural neoplasms has been well established. The authors have recently seen three patients with primary laryngeal cancers, a history of asbestos exposure, and intrathoracic changes on their chest roentgenograms consistent with asbestosis. In this communication they briefly detail the cases to alert their colleagues to this possible association.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR: A. Morgan

TITLE: Adsorption of Human Serum Albumin by Asbestiform Minerals and Its Application to the Measurement of Surface Areas of Dispersed Samples of Chrysotile

ORIG. REFS.: VOL. PP. DATE ABST. REFS.: VOL. PP. DATE
Environ. Research 7 330- June 1974 11 refs.

Digest I e Digest Number 1162774 FILE NUMBER 752

ABSTRACT: The adsorption of protein by various asbestiform minerals was measured using iodine-131 labelled human serum albumin. It was shown that the amount of albumin adsorbed by chrysotile is very dependent upon the degree of dispersion of the material, and tends to a maximum of about 70 mg/g for fully opened samples at an equilibrium concentration of 0.1 mg/ml. Removal of magnesium from chrysotile by acid leaching produces a progressive decline in its affinity for protein. Calculations of the surface area of dispersed chrysotile, based on the amount of albumin adsorbed, correspond quite well with measurements of surface area by nitrogen adsorption. It is suggested that albumin adsorption provides a simple and convenient technique for characterising the degree of dispersion of chrysotile in suspension. The affinity of albumin for amphiboles is less than for chrysotile and by contrast, dispersion by shaking or by ultrasonic treatment produces little change in uptake.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR: S.F. McCullagh

TITLE: The Biological Effects of Asbestos

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ORIG. REF.	VOL.	PP.	DATE	ABSTN. REF.	VOL.	PP.	DATE
Med. J. Australia	2	45-49	July 13, 1974	51 refs.			

ABSTRACT:

Recent developments are reviewed. The terms pulmonary asbestosis and pleural asbestosis should be introduced to avoid confusion between the two. Pulmonary compliance is the single most valuable test of lung function in the detection of pulmonary asbestosis, and a method has been described recently which may make this measurement practicable in the routine surveillance of an asbestos exposed workforce. Pleural asbestosis may mimic restrictive lung disease but only if the pleural changes are very extensive. There is little evidence linking these essentially benign changes with mesothelioma. It is now thought that the carcinogenicity of asbestos and of other fibres is a function of their physical rather than of their chemical structure. Lung cancer in an asbestos worker can be attributed to asbestos exposure only if there is also evidence, albeit perhaps only that of a trend, of pulmonary asbestosis. Accumulating evidence continues to emphasize the importance of cigarette smoking in the lung cancer of asbestos

workers. Current standards of workplace hygiene are reviewed and conflicting opinions about methods of medical surveillance compared. In the general urban atmosphere, the amount of asbestos is between one hundred thousandth and one millionth of that held to be safe in the workplace. Motor-car brake linings release little, if any, asbestos in their normal road use. The amount of asbestos in water and beverages is likewise negligible.

S. Sethi, et al.

Giant Cell Formation After Intraperitoneal Application of Crocidolite
Asbestos Fibres in Rats

Ann. Occup. Hyg. 17 53-56 August 1974 17 refs.

Index Date 10/74 Index Number 752

U.I.C.C. crocidolite was administered to rats intraperitoneally using the cover slip method. Animals were sacrificed at 24-hr intervals and the cover slips prepared for phase contrast and interference contrast observations. Early cellular reaction consisted of mononuclear dendritic and epithelioid macrophages, which had phagocytosed asbestos fibres. The fibres were lying within lysosomes and were arranged around the nucleus. Polykaryocytes, appearing on the fifth day, showed an interesting feature, namely, secondary integration of mononuclear cells. In the control groups, which received corundum and physiological saline respectively, no polykaryocytes were observed. The mechanism of formation of polykaryocytes induced by fibrous asbestos is discussed.

Health Foundation, Pittsburgh, Pa.

AUTHOR: P. Gross

TITLE: Is Short-Fibered Asbestos Dust a Biological Hazard?

Digest Date
10/74

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Number
1211124

FILE NUMBER
752

ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Arch. Environ. Health	29	115-117	August 1974	18 refs.			

Contrary to the determination that the finer the quartz dust, the greater its pathogenicity; the pathogenicity of the finest asbestos dust has been shown to be negligible. It has been the finding of research laboratories in Germany, England, South Africa, and the United States that short-fibered asbestos, dust, ie, less than 5u in length, is incapable of causing fibrosis or cancer. This finding, in conjunction with the failure of different laboratories in the United Kingdom and in this country to discern abnormalities following prolonged asbestos feeding to rats, should lead to the abandonment of the present concept that maintenance of mesotheliomas and gastrointestinal cancers arise from the ingestion of asbestos dust from the lungs. These negative results should also allow the abandonment of the present concept as a result of the finding of ultrashort and mineral fibers in the lungs of rats and drinking water.

Industrial Health Foundation, Pittsburgh, Pa.

Digest	ite	Digest	FILE NUMBER
10/74		Number	752

AUTHOR G.L. Lee and D.J. Smith

TITLE Steelwork Insulated with Sprayed Crocidolite Asbestos: Controlling a Potential Hazard

ORIG. REFS	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Ann. Occup. Hyg.	17	49-	August				
	52		1974	9 refs.			

ABSTRACT

Surveys of factory sites revealed the presence of crocidolite asbestos in a number of places. Dust sampling and visual evidence suggested a potential occupational health risk in one of the areas. A procedure for sealing the asbestos deposits and ensuring continual maintenance was adopted and is described. Some cost-effectiveness data relative to removal and replacement with alternative materials is given.

Health Foundation, Pittsburgh, Pa.

AUTHOR: E.E. Gasson

TITLE: Asbestos in Industry

Digest Date
11/74

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Number
12447

FILE NUMBER
752

ORIG. REFS.
Occup. Health

VOL. 26
PP. 298-306
DATE August 1974

ABSTR. REFS.
9 refs.

VOL.
PP.
DATE

ABSTRACT

The properties, uses, and biological effects of asbestos are reviewed.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR
Anon.

TITLE
Biological Effects of Asbestos

Digest Date
11/74
Digest Number
752

ORIG. REF.
Lancet

VOL.
2
706

DATE
September
21, 1974

ABST. REF.
1 ref.

VOL.
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ABSTRACT: Information is usefully summarised in the proceedings of a conference held at the International Agency for Research on Cancer. It is interesting to compare the results of epidemiological studies of human populations exposed to asbestos with the pathology of diseases produced by asbestos in animals. Asbestosis and bronchial carcinoma seem to be produced by all fibre types widely used but with clear exposure-response relationships. In contrast, the production of mesothelial tumours in man seems to be closely linked with exposure to crocidolite. When various types of asbestos are injected into the pleural cavity of laboratory animals, all induce mesotheliomas. The apparent discrepancy between the experimental and epidemiological findings can be explained by assuming that small crocidolite fibres, when inhaled, penetrate more readily to the pleural cavity. The dimensions of the crocidolite fibre indicate that it is the most respirable type, and its chemical stability ensures its persistence in lung tissue. The fact that all fibre types

so far tested induce mesotheliomas directs attention to the physical properties of the fibres rather than to their chemical composition. This view is reinforced by the finding that fibres composed of glass or aluminium oxide, having the approximate dimensions of small asbestos fibres, are also able to induce mesotheliomas. It is therefore unlikely that trace metal, hydrocarbon, or other contaminants are concerned in the induction of mesotheliomas. However, in the induction of bronchial carcinomas smoking and exposure to all asbestos types probably confer a greater than additive risk. Moreover, chemical carcinogens and asbestos fibres have synergistic effects in the induction of bronchial carcinomas in laboratory animals. These findings have obvious implications for asbestos workers.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR F.M.M. White, et al.

TITLE Rheumatic Complaints and Pulmonary Response to Chrysotile Dust Inhalation
in the Mines and Mills of Quebec

ORIG. MISC. VOL. 111 PP. 533-535 DATE September 2, 1974
CANADIAN MED. ASSN. JOURNAL 17 refs.

ABSTRACT

In 1967-68 an age-stratified random sample of 1069 current workers in Quebec asbestos mines and mills was surveyed. Questions concerning rheumatic complaints were included in a modified MRC questionnaire used at that time, and on this basis a rheumatic severity gradient was devised. No relationship could be detected between rheumatic complaints and pulmonary radiologic response to chrysotile dust exposure, despite implications in the literature that such a relationship might exist.

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E.E. Gasson

Asbestos in Industry - 2

DOC. TITLE	VOL.	PP.	DATE	ABSTN. NITE.	VOL.	PP.	DATE
Occup. Health	26	352-	September				
	362		1974	1 ref.			

The methods of worker protection are outlined briefly. These include engineering controls, personal protection, monitoring, and medical supervision. The special role of the occupational health nurse is discussed. Research programs are currently being conducted by the Asbestosis Research Council in Britain, the U.S. Public Health Service, and the Institute of Occupational and Environmental Health in Quebec, Canada.

Industrial Health Foundation, Pittsburgh, Pa.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR F. Whitwell, et al.

TITLE A Study of the Histological Cell Types of Lung Cancer in Workers Suffering From Asbestosis in the United Kingdom

ORIG. REF. VOL. PP. DATE ABSTR. REF. VOL. PP. DATE
British J. Ind. Med. 31 298-303 October 1974 20 refs.

ABSTRACT The present study concerns the predominant cell type of lung cancer in workers with certified asbestosis who died of carcinoma of the lung in the United Kingdom between 1962 and 1972. Clinical data, necropsy reports, histological sections, and in some cases paraffin blocks were obtained from the nine pneumoconiosis panels in the country and from hospitals where the patients had been treated. Histological analysis was confined to the 88 male and nine female cases in which adequate postmortem tissue had been obtained. The number of female cases was considered to be too small to be of value as a separate series. Among the males, adenocarcinoma was the commonest type of lung cancer found in 34%. Information about the smoking habits of 69 of the 88 men was obtained; all had been smokers at some time. There was little difference between the smoking habits of subjects who had the cell type of carcinoma. The difficulty in finding a correlation between the cell type of carcinoma and the type of smoking habit is pointed out.

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the usual practice to hold a necropsy on any patient when asbestosis has been certified wherever the place of death. This series therefore has a wider basis of selection than any hospital-based series. Cigarette smoking can exert a carcinogenic effect on different parts of the bronchial tree, producing squamous or oat-celled tumours proximally and adenocarcinoma distally. Asbestos dust lying in distal parts of the lung may exert a co-carcinogenic probably a multiplicative effect with tobacco smoke, producing adenocarcinoma of the distal part of the respiratory tract.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR: A.L. Reeves, et al.

TITLE: Inhalation Carcinogenesis from Various Forms of Asbestos

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ORIG. REF.	VOL.	PP.	DATE	ABSTN. REF.	VOL.	PP.	DATE
Environ. Research	8	178-1	October 1974	80 refs.			

ABSTRACT Rats, rabbits, guinea pigs, gerbils, and mice were exposed to the inhalation of chrysotile, crocidolite, or amosite for 2 years. Mean atmospheric concentrations were 47.9-50.2 mg/m³, but only 0.08-1.82% of the dusts retained fibrous morphology during the dissemination procedure which involved hammer milling. Trace contamination especially by chromium and nickel was also increased. Light microscopic fiber counts per ml chamber air were 54 (chrysotile), 1105 (crocidolite), and 864 (amosite). A fibrogenic response to these dusts was observed in all five animal species, the severity corresponding to the extent of exposure (with reaction to chrysotile frequently very slight). Gerbils developed frequent alveolar proteinosis. Mice developed spontaneous papillary carcinomas in the lungs. Disregarding the latter species, carcinogenic response to asbestos inhalation was restricted to rats and occurred in all three exposure groups. There were 2 lung cancers and 1 pleural mesothelioma after chrysotile inhalation; 4 lung cancers after crocidolite

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F.T. Poole

A Strict Interpretation

ORIG. REFS.	VOL.	PP.	DATE	ABST. REFS.	VOL.	PP.	DATE
Occup. Health	26	404-405	October 1974				

ABSTRACT Contractors involved in demolition work (or 'stripping out') may come across materials, such as asbestos lagging, which they had not expected to find. But encountering the unexpected is no defence to a charge, under the Factories Act (Great Britain) of failing to give advance notice to the factory inspector when conducting "building operations" which include a 'process involving asbestos'. The facts of this case do indicate a harsh application of the Asbestos Regulations, and while it can be appreciated that to soften the wording of the Regulations would be likely to undermine their effectiveness, it is hoped that a contractor who unexpectedly comes on asbestos in the course of his operations, and who immediately notifies the factory inspector and explains the situation, can expect to find a sympathetic ear and that a prosecution will not result. This is the course that should be followed, rather than to keep quiet about the asbestos in the hope that no one will come to know about it.

Industrial Health Foundation, Pittsburgh, Pa.

inhalation; and 1 lung cancer and 2 pleural mesotheliomas after amosite inhalation. These cases constituted 7-9% incidence of malignancy among rats with adequate survival record. Hypotheses of asbestos carcinogenesis are reviewed and it is suggested that different etiologic principles may be involved in the causation of lung cancer and of pleural mesothelioma.

AUTHOR E.S. Flowers

TITLE Relationship Between Exposure to Asbestos, Collagen Formation, Ferruginous Bodies, and Carcinoma

ORIG. REF. VOL. 35 PP. 724-729 DATE November 1974 ABSTR. REFS. 20 refs. VOL. PP. DATE

ABSTRACT Exposure to asbestos is associated with chronic fibrosing processes, formation of ferruginous bodies, and an increased risk of carcinoma. It is possible to relate the various biological responses to asbestos exposure in terms of fundamental effects on the redox state of cells or tissues. Collagen synthesis is mediated by the level of α -ketoglutaric acid, and the rate of collagen formation is directly related to the rates of fibrosis, including elastin formation. The increase in oxidative reactions associated with collagen formation is thought to increase the amount of ferric iron bound to cellular protein, resulting in formation of a silicate-iron (III) bond on an asbestos fiber. The iron-containing protein bound to the asbestos fiber by the strong silicate ionic bond is a ferruginous body. The corresponding decrease in the ferrous-ferric redox couple inhibits electron transport, thus stabilizing exoperoxides and free radicals thought to be involved in the initiation of carcinomas.

Industrial Health Foundation, Pittsburgh, Pa.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR J.B. Schoenberg and C.A. Mitchell

TITLE Implementation of the Federal Asbestos Standard in Connecticut

ORIG. REFS.	VOL.	PP.	DATE	ABSTN. REFS.	VOL.	PP.	DATE
J. Occup. Med.	16	781-784	December 1974	17 refs.			

ABSTRACT The authors have studied practical aspects of implementing the new federal asbestos standard among a selected group of Connecticut companies which use asbestos materials. They found many minor users of asbestos, most of whom did not consider their employees to be exposed to asbestos; this finding suggests the need for carefully defining "exposure" so that groups of employees with some risk of asbestos disease are not arbitrarily excluded from coverage. Since even those companies that knew they were covered by the standard were often unaware of its specific provisions, increased two-way communication with OSHA is greatly needed. So far, most companies have been able to obtain initial industrial hygiene consulting services from their insurance carriers. However, many small companies have had difficulties in providing appropriate facilities for medical surveillance. Other problem areas discussed include the need to standardize techniques for environmental measurements as well as for medical examination procedures.

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and to investigate the potential hazards of increasingly used asbestos substitutes. Many of their findings and comments are of a general nature, and are also relevant to future OSHA standards for other hazardous substances.

Health Foundation, Pittsburgh, Pa.

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AUTHOR S.T. Beckett and M.D. Attfield

TITLE Inter-laboratory Comparisons of the Counting of Asbestos Fibres
Sampled on Membrane Filters

ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Ann. Occup. Hyg.	17	85-96	December 1974	5 refs.			

ABSTRACT Two series of exchanges of slide-mounted asbestos samples have been conducted between British laboratories, to determine the degree of agreement between different laboratories counting the same slides, the effectiveness of written compared with personal instruction, and the reasons for disagreements. It was found that disagreements between laboratories that were isolated or new to fibre counting were large, but were reduced by direct personal consultation. The main causes of these differences were uncertainties in the counting of irregular fibres and fibre masses, misalignment of the microscope phase rings, and failure to cover the full depth of focus, in which fibres were present. Results of an exchange between several experienced laboratories showed that counting over the whole field of view from a microscope consistently returned substantially lower counts than counting only the central graticule area was evaluated. All discrepancies were within 10% of the 1000 asbestos samples when for samples counted from

factory air. It is concluded that there is a need for closer definition and standardisation of counting procedures.

Industrial Health Foundation, Pittsburgh, Pa.

J. Coldfield and F.E. Brandt

Dust Control Techniques in the Asbestos Industry

ORIG. REFS	VOL.	PP.	DATE	ABSTR. REFS	VOL.	PP.	DATE
Am. Ind. Hyg. Assn. J.	35	799-808	December 1974	3 refs.			

ABSTRACT

Asbestos fiber is a remarkable and useful material in modern-day technology. Long exposure and relatively high concentrations cause various diseases. Process changes, leaktight equipment, industrial exhaust systems and dust filters are used to control dust exposures in mining and milling and manufacturing. Examples from asbestos mills, asbestos-cement pipe plants and textile operations are given. Belt conveyors, vibrating screens, bag opening stations, machine hoods, and textile cards are discussed. Duct design and filter selection are discussed.

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Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR P. Gross, et al.

TITLE Ingested Mineral Fibers

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ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Arch. Environ. Health	29	341- 347	December 1974	11 refs.			

ABSTRACT:

Three different laboratories independently investigated the ability of ingested mineral fibers to penetrate tissues in rats. All concluded that there was no evidence of tissue penetration by ingested mineral fibers. These experimental observations are supported by the findings in coal and hard-rock miners who swallow, during their lifetime, nearly 100 times the amount of dust that is stored in their lungs. The intestinal wall or mesenteric lymph nodes of these people show no evidence of storage of the ingested dust particles. Animals fed asbestos over much of their lifetime and allowed to live to the age of cancer production, failed to provide evidence of a cancerogenic effect.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR G. Lee

TITLE Asbestos-based and other industrial materials

ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Occup. Health	26	484-487	December 1974				

ABSTRACT

One of the responses from the asbestos industry to the increasing use of alternatives has been the development of liquid dispersed asbestos (Fortex). The dispersal process imparts dust-suppression properties to the material and hence handling becomes relatively simple and safe. For small bore pipe applications, tapes made from Fortex have been found by some users to be superior to the market alternatives. Doubtless, other formulation developments will follow to reduce the potential hazards of asbestos products. It can never be disputed that asbestos has been and continues to be a valuable material, saving lives and improving the quality of existence for many millions of people. For some applications it remains the best and sometimes, the only viable choice. To meet the needs of changing technology, overcome health problems and provide that freedom of choice which healthy societies regard as being important, a wide range of materials

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is now available. Many of the newer products do not appear to present the same problems which are associated with asbestos, but it should not be forgotten that the same ingenuity of mankind in developing new materials has also produced safe procedures for dealing with most of the situations which arise with asbestos.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR Q. Rahman, et al.

TITLE In vitro dissolution of three varieties of asbestos in physiological fluids

ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Work-Environm.- Health	11(1)	39-42	1974	22 refs.			

ABSTRACT

The dissolution of silica, magnesium and iron from chrysotile, anthophyllite and amosite in the Ringer buffer and human serum at 37°C was studied for varying periods up to 60 days. For the purpose of comparison, the solubility of asbestos was also investigated in veronal acetate buffer. Serum was found to be a better solvent than either of the buffers. In general, the dissolution of silica and magnesium was maximum from chrysotile and that of iron from amosite. The biochemical significance of the findings in relation to asbestosis has been discussed.

AUTHOR: A. Miller, et al.

TITLE: "Nonspecific" Interstitial Pulmonary Fibrosis

ORIG. REF.	VOL.	PP.	DATE	ABST. REFS.	VOL.	PP.	DATE
New Engl. J. Med.	292	91-93	Jan. 9, 1975	15 refs.			

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ABSTRACT: Electron microscopy has only recently been applied to "idiopathic" interstitial pulmonary reactions. In 1971, the authors described a patient with interstitial granulomas and fibrosis indistinguishable from sarcoidosis. A history of occupational exposure impelled electron microscopy and x-ray diffraction studies, which revealed talc crystals in his lungs. For the patient described, they examined lung tissue that had shown severe interstitial fibrosis, with no evidence of mineral particles, on light microscopy. Although the patient had had no exposure to known pathogenic dusts, electron microscopy demonstrated ubiquitous fibrils of chrysotile asbestos, averaging 27.5 nm (275 Å) in width and less than 100 nm (1000 Å, or 0.1 µm) in length--well below the resolution of a light optical system.

Author J.A. Merchant, et al.

The HL-A System in Asbestos Workers

Orig. Title British Med. J. Vol. 1 pp. 189-191 Date Jan, 25, 1975 Abst. Refs. 14 refs. Vol. pp. Date

ABSTRACT

In a study of the HL-A system in 56 selected asbestos workers referred to the Pneumoconiosis Medical Panel with definite or suspected asbestosis, the W 27 antigen was found more often than among a control population. Six of the 10 asbestos workers with the W 27 antigen had definite radiographic evidence of asbestosis compared to 13 out of 46 without the W 27 antigen.

These observations, if confirmed, suggest that the W 27 antigen may provide a useful marker of an enhanced susceptibility to the tissue-damaging effects of asbestos dust.

Industrial Health Foundation, Pittsburgh, Pa.

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AUTHOR
H. Weill, et al.

TITLE
Lung Function Consequences of Dust Exposure in Asbestos Cement
Manufacturing Plants

ORIG. PERS.	VOL.	PF.	DATE	ABSTR. REFS.	VOL.	PF.	DATE
Arch. Environ. Health	30	88- 97	Feb. 1975	17 refs.			

ABSTRACT
A comprehensive study of health effects associated with the mixed dust exposure in this industry has included the collection of clinical, radiographic, lung function, and dust exposure data on 859 workers in two plants. Evidence is presented supporting a dose-response relationship between indexes of dust exposure and lung function, similar to the previously reported relationship with extent of x-ray film changes using the ILO U/C classification. Lung volumes and maximum expiratory flow rates decrease in relation to increasing cumulative dust exposure while pulmonary diffusing capacity (D_L) is not dust-dose related. Workers who had crocidolite exposure had smaller lung volumes, lower expiratory flow rates, and reduced D_L when compared with those having only chrysotile exposure. When the study population is divided into exposure groups, data thus far analyzed suggest that the chest x-ray film will reveal

small opacities as early as significant functional changes can be detected, but individuals may have functional reduction prior to the appearance of x-ray film changes.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR
Anon.

TITLE
Background Documentation on Evaluation of Occupational Exposure to Air-borne Asbestos

ORIG. REFS	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Am. Ind. Hyg. Assn. J.	36	91-103	Feb. 1975	96 refs			

ABSTRACT

This review presents background information and literature documentation to supplement the "Recommended Procedures for Sampling and Counting Asbestos Fibers: Procedures for the Evaluation of Occupational Exposure to Airborne Asbestos" prepared by the joint ACGIH-AIHA Aerosol Hazards Evaluation Committee. It reviews the nature of the inhalation hazard associated with asbestos fibers, the sampling and analytic methods which have been used, and a rationale for the selection of the membrane filter sampling-optical phase microscope identification and assay methodology which is recommended.

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Industrial Health Foundation, Pittsburgh, Pa.

Digest Date	Digest Number	File Number
4/75	4771-15	752

AUTHOR: Anon.

TITLE: Recommended Procedures for Sampling and Counting Asbestos Fibers

DATE RECEIVED:	VOL.	PP.	DATE	ABST. RECEIVED:	VOL.	PP.	DATE
Am. Ind. Hyg. Assn. J.	36	83-90	Feb. 1975				

ABSTRACT:

Fibrous Asbestos has been identified as the causative agent of asbestosis and has been associated with an increased cancer incidence. The American Conference of Governmental Industrial Hygienists (ACGIH) has established (1974) a Threshold Limit Value (TLV) for asbestos of 5 fibers greater than 5 micrometers in length per milliliter of air. A TLV footnote specifies the determination shall be made by the membrane filter method at 400X to 450X magnification and with phase contrast illumination. These procedures define a standard of sampling and of processing the collected samples in order to evaluate occupational exposure to asbestos fibers.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR: G. Knight

TITLE: Overlap Problems in Counting Fibers

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ORIG. REFS	VOL.	PP.	DATE	ABST. REFS.	VOL.	PP.	DATE
Am. Ind. Hyg.	36	113-	Feb. 1975	2 refs.			
Assn. J.		114					

ABSTRACT:

The probabilities of certain errors in counting fibers due to accidental overlaying during sampling are calculated and shown to be significant. Justification is given for simple rules to get agreement in counting between microscopists.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR S. Gabor and Z. Anca

TITLE Effect of Asbestos on Lipid Peroxidation in the Red Cells

ORIG. REFS

VOL.

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VOL.

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DATE

British J. Ind.
Med.

32

39-

Feb. 1975

18 refs

ABSTRACT

In vitro exposure of red cells to five International Union against Cancer (IARC) standard reference asbestos samples resulted in an increase of thiobarbituric acid substances. Chrysotiles developed the largest amounts of lipid peroxides, followed by anthophyllite, amosite, and crocidolite in decreasing order. Compared with the control samples, erythrocytes free of dusts, all types of the asbestos examined disclosed significant differences. The results obtained provide support for the cytotoxic potential of amosite and crocidolite and, on the other hand, suggest that a lipid peroxidation of unsaturated fatty acids may be involved in the mechanism(s) of membrane-damaging effects of asbestos dusts.

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Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR J.H. Fontaine and D.M. Trayer

TITLE Asbestos Control in Steam Electric Generating Plants

ORIG. REFS.	VOL.	PP.	DATE	ABSTN. REFS.	VOL.	PP.	DATE
Am. Ind. Hyg. Assn. J.	36	126-130	Feb. 1975	7 refs.			

A program to control industrial work exposures to airborne asbestos fibers is presented. The program is consistent with OSHA standards and with current good industrial hygiene practice. The program includes methods of problem evaluation, the establishment of effective corporate standards, and provisions for environmental and medical surveillance. Hazard control measures and techniques are discussed and their merits related.

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Industrial Health Foundation, Pittsburgh, Pa.

Author I. Doniach, et al.

Title Prevalence of Asbestos Bodies in a Necropsy Series in East London:
Association with Disease, Occupation, and Domiciliary Address

ORIG. REFS	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
British J. Ind. Med.	32	16-	Feb. 1975	13 refs.			

Abstract The prevalence of asbestos bodies was measured in lung sections in a necropsy series carried out at the London Hospital (1965-66) after exclusion of all known asbestos factory workers and cases of asbestosis and of mesothelioma. Associations were sought between the presence and number of asbestos bodies with the patients' sex, domiciliary address, occupation, industry, and diseases recorded at necropsy. Asbestos bodies were present in 42% of the 216 men in the series and in 30% of the 178 women. The number of bodies in the positive cases was small in comparison with the numbers seen typically in asbestosis; thus there were less than 6 asbestos bodies per 6.75 mm³ lung tissue in 107 of the total 145 positive cases in contrast to 1,000 or more in asbestosis. In comparison with the overall series, an increased number of asbestos body positives was present in males with carcinoma of stomach and females with carcinoma of breast. In view of this finding lung sections were counted in

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further post-mortem examples of these carcinomas making a total of 50 males with carcinoma stomach and 82 females with carcinoma breast. Thirty-five positive cases were found in the carcinoma stomach group as against 22.7 expected and 38 in the carcinoma breast group against 26.35 expected. There was no excess of observed over expected asbestos body positives in 51 males with carcinoma of bronchus. There was an excess of asbestos body positives (60.9%) in heavy manual workers and in both heavy and light manual male workers in the shipping (61%), electrical and engineering (56%), and transport (54%) industries. The incidence in male clerical workers was 12.8%. The incidence of asbestos body positives according to home address was highest (53% in males, 45% in females) in patients living in the industrial and dockland area due east of the hospital. The incidence fell in the less industrial areas north-east of the hospital. Consideration of possible environmental sources of the inhaled asbestos suggests that in this survey occupation, industry, and domiciliary area all play a part. The comparatively minor intensity of asbestos pollution in our positive cases showed a positive association with carcinoma of stomach and breast, possibly playing a direct pathogenic role in carcinoma of stomach. No positive association was identified with any other neoplastic disease including carcinoma of bronchus.

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AUTHOR: R.A. Curtis and P.J. Bierbaum

TITLE: Technological Feasibility of the 2 Fibers/cc Asbestos Standard in Asbestos Textile Facilities

ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Am. Ind. Hyg. Assn. J.	36	115-125	Feb. 1975	9 refs.			

ABSTRACT: The technical feasibility of developing dust control practice which would bring the asbestos industry into compliance with OSHA 2 fibers/cc standard, scheduled to become effective July 1, 1976, has been questioned since its promulgation. This paper presents the results of industrial hygiene surveys, including the results of 243 asbestos air samples, conducted at two asbestos textile production facilities which have achieved the 2 fibers/cc standard. Both facilities use nonconventional production techniques. Conclusions drawn from the investigations express the need for: (1) a study of new products; (2) a tool to motivate consumers to switch to the new products when appropriate; and (3) legislation which will protect all domestic producers of asbestos textiles from certain producers who do not have to absorb the added expense of meeting the OSHA standard.

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AUTHOR L.W. Oritz, et al.

TITLE Calibration Standards for Counting Asbestos

ORIG. REFS.	VOL.	PP.	DATE	ORIG. REFS.	VOL.	PP.	DATE
Am. Ind. Hyg.	36	104-	Feb. 1975				
Assn. J.	112			8 refs			

ABSTRACT

A laboratory proficiency testing program has been initiated by NIOSH to permit standardization of asbestos counting procedures by various state agencies. This has required preparation of multiple membrane filter samples containing "identical and predictable" concentrations of asbestos fibers, with consistent particulate backgrounds. A technique to filter liquid (toluene) suspensions was developed to provide chrysotile asbestos standards ranging from 200 to 1,500 fibers/mm² of filter area, with an aluminum oxide particulate background. Details of the necessary techniques are described. To evaluate variations inherent in preparing these "identical" samples and to estimate variations between different counters, extensive replicate fiber counting was performed. Count data from several counters at a single facility show that this liquid suspension filtration technique provides reproducible asbestos standards as measured by optical microscopy with a coefficient of variation of $\pm 20\%$ with the maximum individual variation of $\pm 50\%$.

AUTHOR: Q. Rahman, et al.

TITLE: Biochemical Changes Caused by Asbestos Dust in the Lungs of Rats

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Scand. J. Work Environ. & Health	1	50-53	March 1975	18 refs.			

ABSTRACT: The contents of collagen, hexosamine, phospholipids, and cholesterol and the activities of acid and alkaline phosphatases, glutamic oxaloacetate transaminase, glutamic pyruvate transaminase, aldolase, hexokinase, and lactic dehydrogenase were determined in the lungs of rats 150 days after the intratracheal injection of amosite, anthophyllite, and chrysotile. Anthophyllite did not cause any significant change, while amosite and chrysotile caused significant increases in the contents of collagen and mucopolysaccharides. Lactic dehydrogenase and acid phosphatase activities were increased by all the dusts, while the other enzymes were not seriously affected. The biochemical significance of the findings in relation to asbestosis was discussed.

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Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR: R.P. Bagioni		Dig + Date		Digest Number		FILE NUMBER	
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TITLE Separation of Chrysotile Asbestos from Minerals that Interfere with its Infrared Analysis

ORIG. REFS.	VOL.	PP.	DATE	ABST. REFS.	VOL.	PP.	DATE
Environm. Science & Technol.	9	262-263	March 1975	8 refs.			

ABSTRACT:

The persistence of interferences in chrysotile asbestos determinations has rendered the use of infrared methods totally unsuitable for analytical analysis. Interferences that show a stretch at 2.72 μ will invalidate most infrared techniques. Where it was previously possible to remove organic interferences through ashing techniques, it is also possible to remove mineral interferences through centrifugation in a high density liquid. The removal of mineral interferences has helped to improve the infrared methods.

AUTHOR

J.L. Kay and S.H. Zaidi

TITLE

In Vitro Studies on the Cytotoxic Action of Different Varieties of Asbestos Dust on Macrophages

ORIG. REFS

VOL.

PP.

DATE

ABSTR. REFS.

VOL.

PP.

DATE

Acta-Pharmacol. et Toxicol.

36

225-

March 1975

23 refs.

ABSTRACT

The cytotoxic action of a variety of asbestos dusts viz. chrysotile, amosite, anthophyllite, tremolite and actinolite was tested in vitro using alveolar and peritoneal macrophage cell cultures. The release of acid phosphatase and the uptake of the dye erythrosin B were taken as parameters of cytotoxicity. Among the several varieties of asbestos tested for this purpose, chrysotile proved to be most cytotoxic for both the alveolar and peritoneal macrophages, although the former were more sensitive. Amosite was only slightly toxic for alveolar macrophages. Anthophyllite, tremolite and actinolite behaved as control inert dusts. Carboxymethylcellulose exhibited an anticytotoxic effect when chrysotile was pretreated with the polymer or when the dust cell interaction was allowed to take place in its presence.

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AUTHOR: C.H. Gorski and L.E. Stettler

TITLE: The Adsorption of Water and Benzene on Amosite and Chrysotile Asbestos

OP. C. REFS.: 36 VOL. 292-298 DATE: April 1975
 ASSN. J. 16 refs.

ABSTRACT

In previous work the authors showed that chrysotile is more porous than amosite and consequently has a higher surface area. In the present work, water with a low molecular cross-section and benzene with a high molecular cross-section are used as adsorbates. Benzene adsorption is extremely slow on both adsorbents with each point taking from 4 to 24 hours for equilibration. Evidently, the larger benzene molecule has a more difficult time working its way through the small pores. The water isotherm on both asbestos minerals is typical Type II which shows that physical adsorption is predominant. In both cases hysteresis was found. Benzene adsorption on amosite resembled Type IV which reflects capillary condensation phenomena. With chrysotile some chemisorption may have occurred. BET surface areas and heats of adsorption are calculated.

Industrial Health Foundation, Pittsburgh, Pa.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR M.B. Divertie

TITLE Ultrastructural Morphometry of the Diffusion Surface in a Case of Pulmonary Asbestosis

ORIG. REFS.
Mayo Clinic
Proceedings

VOL. 50

PP. 193-197

DATE April 1975

ABSTN. REFS. 21 refs.

VOL.

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ABSTRACT A combination of electron microscopy and stereologic principles has allowed an evaluation of the contribution of structures in the blood-air barrier to gas exchange across it. In the present study this method was applied to biopsy material from the lungs of a patient with asbestosis. Within the limits of the sampling method, the results of the study are interpreted to indicate that measurable diffusion abnormalities were principally due to changes other than an increase in membrane thickness.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR W.P. Howard

TITLE Asbestosis

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OR. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Lancet	1	984-985	April 26, 1975				

ABSTRACT

David McKie (Lancet, March 8, p. 568) drew attention to the way in which asbestosis has been dramatised in recent weeks by Press and television. It is important to realise that the cases to which he particularly referred were exposed to asbestos dust under conditions prevailing 20 and 30 years, or even longer, ago, when our ability to monitor the atmosphere at work and our knowledge of threshold limit values in relation to asbestosis were not as refined as they are today. The history of the control of asbestos dust in asbestos factories has been one of steady improvement over half a century. The standards for asbestos-dust concentration associated with the 1969 Asbestos Regulations are intended to prevent the exposure of asbestos workers to amounts of dust which could impair their health, and in a recent survey carried out by the Employment Medical Advisory Service of 700 personal samples taken, 92% were

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below the stringent 2 fibres per ml. threshold standard. These results are encouraging, because they demonstrate that asbestos products, which are important basic materials for most of British industry, can be used safely and are being used safely.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR: H.L. Hardy

TITLE: Submicroscopical Asbestos Fibers and Disease

Digest Date 7/75	Digest Number 977	File Number 752
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ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
New Eng. J. Med.	292	1194	May 29, 1975				

ABSTRACT: The case report of Miller et al. (N. Engl. J. Med. 292: 9193, 1975) needs discussion. The title, "Nonspecific Interstitial Pulmonary Fibrosis: Association with asbestos fibers detected by electron microscopy," underlines the authors' wise reservations about any cause-and-effect relation. As in their published 1971 case of talc associated with sarcoidosis (Am. J. Med. 50: 395402, 1971), the facts of the case require complete knowledge of the total dose of job-related fibrogenic material. The superiority of the electron over the optical microscope does not relieve the investigator of acquiring believable data on the dose of dust to be held responsible for such fatal disease as reported by Miller et al. The statement that in this case the amount of asbestos fibers was three or four orders of magnitude more than that found in a city dweller's lungs needs to be expanded to quantities in established cases of industrial asbestosis. Small particles of potentially hazardous dusts detected by electron microscopy may be harmless

by virtue of their smaller surface area. Or they may contribute a fraction of insult to be added to past viral or other infection. Since considerable authority is lent to the thesis that sarcoidosis will eventually be shown to have its unique cause, this case and the 1971 case referred to by Miller et al. may be the end-stage, burned-out pathological picture of sarcoidosis or infection. Do the iron-filled macrophages imply hemosiderosis? Are such cells associated with the findings of asbestos fibers? The asbestos fibers known to be acquired by city dwellers, visible only at the magnification possible with the electron microscope, suggest that they are of no pathogenic importance. To raise the question that dependable occupational and environmental histories are rarely taken is very helpful in these days of attention to harmful insults to the worker and the general population. The nonspecific diagnoses of interstitial pulmonary fibrosis must give way to more dependable knowledge of cause. The case report of Miller et al. suggests that greater use of modern tools may lead to such knowledge.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR: P.C. Reist

TITLE: Counting Asbestos Fibers by the Most Probable Number Method

ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Amer. Ind. Hyg. Assn. J.	36	379-384	May 1975	6 refs.			

ABSTRACT:

A procedure for evaluating asbestos fiber counts is described which uses the most probable number method of bacteria counting. This technique is faster than conventional counting methods, with approximately comparable accuracies, although it suffers from a lack of rigor and requires the observer to estimate fiber concentrations to within an order of magnitude before counting. For the routine assessment of a large number of asbestos samples this procedure would seem to be more desirable than conventional counting because of the economy of time as well as being easier on the observer.

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AUTHOR E. Castleran, et al.

TITLE The Hazards of Asbestos for Brake Mechanics

ORIG. REFS	VOL.	PP.	DATE	ABSTR. REFS	VOL.	PP.	DATE
Public Health Reports	90	254-256	May/June 1975	26 refs.			

ABSTRACT In view of the tendency of the accumulating literature to reveal cancer induction from asbestos at progressively lower levels of exposure, mechanics should be advised not to blow out brake parts and to use instead methods which create less airborne dust. The manufacturers of automotive friction materials could easily attach a clear hazard warning to every item sold. The limited success of both the Baltimore and Washington studies shows the limited efficacy of voluntary compliance with health warnings--the shop managers and the mechanics simply do not have the same regard for a warning that they have for a regulation. The lack of safety, if any, provided by the current asbestos standards has been completely recognized as insufficient. While it is advisable that brake mechanics at least be warned of the potential hazard of their work, it is also apparent that education of the public will be a common practice so long as health regulations permit it.

National Health Foundation, Pittsburgh, Pa.

F. Mirabella

Post Mortem Ascertained Cases of Lung and Pleural Tumors Due to Asbestos

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Med. Lavoro	66	192-211	May/June 1975	145 refs. (Italian)			

Abstract: In a revision of autopsy cases with asbestosis carried out and published between 1900 and 1974, upon 2044 subjects (of both sexes), 583 malignant intrathoracic neoplasms have been found, comprising bronchogenic carcinomata and pleural mesotheliomata (or 28.5%). Chronologically in the period 1930-1955 the percentage of such neoplasm was 19.7% of all autopsies; in the period 1955-1974 they rose to 35.3%, reaching in some post-mortem departments an average of over 40%. In the total of malignant growths of the asbestotics, the intrathoracic location would often constitute 60-70% and above. The Anglo-Saxon ethnic group (but not exclusively) would seem to be more affected than the Neo-Latin branch. Asbestosis and Mesothelioma: The mesothelioma of the pleura is an uncommon neoplasm in the autopsies of the general population; in the post-mortem departments of industrial and especially of maritime cities with dockyards involved in naval construction and demolition, notwithstanding a chronological increase of incidence,

there have not been such frequent reports of mesothelioma over 0.77% of autopsy cases (Koenig, at St. George's Hospital Hamburg); but generally the average would be about 0.20% (on 346, 720 records of the pathological institutes in general hospitals, documented in the medical bibliography, the discovered mesotheliomata were 685). In the post-mortems of asbestosis sufferers, the incidence of the mesothelioma seems, of the contrary, to be 20-30 times over. Pertinent tables are included.

Industrial Health Foundation, Pittsburgh, Pa.

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AUTHOR
G. Scansetti, et al.

TITLE
Cement, Asbestos, and Cement-Asbestos Pneumoconioses--A Comparative
Clinical-Roentgenographic Study

ORIG. REFS.

VOL.

PP.

DATE

ABSTR. REFS.

VOL.

PP.

DATE

Arch. Environ.
Health

30

272-
275

June 1975

15 refs.

ABSTRACT

The incidence and characteristics of cement-asbestos pneumoconiosis were compared with those of asbestosis and cement pneumoconiosis in three homogeneous samples of cases. The clinical, functional, and radiological features of cement-asbestos pneumoconiosis are similar to those of classical asbestosis, but the observed changes are less common and occur after a longer exposure.

Industrial Health Foundation, Pittsburgh, Pa.

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AUTHOR G.W. Gibbs and C.Y. Hwang

TITLE Physical Parameters of Airborne Asbestos Fibres in Various Work
Environments--Preliminary Findings

ORIG. REFS. VOL. PP. DATE ABSTR. REFS. VOL. PP. DATE
Am. Ind. Hyg. 36 459- June 1975
Assn. Journal 466 19 refs.

ABSTRACT

The results of a pilot investigation to describe the physical parameters, length, aspect ratio, mass and shape of airborne fibres in a variety of industries producing processing and handling chrysotile, amosite and crocidolite are described. Samples of airborne dust were collected on nucleopore membrane filters and examined by scanning electron microscopy. The diameters and lengths of airborne fibres collected during the dumping of raw amosite at an asbestos products plant were greater than those of fibres collected during the application of amosite insulation. Chrysotile fibres collected in the carding area of an asbestos textile plant also tended to have smaller diameters than fibres collected in the dryer and bagging areas of an asbestos mill. The measurements of fibre dimensions indicate that the degree of protection afforded a worker by optical counts using the membrane filter technique is likely to depend on variety of asbestos and stage of processing.

Preliminary results are not in conflict with experimental data suggesting that asbestosis might be related to the mass of airborne dust and primary malignant mesothelial tumors to exposure to fibres in a specific range of fibre diameter and length.

Industrial Health Foundation, Pittsburgh, Pa.

Author M. Numminen

Title The Epidemiologic Relationship Between Pleural Mesothelioma and Asbestos Exposure

ORIG. MSS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Scand. J. Work, Environ. & Health	1	128-137	June 1975	33 refs.			

ABSTRACT

This paper describes an investigation of 85 notifications of either probable or possible mesothelioma to the Finnish Cancer Registry from 1953 through 1969. The investigation covers characteristic epidemiologic features and the possibility of the mesothelioma being connected with occupational or other exposure to asbestos. The incidence rate of pleural mesothelioma was estimated at 1.1 per million per year. The male/female ratio was 1.3:1, which greatly differed from that for malignant neoplasms of the bronchus or lung in Finland in 1960. The mean age at death from mesothelioma was over 7 years lower than that for bronchial carcinoma. The ratio of the crude incidence rates for the urban and rural populations was 4.2: the corresponding ratio for cases of carcinoma of the bronchus or lung was 1.2 in Finland in 1960. The last occupations of the 82 deceased persons, obtained from the death certificates, were divided into three categories according to possible asbestos exposure. Exposure was present or probable in 9 (11.0%) cases, 28

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(34.2%) had a possible exposure, and in 33 (40.2%) cases exposure was absent or unlikely. The occupation of 12 (14.6%) persons was unknown. Additional information of possible exposure history was obtained by interviewing the relatives of 10 mesothelioma patients. For half of the persons a definite, although in some cases trivial, exposure to asbestos could be ascertained. For the other five persons no exposure, either occupational, neighborhood or domestic, to asbestos could be traced. The residential distribution of the 85 persons with mesothelioma revealed no clustering of cases.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR C.F. Harwood, et al.

TITLE Asbestos Emissions From Baghouse Controlled Sources

ORIG. PERS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Amer. Ind. Hyg. Assn. J.	36	595-603	Aug. 1975	8 refs.			

ABSTRACT

There is virtually no information published on the absolute efficiency of baghouses in reducing the emissions of fine particles of asbestos. This lack of information is unfortunate because serious occupational health problems may result from the common practice of recirculating air to conserve energy. Emission testing has been conducted at five asbestos processing plants where the emission are controlled by baghouses. The results showed that the mass removal efficiency frequently exceeded 99.00%. Membrane filter samples of the effluent were examined by optical and electron microscope. It was observed that despite the high mass efficiency, the number of fibers emitted, which were greater than 1.5 μ m in length, was about 10^4 - 10^5 fibers/ m^3 , while the number of fibers less than 1.5 μ m was 10^7 - 10^8 fibers/ m^3 . The significance of the size of the fibers in terms of probable health impact is briefly discussed.

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AUTHOR: S. Sethi, et al.

Digest Date
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TITLE: The Induction of Polykaryocytes by Various Fibrous Dusts and Their Inhibition by Drugs in Rats

ORIG. ACFS	VOL.	PP.	DATE	ABST. REFS.	VOL.	PP.	DATE
Ann. Occup. Hyg.	18	173-	Sep. 1975				
		177		14 refs.			

ABSTRACT

U.I.C.C. chrysotile, glass fibres, and fibrous quartz were intraperitoneally administered to rats using the cover slip method. The animals were sacrificed at 24-hr intervals and the cover slips prepared for phase contrast and interference microscopy. On the first days mononuclear denritic and epitheloid macrophages were observed, which had phagocytosed fibrous material and deposited it perinuclearly in lysosomes. Between the fourth and fifth day polykaryocytes appeared, which showed variable sizes and secondary migration of mononuclear cells. Giant cell morphology and mode of development were independent of the type of fibre administered. Control animals which had received Leonard upper quartz, powdered glass or physiological saline, showed only mononuclear cellular reaction during eight days of the experiment. Animals which had received U.I.C.C. crocidolite were treated with meprobamate and procaine hydrochloride on the third to the fifth day. In this case no polykaryocytes were found. The mechanism of polykaryocyte induction and the influence of the drugs as regards inhibition of polykaryocyte development are discussed.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR G.W. Gibbs

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Topic Fibre Release From Asbestos Garments

COPIES	PAGES	VOL.	PP.	DATE	ABSTR.	REFS.	VOL.	PP.	DATE
Ann. Occur. Hyg.	18	143-	Sep. 1975						
		149				4 refs.			

ABSTRACT

The concentrations of airborne fibres ($\geq 5 \mu\text{m}$) in the breathing zones of workers wearing asbestos safety garments were measured using the membrane filter method. At plant 1 where men wore asbestos coats, hoods and mittens, concentrations of fibres ranged from 0.3 to 5.0 fibres/cm³ and the 8 hr time-weighted concentrations from 0.1 to 1.1 fibres/cm³. At plant 2 where hoods, coats mittens and leggings were worn, concentrations of airborne fibres ranged from 9.9 to 26.2 fibres/cm³ and the 8 hr time-weighted average concentrations was 4.7 fibres/cm³. Counts of fibres collected on Nuclepore filters and examined by scanning electron microscopy showed that the concentrations of fibres $\geq 5 \mu\text{m}$ in length represented 2.3-32 per cent of the total airborne fibre. The difference between the quantities of fibre released from the garments at the different plants was probably related to the methods or materials used in garment manufacture. The results showed that there is a need to identify

and to reduce the release of fibre from asbestos safety garments currently supplied to protect persons working in hot environments.

Industrial Health Foundation, Pittsburgh, Pa.

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N. Klosterkotter and K. Robock

New Aspects on Dust and Pneumoconiosis Research

ORIG. INFO	VOL.	PP.	DATE	ADDITIONAL REFS.	VOL.	PP.	DATE
Am. Ind. Hyg. Assn. J.	36	659-668	Sep. 1975	13 refs.			

ABSTRACT

This lecture deals with pneumoconiosis, in particular with fibrotic tissue reactions caused by SiO_2 and asbestos dusts in the lungs. The term "fine dusts" is defined in connection with the setting up of LAC-values. The aerodynamical diameter of particle shaped and fibriform dust is set forth. Results of the fundamental research with SiO_2 , coal mine and asbestos dusts in animal and cell experiments are explained.

AUTHOR: S. Narang, et al.

TITLE: Inhibition of Chrysotile Hemolysis by Polymers

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ORIG. REFS.	VOL.	PP.	DATE	ABSTN. REFS.	VOL.	PP.	DATE
Ind. Health	13	105-	Sep. 1975				
		108		8 refs.			

ABSTRACT:

Carboxymethylcellulose and polyvinylpyridine N-oxide were tested for their ability to inhibit chrysotile-induced hemolysis. Carboxymethylcellulose proved to be an antagonist when used for pretreatment of asbestos dust as well as when the chrysotile-erythrocyte interaction was allowed to take place in its presence. Pretreatment of erythrocytes with the polymer, before their exposure to chrysotile did not prevent the hemolytic action of chrysotile. Polyvinylpyridine N-oxide was antihemolytic to a lesser extent and only at higher concentrations.

AUTHOR: Anon.

TITLE: Asbestos Risk Exists From Use of Taping Compounds

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CIT. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Insulation Htg. Progress Reports	7	2, 4	Winter 1975				

ABSTRACT

In spite of the introduction of asbestos-free insulation materials and the existing bans on the use of asbestos-containing spray fireproofing, a serious asbestos hazard remains in the construction industry, with members of the Painters Brotherhood of the Building and Construction Trades Department being at greatest risk. Wallboard finishing compounds and spackle have been found to contain significant amounts of chrysotile asbestos, which is released into the air as dust either during the dry mixing of these compounds or during sanding. In the past few years, many contractors have switched to premixed compounds, thereby eliminating one major source of asbestos dust. This practice, though, depends entirely on the contractor and what he supplies; several tapers interviewed recently by Mount Sinai personnel said they still had occasion to use the dry-mix brands. The problem that remains, even when ready-mixed compounds are used, is that of the dust produced when the dried compound is sanded, prior to

painting. In some areas of the country, tapers, or their apprentices, stay and do their own sanding; in others, the painters are left to finish the job, often sanding while other men are working in the same room. Sanding is done either by hand or with a pole. Simply because sanding is only a small part of this construction activity is no reason to minimize the importance of the problem. Although exposure duration may be short, the cumulative effect of repeated short-term exposures to measurable concentrations of asbestos fibers can be serious. In the course of a medical study of 69 drywall tapers belonging to Local 1974 of the Drywall Tapers and Painters of Greater New York, two-thirds of whom had had an exposure of ten years duration or longer and 61 of whom were smokers or exsmokers, X-ray abnormalities characteristic of asbestos exposure were found in 37 out of 63 films. There is a close similarity between these findings and those among insulators.

AUTHOR T.L. Ogden and W.H. Walton

TITLE The Descent Angle of Inclined Cylinders--A Possible Means of Separating

Fibres by Length

ORIG. REF.	VOL.	PP.	DATE	ABST. REFS.	VOL.	PP.	DATE
Ann. Occup. Hyg.	18	157-	Sep. 1975				
		160		1 refs.			

ABSTRACT:

Measurements are presented of the angle of descent of inclined cylinders in viscous flow. The results agree with Gans' theory. The descent angle is partly length-dependent, and in principle could be used to separate fibres by length aerodynamically.

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Industrial Health Foundation, Pittsburgh, Pa.

Digest Date	Digest Number	FILE NUMBER
2/76	2171	752

AUTHOR: K.S. Lavappa, et al.

TITLE: Cytogenetic Studies on Chrysotile Asbestos

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Environ. Research	10	165-173	Oct. 1975				
				26 refs.			

ABSTRACT:

The cytogenetic effects of chrysotile asbestos (chrysotile A) in vivo in Rhesus monkeys and Swiss albino mice, and in vitro in embryonic hamster cells were investigated. Single oral dosages of chrysotile, 100 or 500 mg/kg, failed to induce chromosome aberrations in bone marrow cells of Rhesus monkeys. Similarly, oral or intraperitoneal administration of chrysotile over a dose range from 0.4 to 400 mg/kg, failed to induce micronuclei formation in bone marrow cells of mice. However, chrysotile induced a significant and dose-related increase in chromosome aberrations and a dose-related inhibition of the mitotic index of cultured Syrian hamster embryo cells.

Industrial Health Foundation, Pittsburgh, Pa.

		gest Date	Digest Number	FILE NUMBER
		12/75	153,171	752

AUTHOR: R.E. Hefner, Jr. and P.J. Gehring

TITLE: A Comparison of the Relative Rates of Hemolysis Induced by Various Fibrogenic and Non-Fibrogenic Particles With Washed Rat Erythrocytes in Vitro

ORIG. REFS	VOL.	PP.	DATE	ABST. REFS.	VOL.	PP.	DATE
Amer. Ind. Hyg.	36	734-	Oct. 1975				
Assn. J.		740		26 refs.			

ABSTRACT:

Correlations between in vitro hemolytic activity and the in vivo fibrogenic activity of a number of particulate materials are demonstrated. Fibrogenic particles are capable of inducing hemolysis, while non-fibrogenic particles are not. It is suggested that particulates inducing a rate of hemolysis greater than $1 \times 10^{-4} \text{ min}^{-1}$ may be fibrogenic.

Industrial Health Foundation, Pittsburgh, Pa.

		Digest Date		Digest Number		FILE NUMBER	
		12/75		12-3077-2		752	
AUTHOR: M. Hamilton							
TITLE: OH Congress Session: Asbestos							
ORIG. REFS	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Occup. Health	27	431-	Oct. 1975				
		433					
ABSTRACT:							

The 18th International Conference in Brighton, England of the Permanent Commission and International Association on Occupational Health included papers on the current status of research on asbestos health effects. The discussions are summarized briefly.

Industrial Health Foundation, Pittsburgh, Pa.

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AUTHOR: J.W. Skidmore and J.S.P. Jones

TITLE: Monitoring an Asbestos Spray Process

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
Ann. Occup. Hyg.	18	151 -	Sep. 1975				
	156			8 refs.			

ABSTRACT:

An assessment has been made of the hazard of the fibre clouds associated with an asbestos spray process which incorporated a pre-damping stage. Spraying produced only low concentrations of asbestos fibres, but the subsequent clean-up operations were inadequate. There were potential hazards for building operatives from debris and deposits left by the spray team.

Author: L.N. Falaan and S.F. McCullagh

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Vital Capacity and One-Second Forced Expiratory Volume in Australian Male Asbestos Cement Workers

CPIS. NITS	VOL.	PP.	DATE	ANSTR. REFS.	VOL.	PP.	DATE
Ann. Occup. Hyg.	18	133-	Sep. 1975	7 refs.			
		141					

ABSTRACT:

The VC and FEV₁, corrected for temperature but not pressure, of 955 men engaged in the manufacture of asbestos-cement products were measured, and their age, height in footwear, clothed weight and smoking habit recorded. Although the asbestos-cement workers as a group had a lower VC and FEV₁ than was found in a parallel study of non-asbestos workers, the difference did not achieve statistical significance. When 952 of these men were placed each into one of five exposure categories, the data clearly showed the effect of asbestos exposure on VC and FEV₁ and their relationship with age and height. As in the author's study of non-asbestos workers, smoking habit did not influence the relationship of either VC or FEV₁ with age and height.

Medical Health Foundation, Pittsburgh, Pa.

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FILE NUMBER

752

AUTHOR: D.E. Amacher, et al.

TITLE: The Dose-Dependent Effects of Ingested Chrysotile on DNA Synthesis in the

Gastrointestinal Tract, Liver, and Pancreas of the Rat

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Environ. Research	10	208-	Oct. 1975				
		216		28 refs.			

ABSTRACT:

The effects of single oral administration of saline suspensions of chrysotile A to fasting male albino rats on DNA synthesis in the GI tract, pancreas, and liver were studied after a subsequent interval of 3 days. Incorporation of (³H)TdR was elevated in the whole stomach, duodenum, and jejunum following administration of chrysotile in the dose range of 5 to 100 mg/kg; incorporation in the liver was, however, reduced. There was no change in pancreatic and colonic (³H)TdR uptakes following administration of chrysotile. Preliminary data suggest that physicochemical alterations of chrysotile by gastric acid may influence its subsequent effects on DNA synthesis.

Industrial Health Foundation, Pittsburgh, Pa.

Digest Date
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Number
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FILE NUMBER

753

AUTHOR: P.T. Shettigara and R.W. Morgan

TITLE: Asbestos, Smoking, and Laryngeal Carcinoma

ORIG. REFS.	VOL.	PP.	DATE	ABST. REFS.	VOL.	PP.	DATE
Arch. Environm. Health	30	517-519	Oct. 1975				
				21 refs.			

ABSTRACT:

This study was designed to examine the relationship between exposure to asbestos and laryngeal cancer. A retrospective study of 43 pairs of patients with laryngeal cancer and their matched controls examined a number of variables, including smoking, exposure to asbestos, and other occupational factors. Patients with laryngeal cancer and the controls were matched for age, sex, and place of residence. The data indicate a substantial association between asbestos exposure and laryngeal cancer. Cigarette smoking was also associated with the disease, although the strength of association was not as high as that for asbestos. Exposure to uranium, chromium, nickel, cobalt, arsenic, x-rays, and alcohol did not appear related to later development of carcinoma of the larynx. We conclude that exposure to asbestos and cigarette smoking are potent factors in the development of this disease.

AUTHOR: A. Morgan, et al.		Digest Date 2/76	Digest Number 211/76	FILE NUMBER 752
TITLE: Studies on the Deposition of Inhaled Fibrous Material in the Respiratory Tract of the Rat and its Subsequent Clearance Using Radioactive Tracer Techniques				
ORIG. REFS:	VOL.	PP.	DATE	ABSTR. REFS.
Environ. Research	110	196-	Oct. 1975	
		207		10 refs.

ABSTRACT:

The distribution of fibre deposited during 30 minute inhalation exposure of rats to the UICC standard reference samples was investigated. These samples were made radioactive by neutron irradiation, which enabled the amount of asbestos in various tissues to be determined radiometrically. The total amount of fibre deposited varied from 31 to 68% of that respired and, on average, 17% remained in the lower respiratory tract (alveoli and conducting airways up to and including the trachea) at the end of exposure. Activity median aerodynamic diameters (AMADs) of the materials used were measured with the cascade centerimeter. Differences in the total deposition of inhaled fibre, and in the distribution of deposited material, were correlated with the AMADs of the various samples. Autoradiographs of lung sections showed that at the termination of exposure, fibre was present in the conducting airways, particularly at bifurcations, and also distributed relatively uniformly throughout the alveolated regions.

Industrial Health Foundation, Pittsburgh, Pa.

		Dig		Date		Digest Number		FILE NUMBER	
		1/76		9/3/76		752			
AUTHOR: J. Assuncao and M. Corn									
TITLE: The Effects of Milling on Diameters and Lengths of Fibrous Glass and Chrysotile Asbestos Fibers									
ORIG. REF:		VOL.		PP.		DATE		ABSTN. REF:	
Am. Ind. Hyg.		35		811-		Nov. 1975			
Assn. Journal		1		819		16 refs.			
ABSTRACT:									

By means of light and electron microscopy techniques, it was determined that ball milling reduces fibrous glass fiber lengths, but does not affect their diameters. Ball milling reduces both diameters and lengths of chrysotile asbestos in the size range that can be evaluated by phase contrast microscopy.

AUTHOR: F.D. Pooley		Dis Date	E gest Number	FILE NUMBER
		2/76	222/71	752
TITLE: The Identification of Asbestos Dust With an Electron Microscope Microprobe Analyser				
ORIG. REFS:	VOL.	PP.	DATE	ABSTN. REFS.
Ann. Occup. Hyg.	18	181-186	Dec. 1975	8 refs.

ABSTRACT:

It is possible with the aid of a transmission electron microscope fitted with suitable x-ray analytical equipment, to identify submicroscopic particles of the various asbestos minerals. Identification of particles should depend upon the production of accurate chemical data and not upon spectrum morphology. Suitable pure mineral powders of known chemistry can be used as standards to calibrate equipment and the calibration used to obtain the chemistry of unknown particles for a positive identification. The transmission E.M. fitted with energy dispersive x-ray analytical equipment is more versatile than other combinations of electron optical machines and x-ray analytical equipment. This is due to the more versatile operating characteristics of the transmission E.M. and the ability to display the x-ray spectra obtained from a particle with an energy dispersive analysis system, thus showing the presence of all the major elements with higher atomic numbers than sodium 11.

Health Foundation, Pittsburgh, Pa.

AUTHOR:

S.T. Beckett, et al.

TITLE:

The Use of Infrared Spectrophotometry for the Estimation of Small Quantities of Single Varieties of U.I.C.C. Asbestos

CIT. REF.:

VOL.

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ABSTN. REFS.

VOL.

PP.

DATE

Ann. Occup. Hyg.

18

313-

Dec. 1975

320

15 refs.

ABSTRACT:

An i.r. technique has been developed to measure small quantities (down to less than 10 μg) of single varieties of asbestos. This has been used to monitor airborne fibre concentration and to measure the asbestos recovered from the lungs of rats. The method has the advantages that it is relatively simple to perform and requires minimal labour, while its precision for estimating micro quantities of asbestos (< 200 μg) is much greater than by direct weighing.

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est Date 3/76 Digest Number 752
FILE NUMBER

AUTHOR: A.P. Wehner, et al.

TITLE: Chronic Inhalation of Asbestos and Cigarette Smoke by Hamsters

ONIC. REFS.	VOL.	PP.	DATE	ANST. REFS.	VOL.	PP.	DATE
Environmental	10	368-	Dec. 1975				
Research		383		26 refs.			

ABSTRACT:

One hundred and two male Syrian golden hamsters received chronic exposures to a respirable aerosol of Canadian chrysotile asbestos (mean aerosol concentration = 23 µg/l) 7 hours per day, 5 days per week. Half of the animals were also exposed for 10 minutes to cigarette smoke in modified Hamburg II smoking machines, three times per day, 5 days per week, for the duration of their life span. The other half of the animals received sham-smoke exposures. Another group of 102 hamsters served as controls. Half of the controls received smoke exposures, the other half received sham exposures. Asbestos exposure resulted in earlier and more severe lung lesions than in identical groups of concurrent experiments, which had received life span exposures to aerosols of NiO (53 µg/l) and CoO (10 µg/l), or which were treated with diethylnitrosamine (12 x 0.25 mg by s.c. injection). Asbestosis developed in all animals and

forced discontinuation of the asbestos exposures after 11 months. Of 12 lung adenomas found in 510 hamsters, ten occurred among the 102 animals of the asbestos-exposed groups, indicating an early neoplastic response. However, perhaps on account of their significantly shorter life span due to asbestosis, the incidence of laryngeal lesions and of malignant tumors was significantly lower in the asbestos + smoke-exposed group than in the control group having received smoke exposures. Neither a carcinogenic effect of asbestos nor a cocarcinogenic effect of cigarette smoke was observed. Cigarette smoke inhalation resulted in significantly lower mean body weights of the smoke-exposed groups.

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Number
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FILE NUMBER

752

AUTHOR: V. Tindrell

TITLE: Alignment of Respirable Asbestos Fibres by Magnetic Fields

ORIG. REF.	VOL.	PP.	DATE	ABSTN. REF.	VOL.	PP.	DATE
Ann. Occup. Hyg.	18	299-311	Dec 1975				
				11 refs.			

ABSTRACT:

Alignment of respirable asbestos fibres by magnetic fields has many advantages in investigations of biological effects of asbestos. Their alignment in thin films or on membrane filters facilitates determination of diameter and length distributions using light and electron microscopes. Fibres aligned in thin film or in liquid suspension produce distinctive light-scattering patterns when illuminated by a laser beam. Photoelectric measurement of the light intensity distribution aids identification of the geographical source of the asbestos; it also permits estimation of fibres in air samples and in dust recovered from human and animal lungs and provides indices of fibre size.

		Digest Date		Digest Number		FILE NUMBER	
		2/76		221/32		752	
AUTHOR. G.S. Rajhans and G.M. Bragg							
TITLE. A Statistical Analysis of Asbestos Fiber Counting in the Laboratory and Industrial Environment							
ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Am. Ind. Hyg.	36	909-	Dec. 1975				
Assn. J.		915		10 refs.			

ABSTRACT:

The reproducibility of standard fiber counts in the laboratory and four industrial plants is discussed in detail. Under field conditions the standard deviation of the results varied between 0.4-1.2 f/ml. Under ideal laboratory conditions the standard deviations of the counts were approximately 0.2 f/ml. It is concluded that the standard method is sufficiently precise for industrial measurements.

Industrial Health Foundation, Pittsburgh, Pa.

Digest Date	Digest Number	FILE NUMBER
2/76	1257	752

AUTHOR L. Bruckman and R.A. Rubino

TITLE Asbestos: Rationale Behind a Proposed Air Quality Standard

ORIG. PAGES	VOL.	PT.	DATE	ABSTR. PAGES	VOL.	PT.	DATE
J. Air Pollution Control Assn.	25	1207-	Dec. 1975	45 refs.			

ABSTRACT

The discussion presents a proposed asbestos air quality standard and the rationale utilized in its formulation. The criterion of mesothelioma has been selected as the basis for developing the subject standard. A concentration mesothelioma incidence envelope has been constructed for the general population, based on mesothelioma incidence due to industrial exposure. An ambient air quality asbestos standard of 30 nanograms per cubic meter, based on a 30-day average sample is recommended. This standard is projected to result in 150 nationwide fatalities. Available ambient air asbestos data indicates that non-urban and remote non-urban areas have asbestos levels typically less than 1 nanogram per cubic meter while urban areas are usually below 30 nanograms per cubic meter. Dispersion calculations are used to determine the maximum allowable asbestos mass emission standard for manufacturing sources (24 grams per day) and

a maximum allowable average asbestos concentration (25 micrograms per cubic meter). A family of curves for various workdays depicting the average allowable asbestos concentration as a function of total asbestos contaminated exhaust gas flow rate, consistent with the 24 grams per day emission standard are presented. In addition, a preliminary asbestos stack sampling train has been developed requiring electron microscopy as the analytical procedure to be used to determine the sample asbestos content.

Digest Date
2/76

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Number
224/76

FILE NUMBER
752

AUTHOR V. Osborne and D. Osborne

TITLE A Model for Asbestos Removal

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Professional	20	28-	Dec. 1975				
Safety		31					

ABSTRACT:

The authors describe how an asbestos-removal project was handled--problems encountered, how they were met, and results achieved upon completion of the task.

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Number
218171

752

AUTHOR: L.N. Pylev, et al.

TITLE: Carcinogenic Activity of Synthetic Asbestos

ORIG. REFS	VOL.	PP.	DATE	ABST. REFS.	VOL.	PP.	DATE
Gig. Truda Prof.	1	31-35	1975				
Zabolavanitsa	(10)			26 refs.	(Russian)		

ABSTRACT:

The synthetic chrysotile after its three-fold injection to rats in doses of 20 mg proved a weak carcinogenic. Na, Mg-hydroxyamphibole induced pleural mesotheliomas in 54.5 per cent of the cases. The role of trace metals in the mechanism of asbestos carcinogenicity is discussed.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR F.M. Kogan, et al.

TITLE Carcinogenic Effect of the Chrysotile-Asbestos Dust in Experiments

11/75

Number 146/4

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ORIG. REFS	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Gig. Truda Prof.	(6)	31-	1975	6 refs. (Russian)			
Zabolevaniya		35					

ABSTRACT

The carcinogenic effect of the chrysotile-asbestos dust from the Bazhenov deposit was investigated by introducing it through inhalation to animals over a period of 18 months. A number of animals demonstrated pre-tumorous alterations on the level of the bronchial and alveolar epithelium. Twenty three months after initial exposure to the effect of asbestos 1 rat was found to suffer from reticuloleukemia with lesion of the lungs, liver, spleen and kidneys; in 26-27 months 2 animals developed malignant new growths, viz. adenocarcinoma of the lungs, plasmocellular cornified cancer of the lungs and reticulosarcoma of the lungs. Control animals failed to show any such changes.

AUTHOR: D.R. Beaman and D.M. File

TITLE: Quantitative Determination of Asbestos Fiber Concentrations

Digest Date
2/76Digest
Number
22-276FILE NUMBER
752

ORIG. REF.	VOL.	PP.	DATE	AUTH. REF.	VOL.	PP.	DATE
Analytical	48	101-	Jan. 1976				
Chemistry	110			22 refs.			

ABSTRACT:

By using a transmission electron microscope equipped with selected area electron diffraction (SAED) and energy dispersive spectrometry capabilities, it is possible to resolve many of the ambiguities that lead to incorrect fiber concentrations when the determination is based only on morphology or crystal structure or elemental composition. It was found that 40-100% of the chrysotile fibers in water samples have distinctive tubular morphology. Identifiable SAED patterns were observed for about 30 and 60% of the chrysotile and amphibole fibers, respectively, in pure standards. The losses occurring during sample preparation in a condensation washer were confirmed, quantified, found to be variable and to average about 50% for amphibole fibers and 10% for chrysotile fibers. By applying corrections for SAED ambiguities and losses during sample preparation and by making allowances for the dependence of fiber composition on fiber size, it

was possible to measure asbestos fiber concentrations with a precision of $\pm 30\%$. A classification scheme was developed to establish maximum and minimum limits of fiber concentration for each sample.

Issue Date
3/76

Issue Number
271/75

Page Number
752

AUTHOR: H.N. Cunningham, et al.

TITLE: Quantitative Relationship of Fecal Asbestos to Asbestos Exposure

ORIG. REF.	VOL.	PP.	DATE	ANTR. REFS.	VOL.	PP.	DATE
J. Toxicol.	1	377-	Jan. 1976				
Environ. Health		379		5 refs.			

ABSTRACT:

A method is described for isolating chrysotile fibers from feces and counting them with an electron microscope. The detection limit was 150,000 fibers per gram feces; average recovery was 85.5%. When the method was used to check the asbestos in feces of people subjected to industrial exposure vs. controls, the means were significantly different ($p < 0.02$). Duplicate fecal samples were found to check within an average of $\pm 31.1\%$ of their means.

AUTHOR

M.R. Becklake, et al.

TITLE

Lung Function Profiles in the Chrysotile Asbestos Mines and Mills of Quebec

Digest Date

4/76

Digest Number

4/23/76

FILE NUMBER

752

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Chest	168	303	Feb.				
			1976	4 refs.			

ABSTRACT

Because of a clinical impression that it was not uncommon to find lung function profiles other than the classic restrictive one associated with asbestos exposure, the authors defined the lung function profiles in a sample of over 1,000 Quebec chrysotile asbestos workers. These men had been examined in 1967-68 as part of a comprehensive study of the effects of exposure to asbestos in the chrysotile mines and mills of Quebec. Close to half the men (44.3 percent) had normal lung function profiles and a further 26.5 percent had minor function changes only. Among the remainder, restrictive and obstructive function profiles occurred with comparable frequency (12.8 percent and 12.2 percent respectively). Both were associated with radiologic features of asbestosis; both occurred infrequently in the absence of the smoking habit. These findings suggest an association between the smoking habit and the development of

an asbestos-related fibrosis in so far as this is reflected in a restrictive function profile. In addition, the data provided some indirect evidence based on a principal component analysis that in those Quebec asbestos workers who smoke, the character of the dust-associated function impairment might be either obstructive or restrictive.

Digest Date

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FILE NUMBER

Author: A. Solomon and I. Webster

TITLE: The Visceral Pleura in Asbestosis

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Environ. Research	11	128-	Feb. 1976	13 refs.			

ABSTRACT:

Visceral pleural changes may occur in asbestosis: (1) as the sole radiological evidence of exposure, (2) in conjunction with parietal pleural reaction, (3) in association with parenchymal asbestosis, and (4) as a feature additional to parenchymal and parietal pleural asbestotic manifestations. The severest x-ray abnormalities, of lung substance as well as pleura, occur in men who are heavily and continuously exposed to asbestos. It is therefore not surprising to find interlobar pleural reactions in such patients. The three patients with shorter histories of continuous asbestos exposure probably reflect that there had been an adequate time lapse since exposure with the retention of a significant concentration of asbestos fibers in the lung field. Oblique 450 chest radiographs in association with the routine views enhance the assessment of fissural thickening. Visceral pleural reaction is progressive in some situations. A larger

study is currently in progress to determine the actual dose relationship of visceral and parietal pleural thickening as well as parenchymal asbestosis.

AUTHOR: R.J. Richards and F. Jacoby

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FILE NUMBER

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TITLE:

Light Microscope Studies on the Effects of Chrysotile Asbestos and Fiber Glass
on the Morphology and Reticulin Formation of Cultured Lung Fibroblasts

ORIG. REFS.

VOL.

PP.

DATE

ABSTR. REFS.

VOL.

PP.

DATE

Environ. Research	11	112-	Feb. 1976						
		121							
				6 refs.					

ABSTRACT:

Chrysotile asbestos is highly cytotoxic when initially added to cultured lung fibroblasts, and this is reflected by cell death and by nuclear, nucleolar, and cytoplasmic abnormalities. Renewed growth and recovery of the culture occurs, but the subsequent deposition of reticulin is atypical. The results presented are correlated with earlier biochemical studies and subsequent electromicroscopical investigations. Fiber glass causes little cell destruction, yet produces similar morphological changes but to a much lesser degree.

Foundation, Pittsburgh, Pa.

Digest Date 5/76
Digest Number 578/76
FILE NUMBER 752

AUTHOR: N. Hahon and H.L. Eckert

TITLE: Depression of Viral Interferon Induction in Cell Monolayers by Asbestos

Fibers

ORIG. PERS.	VOL.	PP.	DATE	ABST. REPR.	VOL.	PP.	DATE
Environ. Research	11	52-65	Feb. 1976	39 refs.			

ABSTRACT

Studies on the induction of interferon by influenza virus revealed that this adaptive cellular response was depressed, completely or partially, in either amosite, crocidolite, anthophyllite, Canadian or Rhodesian chrysotile-treated monkey kidney (H.C. 10) cell monolayers. Asbestos fiber concentrations of 1 mg/1.0 x 10⁷ cells, which minimally affected cell viability, depressed interferon production by almost 50%. However, in the virus-cell multiplicity of infection did not significantly increase the effect. In the asbestos fiber-treated cells, Chrysotile B fibers of lengths ranging from 0.1 to 10 µm were more effective in reducing interferon yields than those ranging from 0.1 to 0.5 µm. The depression of interferon production was dependent on prior infection of the cells with virus. The addition of viral inoculum to the asbestos fiber-treated cells before the addition of viral inoculum resulted in a significant increase in interferon production.

tion in cells were unaffected by the presence of asbestos fibers, however, a slightly higher level of virus replication was noted in asbestos fiber-treated cells. When cells were primed with interferon, the presence of asbestos fibers did not interfere with the ability of the primer to enhance interferon production. Neither interferon antagonists, interference with virus-cell interactions, nor adsorption by asbestos fibers accounted for the depression of interferon yields. These findings suggest that asbestos fibers act on cell membranes in a manner, as yet undetermined, to interpose in the viral inductive process of interferon synthesis.

Central Health Foundation, Pittsburgh, Pa.

AUTHOR C.H. Gorski, et al.

TITLE The Porosity of Amosite and Chrysotile Asbestos

Digest Date
4/76

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ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Am. Ind. Hyg.	37	117-	Feb. 1976				
ESN. J.		122		11 refs.			

ABSTRACT

A computer program has been set up in Fortran language to calculate pore size distribution using the Cranston-Inkley method of calculation. Nitrogen adsorption isotherms were determined on amosite and chrysotile asbestos at -195°C. Size reduction had a major effect on increasing pore volumes of both asbestos materials.

Industrial Health Foundation, Pittsburgh, Pa.

AUTHOR: A. Toivanen, et al.

TITLE: Pulmonary Asbestosis and Autoimmunity

Digest Date
5/76

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Number
575/76

FILE NUMBER
752

ORIG. REFS.	VOL.	PP.	DATE	ABSTN. REFS.	VOL.	PP.	DATE
British Med. J.	1	691-	March 20,				
		692	1976	5 refs.			

ABSTRACT:

Antinuclear antibodies and the rheumatoid factor in cases of asbestosis probably result from the pulmonary lesions and are not evidence of an autoimmune mechanism in the pathogenesis of the disease. Another probable explanation of the negative finding in the authors' cases is that antophyllite, owing to its different physicochemical structure, causes less destruction of lung tissue than other asbestos materials.

FROM

Asbestos in the Office Air

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752

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
JOB Safety & Health	4	13-14	March 1976				

ABSTRACT

A paper on the discovery of asbestos in dangerous amounts in the air of certain multistory buildings was presented before an Environmental Protection Agency/World Health Organization symposium in Las Vegas, September 1975. The study report, "Asbestos Contamination of Building Air Supply Systems," was prepared by William Nicholson, Arthur Rohl, and Irving Weisman of the Environmental Sciences Laboratory, Department of Community Medicine, Mount Sinai School of Medicine of the City University of New York. The researchers found that where a dry-spray method had been used in these buildings to apply fibrous asbestos-containing materials (before the health hazard of such applications was well known), and particularly where no sealant was applied over the sprayed materials, erosion over the years has caused a quantity of fibers to float loose. The presence of asbestos in air supply systems may be creating a serious health hazard for building occupants--perhaps especially severe for maintenance crews

who must work in spaces where asbestos in various mixtures was thickly applied in the past. The study found that air contamination may exist in public buildings where asbestos materials were used for fireproofing, decorative, or acoustic spray applications. Because only a limited sampling program is reflected in the Mount Sinai study, certain conclusions of the research are tentative. Examination, monitoring, and corrective procedures--such as resealing the material--are suggested by the authors of the report.

AUTHOR: P.E. Enterline

TITLE: Pitfalls in Epidemiological Research: An Examination of the Asbestos Literature

Literature

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
J. Occup. Med.	18	150-	March 1976				
		156					
				38 refs.			

ABSTRACT:

Variations in results of studies of asbestos and respiratory cancer relate in part to differences in study objectives. Some investigations were structured so as to establish the maximum effect of asbestos on respiratory cancer. That is an optimum latent period effect. Others were designed to detect points where response by the most susceptible individuals could be detected. The nature of the second type of study dictates an overall dilution effect and these studies show smaller overall relative risks than the first. Variations in study results are also related to the methods employed in analysis. Latent periods differed, partly for reasons noted above, and partly because the appropriate information on time since first exposure was often not available. Failure to specify latent periods or to recognize their importance in respiratory cancer could be labeled as a pitfall in epidemiological research on asbestos. Other pitfalls include the following: correcting death certificates and then making comparisons with published vital statistics

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based on uncorrected death certificates; deriving expected deaths from populations that do not reflect the mortality experience of the area in which the study population lives; failure to relate findings to exposure levels; overlapping exposure and follow-up periods in dose-response studies; and failure to adjust for competing causes of death. Despite pitfalls noted here, and there are undoubtedly others, there has been great progress in knowledge about the health effects of asbestos. Moreover, much of this has been implemented to the great advantage of workers exposed to asbestos throughout the world. Clearly, this has been a life saving effort from which all who have participated should take satisfaction. Except for McDonald's study of asbestos miners, however, no really "grand" studies of asbestos exposed workers have ever been undertaken in which exposure and response are related. This needs to be done.

AUTHOR: B.S. Levy, et al.

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TITLE: Investigating Possible Effects of Asbestos in City Water: Surveillance of

Gastrointestinal Cancer Incidence in Duluth, Minnesota

ORIG. REFS.

VOL.

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ABSTN. REFS.

VOL.

PP.

DATE

Amer. J. Epidemiol. 103 362- April 1976

368

15 refs.

ABSTRACT

The recent discovery of over one million asbestos-like fibers per liter of Duluth tap water and the suggestive evidence of a link between certain gastrointestinal (GI) cancers and work exposure to asbestos fibers in the air prompted this study. GI cancer incidence data were gathered for Duluth in the same manner as data previously gathered for comparison cities, Minneapolis and St. Paul. Although some differences in GI cancer incidence occurred among the three cities in 1969-1971, there was no consistent pattern of statistically significant differences observed. The number of GI cancers diagnosed in Duluth residents in 1972 was similar to that in each of the previous three years. This study represents the start of ongoing cancer surveillance in Duluth.

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AUTHOR: K.R. Spurny, et al.

TITLE: The Sampling and Electron Microscopy of Asbestos Aerosol in Ambient Air by Means of Nucleopore Filters

ORIG. REF.	VOL.	PT.	DATE	ABST. REF.	VOL.	PT.	DATE
1. Air Pollution	26	496-	May 1976				
Control Assn.		499		10 refs.			

ABSTRACT: Despite the fact that adverse health effects of asbestos have been known since shortly after the turn of the century, there has been little progress in techniques for determining the mineral in the airborne state. This absence of sampling and analysis methods appears to derive from two main sources: (1) In the environments of the asbestos using industries, asbestos concentrations tend to be high relative to other particulate species, and especially compared with other fibrous species, making estimation of concentration by microscopy relatively easy. (2) The term "asbestos" describes a crystal habit, not a chemical compound; therefore there is no unique chemical property of asbestos that can be used as the basis for its measurement.

International Health Foundation, Pittsburgh, Pa.

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7/76

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FILE NUMBER

752

AUTHOR K. P. S. Lumley

TITLE A proportional study of cancer registrations of dockyard workers

ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
Brit. Jourl. of	33	108-	May 1976	25 refs.			
Indus. Medicine	1	114					

ABSTRACT

Evidence of an occupational effect due to asbestos exposure was sought by comparing cancer registrations for dockyard workers with those for Plymouth men in the same age groups for 1960-69. The results show a significant excess of pleural tumours in the dockyard group but no significant excesses at other sites. Registrations for pleural mesothelioma were recorded for men with many dockyard occupations and the observed mean interval between first exposure to asbestos and registration for a pleural tumour (37.6 years) indicates that cases of pleural mesothelioma may be expected to occur among these workers for many years, even though crocidolite is no longer used in the shipyard. A trend of increasing annual excess of stomach and nasopharyngeal cancer was observed in the dockyard group. No cases of peritoneal mesothelioma were observed.

were recorded but it is likely that some did occur which were diagnosed as cancers arising from other sites. This may account for some of the excess of gastrointestinal registrations.

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Thirty-two cases of mesothelioma in Victoria, Australia: a retrospective survey related to occupational asbestos exposure.

ORIG. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Br. J. Jourl. of	133	115-	May 1976	16 refs.			
Indus. Medicine	1	122					

Abstract: Mesotheliomas have been reported in four states in Australia. Crocidolite has been mined and milled at Wittenoom in West Australia where five cases of mesothelioma were reported after exposure of high intensity. The 32 cases of mesothelioma reported in this paper occurred during a period of 11 years in Victoria; 29 were pleural and three peritoneal. There were 22 autopsies. End occupations were misleading in 66% of cases. Two of the three subjects with peritoneal mesothelioma were siblings, and there was no evidence of occupational or other exposures to asbestos in either. There was a significant prevalence of pulmonary asbestos bodies in the tumour series as compared with an unselected consecutive series of 200 routine autopsies ($0.01 > p > 0.001$). The occupational history was as effective a method of assessing 'true' asbestos exposure as the pulmonary asbestos body count. Five cases had had a duration of exposure of one year or less, but they had had heavy exposure. The latent interval before tumour development was 25 years or longer in each case. There was no known exposure to

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asbestos in five cases (16%). The rare association of mesothelioma with types of asbestos other than crocidolite may not exist and could be explicable on the basis of the proportion (16%) of these tumours arising randomly in the population.

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Industrial Health Foundation, Pittsburgh, Pa.

Author: Aron.

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753

Title: Exposure to Asbestos Dust.

ORIG. REF.	VOL.	PP.	DATE	ABSTN. REFS.	VOL.	PP.	DATE
Brit. Med. Jour.	1	1361-1362	June 5, 1975	6 refs.			

ABSTRACT: Occupational exposure to all commercial types of asbestos may lead to the development of pulmonary fibrosis

and carcinoma of the lung, particularly in cigarette smokers. The carcinomas occur in the lungs of asbestos workers who have had sufficient exposure to have at least 60% of those workers who have been accepted by the pneumoconiosis panels as being disabled by asbestosis have subsequently developed cancer of the lung. These are people who had an excessive exposure to asbestos dust more than 20 years ago. The Secretary of State for Employment has appointed a committee to inquire into the possible dangers of exposure to asbestos. Meanwhile, an attempt is being made to establish the actual amount, and type, of mineral dust in the lungs of all cases of mesotheliomas occurring in Britain over the period of one year. This will require collaboration by the coroners, pathologists, epidemiologists, and the Government departments concerned.

The actual analysis of the material from the lungs depends on recent advanced techniques, but it should give a clearer indication of the relative hazards from occupational, immediate environmental, and general exposure to the different types of asbestos and mineral dusts.

AUTHOR J. W. Winters

TITLE Short Communications

Digest Date 10/76

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FILE NUMBER 752

ORIG. REFS.	VOL.	PP.	DATE	ABST. REFS.	VOL.	PP.	DATE
The Annals of	19	77-83	July 1976	6 refs			
Occup. Hygiene							

ABSTRACT:

The Australian Hygiene Standard for occupational exposure to chrysotile and amosite (Australian National Health & Medical Research Council, 1970) is based on an eight hour time-weighted average exposure. The author therefore sought to develop a small light-weight personal sampler which could be worn without inconvenience and would cause no interference with a man's normal work pattern. Such a unit has now been developed and is being used in the surveillance of a workforce of some 2000 people; to date some 700 samples have been collected using 25 sampling pumps. Clerical work associated with sampling is minimized by recording sample data on contact adhesive labels.

Author: S.T. Beckett et. al.

Title: A Comparison of Airborne Asbestos Fibre Counting with and without an eyepiece

Graticule

ORIG. REF.	VOL.	PP.	DATE	ABSTR. REF.	VOL.	PP.	DATE
The Annals of Hygiene	17	69-76	July 1976	4 refs.			

Abstract: Previous results have shown that when asbestos fibres on membrane filters are counted over the whole field of view of the microscope, lower concentration values are obtained than when the counting is confirmed to a central graticule grid area. Further studies have been carried out to verify this grid effect, to determine its magnitude for amosite and chrysotile asbestos fibres, and to ascertain its causes. The effects of various physical and human factors were investigated. With small graticule grids, fibre counts were increased by a factor of about 1.5 for amosite and 2.5 for chrysotile as compared with full-field counting. The effect was attributed mainly to human errors associated with full-field counting. It was concluded that more reliable and accurate counts are obtained in the routine evaluation of airborne asbestos dust concentrations by using an eyepiece graticule method of counting than by the full field method. It

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AUTHOR: S. Yazicioglu

TITLE: Pleural Calcification Associated with Exposure to Chrysotile Asbestos in

Southeast

ORIG. REFS.	VOL.	PP.	DATE	ABSTR. REFS.	VOL.	PP.	DATE
CHEST	70	43-47	July 1970	23 refs			

ABSTRACT:

In this study, pleural calcifications prevailing in the inhabitants of some villages and towns around Diyarbakir, a city in southeast Turkey, have been found to be caused by the inhalation of chrysotile asbestos, the mineral commonly used indiscriminately to paint the walls and floors of houses. There were no industrial establishments in the area, except some local mining, and asbestos deposits were even not included on the mining map of the country. Chest roentgenograms from the Chest Hospital and the tuberculosis dispensaries were screened; and, additionally, 15,239 photofluorograms were obtained during a survey. Of all these, 511 patients were found to have pleural calcifications, some with pericardial and diaphragmatic involvement. Forty-four percent (28) of the 64 patients who had examinations of samples of their sputa had asbestos bodies, and asbestos was also induced in rabbits by administration of the raw material.

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752

Author: Anonymous

Title: Asbestos Fireproofing Material Poses Continuing Problem

Digest No: 7176

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C.C. REF.	VOL.	PP.	DATE	ABST. REF.	VOL.	PP.	DATE
Instr. Hygiene	8	1-4	Summer				
Progress Reports			1976				

ABSTRACT

Spray fireproofing with asbestoscontaining materials was banned by the Environmental Protection Agency. From 1958 through 1972, the steel work of many new highrise buildings was fireproofed using spray techniques with asbestoscontaining materials. Recent data point to a continuing legacy of health risk from this procedure. This risk extends from maintenance personnel who must work in plenum spaces sprayed with asbestos to office building occupants breathing contaminated air from the erosion of fibers within the air supply system. The contamination of air supplies of buildings with sprayed asbestos fireproofing within return air plenums has been documented in studies at the Mount Sinai School of Medicine. One hundred and nineteen air samples were taken in 13 buildings in four United States cities. The samples were taken in buildings in which both fibrous and cementitious asbestos spray materials were applied. Additionally,

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Health Foundation, Pittsburgh, Pa.

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AUTHOR J. Flickinger and J. Standridge

TITLE Identification of Fibrous Material in Two Public Water Supplies

ORIG. PERS.	VOL.	PP.	DATE	ABSTN. REPR.	VOL.	PP.	DATE
Environ. Sci. & Tech.	10	1028 - 1032	Oct. 76				

ABSTRACT:

An evaluation of three microscopic techniques for the enumeration of amphibole asbestos fibers in Lake Superior was undertaken to review existing methods, compare them for sensitivity, and modify the best method for achieving optimum results. Transmission electron microscopy with selected area electron diffraction capability can be used to identify amphibole asbestos fibers in water.

PNEUMOCONIOSIS ABSTRACTS

Vol I & III

PNEUMOCONIOSIS ABSTRACTS

VOLUME I

Reprinted from the Bulletin of Hygiene

for the years 1926 to 1938 inclusive

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The Honorary Managing Committee of the

Bureau of Hygiene and Tropical Diseases

PITMAN PUBLISHING CORPORATION
NEW YORK TORONTO LONDON

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SECTION III

ASBESTOSIS

(Abstracts Arranged in Chronological Sequence)

OLIVER, T. Pulmonary Asbestosis in its Clinical Aspects. *J. Indust. Hyg.* 1927, v. 9, 483-5.

Asbestos mineral is obtained as rock in Canada where it is crushed and then exported to England for weaving into asbestos cloth. Those employed, both at crushing and at weaving, are exposed to the inhalation of dust arising from asbestos. The author reports the clinical condition of two women seen by him, employed as weavers, which he considers to resemble silicosis of the lungs. [The evidence in favour of the dust in question setting up a definite pathological condition of the lungs is by no means definite.]

E. L. Collis.

COOKE, W. E. Pulmonary Asbestosis. *Brit. M. J.* 1927, Dec. 3, 1024-5, 12 figs. on 2 pls.

MCDONALD, S. Histology of Pulmonary Asbestosis. *Ibid.* 1925-6, 12 figs. on 2 pls.

OLIVER, T. Clinical Aspects of Pulmonary Asbestosis. *Ibid.* 1926-7.

These three articles are concerned with the same case, that of a woman who had been employed for thirteen years exposed to asbestos dust in a factory where this material is woven. In 1922 her health broke down, and her chest exhibited signs of fibrosis of the right lung with tuberculous infection. She died two years later. The lungs showed interstitial fibrosis but the typical whorled formations seen in silicosis were absent. The fibrotic condition appeared to be associated with the presence in the lungs of dust particles some of which were composed of oxide of iron and some of broken fragments from asbestos fibres. Asbestos is composed of hydrated magnesium silicate, the composition being roughly 41 per cent silica, 12 per cent magnesia, and 11 per cent water. The fibres of this curious mineral have been used for weaving purposes for many years; indeed, Herodotus describes cloth made from asbestos, while Pliny, Strabo and Plutarch all refer to it. Some of the purest asbestos with longest fibres occurs in Northern Italy, but the chief source of it is Canadian chrysotile. Dr. S. McDonald describes certain curious foreign bodies seen in the lungs under the microscope which vary in size from 20 μ to 70 μ and present features which

suggest organic origin. All experts, however, to whom these bodies were submitted failed to recognize them and, after some hesitation, the opinion is put forward that they must be asbestos fibres in the process of alteration and absorption by hydrolysis, either by direct chemical action or by enzymes. The illustrations given of these curious bodies are certainly interesting. Sir Thomas Oliver speaks of the exposure to dust in factories where asbestos goods are manufactured and tells of having examined other workers similarly employed. He expresses the opinion that asbestos dust is capable of causing a clinical condition somewhat similar to silicosis of the lungs; he also noted a deadening of the skin varying from mild bronzing to slight blueness. [Although the case upon which these three articles are based died of pulmonary tuberculosis, workers exposed to asbestos dust have not in the past earned a reputation for succumbing to tuberculous infection in the same way as have stone-masons and gold miners. Asbestos dust seems capable of setting up fibrosis somewhat different in type from that caused by silica dust, and the tendency to succumb to tuberculosis also appears to be different.]

E. L. Collis.

SEILER, H. E. A Case of Pneumoconiosis. Result of the Inhalation of Asbestos Dust. *Brit. M. J.* 1928, Dec. 1, 982, 1 pl. [3 refs.]

The case is reported of a man aged 40 who had been employed for twenty-two years in the asbestos industry. He complained of lassitude, loss of weight and night sweats. A radiogram showed fine mottling of a silicotic type throughout both lungs. He was cyanosed and had a troublesome cough. No tubercle bacilli were found after repeated examinations. The case is considered to be definitely one of pulmonary fibrosis due to inhaling asbestos dust.

E. L. Collis.

GLOYNIE, S. R. The Presence of the Asbestos Fibre in the Lesions of Asbestos Workers. *Tubercle.* 1929, v. 10, 101-7. [5 refs.]

Raw asbestos was ground up into a fine powder and examined under the microscope. The particles were found to consist of little fibres, straight and rigid. Such particles were next demonstrated in the corns in the skin, to which asbestos workers are liable, in

the upper respiratory tract, and in sputum from the lung. Some of the particles were inoculated subcutaneously into a guinea-pig, after which the fibres were found unaltered in the tissues. They were also found post-mortem in lung tissue previously destroyed by concentrated sulphuric acid. In no case in lung tissues so treated, were the so-called "curious bodies" found which are seen in untreated lung sections from asbestos workers. If such "curious bodies" are treated with concentrated sulphuric acid, they dissolve, laying bare typical asbestos fibres. The fibres form the basic scaffolding upon which material—possibly blood pigment—is laid down.

E. L. Collis.

Wood, W. B. Pulmonary Asbestosis. Radiographic Appearances in Skiagrams of the Chests of Workers in Asbestos. *Tubercle*. 1929, v. 10, 353-63, 12 figs. on 6 pls. [12 refs.]

This paper is a clinical and radiological record of fifteen cases of workers in an asbestos factory. Workers in these factories suffer from a form of pneumoconiosis due to the inhalation of dust from the asbestos. In nature asbestos is found in various parts of the world, Canada, Italy, Corsica, South Africa, etc., associated with quartz and slaty rocks mingled with jaspers and quartzites rich in magnetite and brown iron ore. The crushed product, after carding and spinning, is used for the manufacture of jacketing and packing for steam pipes and joints, and various other articles.

The cardinal symptom of pulmonary asbestosis, like that of other forms of silicosis, is dyspnoea, which progresses until in the advanced stages of the disease it becomes extreme. The dyspnoea may be accompanied by cyanosis and the complexion of most patients has a slightly leaden hue. Chest expansion may be reduced to one inch or less. Cough is seldom excessive and expectoration is moderate in amount or even absent.

The physical signs are those of a bilateral pulmonary fibrosis chiefly affecting the lung bases. Pulmonary tuberculosis may supervene and modify the clinical picture. When the disease is well established the prognosis appears to be grave.

Radiologically the most noticeable feature of the skiagram is the presence of shadows suggesting a diffuse fibrosis of the lower two-thirds of the lungs. The fine ground glass quality of the shadows is noteworthy and the bronchial striations may give a cobweb-like appearance to the film. As these striations radiate outwards from the lung roots they cut the edge of the cardiac shadow, especially on the left side, giving a shaggy appearance as if the heart were encased in coarse felt. When more definite mottling is present it lacks the coarse quality seen in the skiagrams of other forms of pneumoconiosis. Other features are signs of old basal pneumonia, obliteration of costophrenic angle, thickening of the apical pleural cap. Post-mortem the diagnostic feature which serves to distinguish the condition from other forms of

pneumoconiosis is the presence in the lungs of golden-yellow foreign bodies with segmented outline and clubbed extremities bearing a superficial resemblance to minute crustacean forms.

S. Roodhouse Gloyne.

Wood, W. B. & PAGE, D. S. A Case of Pulmonary Asbestosis: Death from Tuberculosis Two Years after First Exposure to the Dust. *Tubercle*. 1930, v. 11, 157-8, 2 figs. on 1 pl.

The clinical history is given, of a young woman, aged 21, who had been for fifteen months a spinner in an asbestos factory with exposure to asbestos dust. Her father had died recently from phthisis. She developed rapid and fatal tuberculosis which affected both lungs, the peritoneum, the intestines, ovaries and Fallopian tubes. No radiographic evidence was found of pneumoconiosis, and very little fibrosis was present in the pulmonary tissue; but asbestosis bodies were seen scattered irregularly through the lungs, and also asbestos fibres in various stages in the formation of typical asbestosis bodies.

E. L. Collis.

i. COOKE, W. E. Asbestos Dust and the Curious Bodies found in Pulmonary Asbestosis. *Brit. M. J.* 1929, Sept. 28, 578-80, 5 figs. [4 refs.]

ii. HADDOW, A. C. Clinical Aspects of Pulmonary Asbestosis. *Ibid.* 580-81.

iii. STEWART, M. J. A Method of Examining the Sputum for Asbestosis Bodies. [Memoranda.] *Ibid.* 581.

(i) Asbestos and asbestos dust are described by W. E. Cooke, taking chrysotile as the type. The factory dust is composed of colourless, refractile, translucent fragments of fibre, and also of black, brown and blue particles of biotite and magnetite. But in the lungs translucent fragments are almost completely absent; because, apparently, these fragments [as was shown by GLOYNE, this *Bulletin*, 1929, v. 1, 977] form the nuclei upon which are deposited colloidal aggregates of blood proteins, so forming the now well-known curious bodies, from 20 to 100 μ in length, shaped maybe like elongated dumb-bells. They are found in myriads in alveoli, bronchioles, fibrous areas and phagocytes. Occasionally a fragment of biotite forms the central core. The way in which the curious bodies are formed is suggested in detail, the deciding conditions being the presence of plasma proteins and fine spicules of difficultly soluble material. Since no other mineral dust is fibrous, the curious bodies are pathognomonic of pulmonary asbestosis.

(ii) The presence of asbestos dust in the lungs, according to A. C. Haddow, gradually, after five years or so produces fibrosis, not as a rule complicated by tuberculosis. It causes dyspnoea on exertion and

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dry cough; but anorexia is a disturbing feature. Slowly weakness and emaciation advance with hopelessness, sleepless exhaustion, until broncho-pneumonia closes the scene. Asbestos bodies are present in the sputum. Radiographs show characteristic translucency above the level of ninth rib posteriorly and fourth rib in front, with definite infiltration below. The patients tend to improve considerably in summer.

(iii) A method for finding asbestos bodies in sputum is given by M. J. Stewart in which the sputum is dissolved in antiformin and centrifuged. The deposit is dried and fixed on an albuminized slide and mounted in Canada balsam. The bodies are only in small numbers, perhaps only one or two to a film. Hydrochloric acid and potassium ferrocyanide stain the bodies Prussian blue.

E. L. Collis.

WOOD, W. B. & PAGE, D. S. A Case of Pulmonary Asbestosis. *Tubercle*. 1929, v. 10, 457-60, 3 figs. on 2 pls. [4 refs.]

The patient whose case is recorded was a single woman, aged 31, who had commenced work as a weaver in an asbestos factory at the age of 21. No respirator had been provided. During the first five years of her employment she had enjoyed fair health except for winter cough and colds in the head. After about five years, her chest "began to feel stuffy" and her appetite for food failed. She continued at work until she had completed about nine years' service. A year after ceasing work she first became conscious of loss of health and wasting. The dyspnoea increased, being accompanied by debility, and an attempt to work as a packer in another trade had to be relinquished. When she came under medical observation she had lost two stones in weight, her face was pale, and had a slightly violet tinge, her fingers were slightly clubbed, and her pulse rate rapid. She perspired freely, and her respiration was hurried on the slightest exertion. The chest was flat and poorly covered, and the respiratory excursions were feeble. There was retraction and impairment of note over the right apex, and slight flattening at the left base with general impairment of percussion note over the whole of left chest. Crackling crepitations were present over left lung, and right base, with a dry rub at angle of left scapula. Chest expansion at the nipple level was one inch. No sputum was available for examination. No tubercle bacilli were found in the faeces (three tests). A skiagram of the chest (which is reproduced in the article) showed: R: apical cap thickened; granular mottling with fine linear striations in upper and middle zones; general cloudiness of bases; costo-phrenic angle obliterated and margins of diaphragm obscured; L: apical cap thickened; projection outwards of hilum shadow, with patchy clouded areas external to this.

On admission to hospital patient's general condition improved. Sputum was obtained on one occasion, but no tubercle bacilli were found. Eight

further examinations of faeces for tubercle bacilli were also negative. After seven weeks with a normal temperature, bronchitis with pyrexia began, broncho-pneumonia supervened and the patient died.

At the autopsy the pleura were found to be uniformly thickened to a slight extent with moderately firm adhesions in the upper thirds and recently plastic pleurisy on both sides. There was diffuse fibrosis and contraction of both lungs, the left side being more affected than the right. The trabeculae stood out on sections with denser fibrosis strands in parts, particularly well marked in the right lower lobe, whilst patches of broncho-pneumonia were evident. Microscopically the fibrosis was found to be uneven in distribution; in less affected areas it was most prominent around blood vessels, and in the more affected areas little was seen but fibrous tissue with blood vessels and elastic fibres. Lymphocytic nodules were present in the fibrous tissue and giant cells of the type associated with foreign bodies. No tubercle bacilli were found.

Sections taken from various parts of the lung showed numerous typical golden-yellow bodies as described by previous authors. The majority were embedded in fibrous tissue, but some were seen in clumps in alveoli (photomicrographs are reproduced). Varying in size and shape, the majority of these golden-yellow bodies showed a large clubbed head, a segmented body, and a tapering tail, suggesting at first sight a crustacean origin. These bodies were also found in the fluid expressed from the lung. As recorded in a previous paper, GLOYNE found them to contain asbestos fibres. The authors suggest that pigment may be deposited around these fibres, thus giving the curious crustacean-like appearance. Evidence of this was seen where two of these golden-yellow bodies crossed each other, separate except at the point of intersection and at one extremity, where they had a large clubbed head in common. [An additional case of pulmonary asbestosis with death from tuberculosis two years after first exposure to the dust was reported by these authors in *Tubercle*, 1930, v. 11, 157.]

S. Rodhouse Gloyne.

STEWART, M. J. & HADDOW, A. C. Demonstration of the Peculiar Bodies of Pulmonary Asbestosis ("Asbestosis Bodies") in Material obtained by Lung Puncture and in the Sputum. *J. Path. & Bact.* 1929, v. 32, 172.

The authors describe two methods of detecting during life the characteristic golden-yellow bodies found, post-mortem, by various authors in the lungs of patients who have died of pulmonary asbestosis. First in lung puncture: a film was made from a minute amount of blood stained material withdrawn from the lung with an exploring syringe and the golden-yellow bodies detected microscopically in the film. Second in sputum: half an ounce of sputum was dissolved in an equal quantity of undiluted antiformin, centrifuged, and the bodies found microscopically in a film of the washed deposit.

The authors suggest the name "asbestosis bodies" for these golden-yellow bodies.

S. Goodhouse Clugne.

WOOD, W. B. & GLOYNE, S. R. Pulmonary Asbestosis. *Lancet*. 1930, Mar. 1, 445-S, 1 fig. [11 refs.]

A summary is given of the recent growth of knowledge relating to the effects following upon inhaling asbestos dust. A serious industrial disease results, known as asbestosis. It has occurred among those employed in weaving asbestos fibres into various forms of fabric. The first symptoms are dyspnoea and cough, associated with breathlessness on exertion; sputum at first is scanty. Loss of appetite, lassitude, pains in the chest and loss of weight follow. The skin presents an unhealthy leaden hue; chest expansion is defective, and may be even less than one inch. Corns in the skin of the hands and elsewhere may be present due to the irritation caused by embedded asbestos particles. The lungs present signs of fibrosis, particularly at the bases, with fine dry crackles. A characteristic is the presence in the sputum or in the lungs of curious asbestosis bodies, varying in size from 21 to 60 μ . These bodies are composed of a fine spicule of asbestos with a deposit of pigmented organic matter. X-ray examination discloses fine fibrosis in the lower two-thirds of the lung fields, with a diffuse haze resembling ground glass. It is distinct from the coarser shadows seen in silicosis. The prognosis of the disease is not satisfactory, as it appears to progress steadily when once started. Broncho-pneumonia or super-added tuberculosis ushers in death. The pleurae are thickened, with plentiful adhesions, the lungs are hard, leather-like and airless. Bronchiectasis may be present. A description is given of the microscopic appearances, including those of the asbestosis bodies, which, when once seen, cannot be mistaken. The question is yet undecided as to how far the pulmonary fibrosis caused by asbestos conduces to tuberculous infection.

E. L. Collis.

GLOYNE, S. R. The Reaction of Tissues to the Asbestos Fibre, with Reference to Pulmonary Asbestosis. *Tubercle*. 1930, v. 11, 151-3, 4 figs. on 2 pls. [1 ref.]

The cellular reaction of living tissues to asbestos dust was tested in various experiments by injecting finely ground dust subcutaneously and peritoneally into guinea-pigs, and into the pleural sac or the lung of rabbits. The fibres tended to separate as a small foreign body at the point of inoculation, and appeared to act as a benign irritant producing a minimal amount of granulation tissue, which contained foreign-body giant cells, or collections of polyblastic wandering cells phagocytizing the asbestos fibres. The cytoplasm of these foreign-body giant cells had a pigmented stippled appearance due to minute asbestos fibres; it is different from the structureless

appearance of tuberculosis giant cells. No asbestosis bodies, so characteristic of human pulmonary asbestosis, were found. When injected intravenously no evidence was found to toxic effects on kidneys, liver or other organs.

E. L. Collis.

MEREWETHER, E. R. A. The Occurrence of Pulmonary Fibrosis and other Pulmonary Affections in Asbestos Workers. *J. Indust. Hyg.* 1930, v. 12, 193-222; 230-57, 5 figs. [30 refs.]

[Opportunity has been taken, in reviewing this paper, to give a brief summary of asbestosis in Industry.] Prior to the commencement of this inquiry, in February, 1928, definite knowledge existed of only two deaths of asbestos workers about whom there was expert opinion that the inhalation of asbestos dust had at least contributed to, if not caused, the fatal outcome. The first fatal case of pulmonary asbestosis, now known as the "Montague Murray Case," occurred in 1899, and was reported to the Departmental Committee of the Home Office in 1906. The patient died of extensive pulmonary fibrosis without tuberculosis. The second case, reported by W. E. COOKE, was complicated by tuberculosis. This case is of importance as it was the first one in which the golden-yellow bodies of pulmonary asbestosis were found. The subsequent collection of cases by Dr. I. M. D. GRIEVE and the occurrence of one in Glasgow in 1928 led the Factory Department of the Home Office to institute an inquiry into the disease in that year. [A previous inquiry in 1910 had suggested that asbestos possessed injurious properties but produced no conclusive proof.] Meanwhile a fatal case had been reported from South Africa by Dr. F. W. STIMSON.

The term "asbestos" is a collective name applied to a variety of silicate minerals, which differ from one another in chemical composition and physical properties, but which resemble one another in their finely fibrous feature and flexibility. Their value depends on the facility with which they are capable of being split up into long and flexible fibres, which can be spun like cotton and woven into cloth; on their resistance to heat and acids; and on their insulating properties with respect to heat and electricity. Varieties of asbestos possess these qualities in differing degree. Commercially, therefore, that variety and grade which is most suitable for the purpose in view is selected, regard being paid to ordinary economic factors, such as the cost of raw material and the price which the finished article may be expected to command. Practically speaking, all that goes under the name of asbestos in commerce is either fibrous serpentine or a fibrous mineral of the amphibole or hornblende group. The composition of these is given in Table I below.

Nearly 80 per cent of the world's production of asbestos is derived from Canada, and is of the serpentine variety; the remainder comes mainly from South Africa and Russia. Only about one-fifth of the world's

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production of asbestos is suitable for spinning. The remainder (about four-fifths) is used for the manufacture of asbestos millboard, tiles, sheeting, paper and many other articles. It is the discovery of industrial uses for these very short fibres which has been responsible for the phenomenal expansion of the industry as a whole. (Steam packings, insulating mattresses, brake linings for motor cars, fireproof curtains, etc.).

The author divides the processes with which industry is concerned into: (1) the manipulation of

those longest employed was adopted; but regard was also paid to the other end of the scale, so as to obtain information as to the length of exposure to dust necessary before effects are manifested, and also as to the particular process in which the worker was engaged.

Table II shows the distribution, according to the length of employment of 775 workers engaged in the processes under review, and of the sample of 363 workers, distributed in the same way. The enormous preponderance numerically of workers employed

TABLE I
Composition of Serpentine and Amphibole Varieties of Asbestos

Mineral Group	Variety	Percentage of							
		SiO ₂	Al ₂ O ₃	FeO Fe ₂ O ₃	MgO	CuO	Na ₂ O	K ₂ O	Combined Water
Serpentine	Chrysotile	39-42.5	0-3.7	0.7-4.4	39-43	0-0.35	—	—	13.3-16.5
Amphibole (horn- blende)	Crocidolite	50.5-52.1	0-1	35.5-37.4	0-3	0.75	6.2-9	—	1.6-4.5
	Amosite	48-53	1.2-9.4	34-44	0.7-6.4	—	0-2.5	—	2-3.3
	Tremolite	57.2	0-0	3-2	22.8	13.4	0-6	0-3	2.4

TABLE II
Distribution, according to Length of Employment, of: (A) 775 Workers engaged in Asbestos Processes; and (B) Selected Sample of 363 Workers

Years employed	(A)		(B)	
	Number	Per cent	Number	Per cent
0-4	483	62.3	89	24.5
5-9	200	25.8	141	38.8
10-14	51	6.6	84	23.2
15-19	24	3.1	28	7.7
20 and over	17	2.2	21	5.8
Total	775	100.0	363	100.0

asbestos, either pure, or admixed with a small proportion of cotton, or other vegetable fibre; (2) the manipulation of asbestos together with other dusty materials; (3) the making up of asbestos cloth into other articles. About 2,200 appears to be the total population at risk in this country, but this figure does not include the large number of workers engaged in the processes in group (2) which involved exposure to the influence of mixed dusts, of which asbestos is but one, and commonly not more than 20 per cent of the mixture.

A selected sample of 363 workers was chosen by the writer for intensive investigation. This represented 16.5 per cent of the population at risk as estimated above. The principle of selecting primarily

under five years in these processes is striking, as is also the very low percentage of workers employed ten years or longer. Comparison of the two parts of the table shows that the effect of this method of selection is that the number examined in each succeeding five-year employment group is a progressively greater proportion of the total number which *could* have been examined in each particular group. With a solitary exception all those examined were at work on the day of examination. All selected workers were examined by the author himself. The clinical examination showed the following changes. Chest expansion is diminished and may be reduced to one-half inch or even less in advanced cases. Retraction of the apices is common, and sometimes shows a peculiar feature

differentiating it from that found in fibroid phthisis. Instead of the immobile and sunken apices seen in the latter disease, they are seen to descend during inspiration, and to rise again during expiration. This seems to indicate the anchoring of normal apices by fibrous tissue in the lower portions of the lungs. Impairment of the percussion note was found to be constantly more marked on the right side; in fact, at first it was thought that in the earliest degrees of fibrosis it was confined to that side, but later and more extended observations led to the conclusion that the earliest

asbestos workers often find the dust irritating; this lasts for a few weeks and then usually disappears. The author has noticed this effect on himself, but only while in a very heavy cloud of asbestos dust. The second type of cough is more intimately associated with the development of fibrosis. Usually it is present only in the morning on getting up, when after rather a sharp attack of coughing, a little viscid sputum is brought up. A similar bout may occur at night after ceasing work. Generally speaking the cough gives little inconvenience until the development of

TABLE III

Distribution of Four Common Symptoms, and of Cyanosis, among Cases of Fibrosis

Symptom	No. examined ¹	Cases in which symptom was present	
		Number	Per cent
Cough	91	54	59.3
Cyanosis	93	52	55.9
Dyspnoea	91	47	51.6
Expectoration	91	31	34.1
Pain	94	10	10.6

¹ Excluding those in which the presence of the symptom is referred to other causes.

detectable cases are bilateral, although the signs on the left side are tenuous. This change is so constant that it has been adopted as the most reliable single clinical sign presented by this type of pulmonary fibrosis, and no case has been classified as fibrotic in its absence. The respiratory murmur is usually weakened, generally more on the right side and often still more at the base; the expiratory sound is weaker than the inspiratory, and often becomes less and less audible as one approaches the bases. The dry character of this type of fibrosis during most of its course is striking. Scattered fine râles in the root areas, axillae, and bases were not infrequent; slight oedema of the lower halves of the lungs was noted in one of the more advanced cases; but in several no adventitious sounds at all were heard. Pleural crepitations, and rarely a slight pleural rub, were noted—these attacks seem to cause little pain—and in one case a little fluid at the right base.

Three types of cases were noted in which physical examination was difficult: (1) those in which dust fibrosis had been implanted upon lungs already emphysematous; (2) those in which there were extensive bilateral fibrotic changes due to healed tuberculosis; (3) cases in which changes following an old massive pleural effusion on one side had obscured the physical signs. The symptoms described by the writer closely resemble those of silicosis. They are tabulated above (Table III).

Cough was of two types. In the first for a few weeks after commencing work in a dusty process,

some other symptoms directs attention to the general health. The pain in the chest is referred to by the patient as "tightness of the chest" or "soreness" or "aching." Well-marked clubbing of the fingers was noted in a few cases. The general nutrition was hardly affected except in the latest stages. Radiograms of the chest were obtained in 133 workers (35.5 per cent). In company with Dr. TWISING the author recognizes the following stages: (1) A very doubtful stage of increased linear striations; (2) Fairly definite fine dusty stippled appearance; (3) Coarser mottling with increased linear striations; (4) Gross lesions with pleural changes and displacements due to the pull of the fibrosing lesions. The damage to the lung is therefore much greater than it appears to be when judged by the silicotic standard. Asbestos fibrosis is much more diffuse; it spins its fine web, as it were, crisscross throughout the lung, enveloping and eventually strangling the ultimate lobular structure, rather than depositing itself in numerous more or less isolated foci, as in silicosis. Thus, at any rate in the less advanced stages, the radiological picture of the lesions does not impress the eye, unconsciously viewing it from the standpoint of silicosis. The radiographic picture may show soft and fairly coarse modulation, but it is never so marked as in a silicotic film. Paradoxically, the distinctive feature, both clinically and radiologically, of the asbestos fibrosis is its uniformity. The modesty of the symptoms, the unobtrusive but diffuse impairment of the percussion note, the homogeneous

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stippling of the skiagram—all are fragments of an entity, unmistakable when assembled, but enigmatic singly.

This first article closes with a record of a number of illustrative cases.

In the second article the author discusses the morbid anatomy, histology, etc.

The essential lesion is a chronic interstitial fibrosis of the lung. In the earlier stages, there is fibroblastic proliferation in the alveolar walls, which become increasingly thickened in consequence; and there is catarrhal desquamation of the alveolar epithelium. At this stage of the disease peculiar golden-yellow

have been found in every autopsy in pulmonary asbestosis. [A description of these bodies and the methods of obtaining them has been given in abstracts in this *Bulletin*, 1930, v. 5, 246; 247; 563; 564]. All these facts lead to the idea that the bodies consist of a central nucleus of asbestos spicules, upon which colloidal aggregate of blood proteins plus, possibly, soluble fractions of asbestos and, in one case of chrysotile workers, an iron salt have been absorbed and moulded by currents in the bronchi and the alveoli.

On the question of asbestosis as an occupational hazard the author has classified his facts as shown in Table V.

TABLE V

Distribution of Workers examined who had been employed for Five Years or over, together with Cases of Fibrosis, according to Process in which Worker was longest employed

Process	No. examined		Cases of fibrosis				Average length of employment in years			
			No.		Percentage of group		Group less cases of fibrosis		Cases of fibrosis	
1. Crushing, opening, disintegrating, and mixing	—	21	—	9	—	42.9	—	8.9	—	10.9
2. Carding	—	39	—	16	—	41.0	—	9.1	—	13.2
3. Spinning, twisting, doubling, plaiting, etc.	—	87	—	12	—	13.8	—	10.1	—	18.7
4. Mattress making	—	15	—	7	—	46.7	—	7.3	—	13.0
5. Weaving and associated processes	—	88	—	40	—	45.5	—	10.0	—	12.7
(a) Cloth weaving	28	—	21	—	75.0	—	9.5	—	14.1	—
(b) Band weaving	21	—	4	—	19.0	—	10.0	—	13.5	—
(c) Cloth and band and unclassified weavers	14	—	4	—	28.6	—	7.2	—	9.5	—
(d) Warpers, beamers, loom tuners, charge hands, and others associated with weaving	25	—	11	—	44.0	—	11.2	—	10.8	—
6. Miscellaneous processes and reining unclassified workers	—	24	—	11	—	45.8	—	8.8	—	13.8
Total	—	274	—	95	—	34.7	—	9.6	—	13.5

"asbestosis bodies" are found in the alveolar spaces and in the thickness of their walls. Detached portions of bodies may often be seen engulfed by alveolar phagocytes, or a larger unbroken body may be partially surrounded by these cells. In the more advanced stages of the disease, the fibrosis of the lung is complete. Alveoli can no longer be made out; but the asbestosis bodies still remain embedded in the fibrous tissue. Pathognomonic curious bodies [Stewart's term "asbestosis bodies" would appear to be more accurate and scientific] are seen in the lung sections. The larger bodies measure from 20 to 100 μ or more in length, and are of a golden-brown colour. They may have single clubbed ends or may appear as elongated dumb-bells; some are filamentous, while others suggest a series of discs. The bodies do not stain with any of the aniline dyes, but in chrysotile workers they give the Prussian blue reaction for iron in varying degrees of intensity. These curious bodies

Comparative data show that the dustiest processes are opening, sieving, and shoveling or otherwise handling asbestos fibre. The heaviest counts of all were found in this group in filling sacks, by hand, with disintegrated fibre in a settling chamber. The cloud of dust was intense. The clumping of the dust particles of the sample on the cover slip was very marked, with the result that the total dust count arrived at was undoubtedly too low. Next in order is cloth weaving, dry and without the application of local exhaust. This is undoubtedly a dusty process, and although local exhaust reduces the count at the breathing level of the weaver, much dust still escapes into the workroom. Weaving cloth wet, not merely damp, reduces the dust count to a remarkable degree. Next in order comes mattress making, without any precautions such as exhaust ventilation, or damping floors, cloth, and tables. Application of exhaust ventilation and damping reduce the count

considerably. The figures for spinning, plying, and brading are believed to be rather too high, owing to contamination of dust from neighbouring and more dusty processes.

No case of diffuse fibrosis clearly due to asbestos was discovered with under five years' employment. Three cases were found with three, three and a half and four and a half years' work, respectively, who showed clinical signs of fibrosis. Definite confirmatory radiological evidence was obtained in the first, definite but slighter radiological changes in the second, and indefinite suggestive changes in the third. Particulars of eight deaths have been collected. In six of these advanced pulmonary fibrosis was the primary cause of death and in the remaining two pulmonary tuberculosis was a contributory factor. The diagnosis was confirmed post-mortem in six of the cases. The important question whether asbestos workers show an increased liability to other diseases of the lungs, such as pneumonia, pleurisy, and pulmonary tuberculosis—especially the latter—requires further investigation, but no outstanding susceptibility to pulmonary tuberculosis was disclosed, either among asbestos workers as a class or among those with fibrosis, considering the frequency of old healed apical lesions among the general population; but, on the whole, the author considers that this matter should be left in abeyance. In view of the relationship between asbestosis fibrosis and silicosis the author has classified the main points of similarity and dissimilarity—

(1) Inhalation of asbestos dust, under favourable conditions of concentration of dust and length of exposure, will produce a serious and even fatal degree of pulmonary fibrosis; (2) the type of fibrosis produced, however, exhibits a number of divergences from that caused by the inhalation of free silica dust, and the outcome of these variations is not yet apparent; (3) the divergences noted so far are exhibited in the radiological picture, and on post-mortem examination of the affected lungs, both in the gross morbid anatomy and in microscopic sections; (4) in the latter case the appearances of the asbestos fibrosis seem to be sufficiently distinctive not to permit of confusion between it and silicosis; (5) the radiological appearances of the asbestos type of fibrosis are more delicate, softer, and more diffuse than the siliceous fibrosis; (6) it follows, therefore, that an opinion as to the degree and intensity of an asbestos fibrosis, based on a comparison of the radiological changes with those shown in standard siliceous films, will be an underestimation; (7) in the absence of a full medical and industrial history, possibilities of confusion of the two types of fibrosis will arise in the interpretation of radiograms; (8) there is evidence that other inorganic dusts, containing no free silica, may be productive of this fine type of fibrosis in varying degree.

A very good summary of pulmonary asbestosis researches with numerous references has recently been written by V. DUBAS in *La Médecine du Travail*, 1930, v. 1, 117-72 and v. 2, 187-200.]

S. Roodhouse Giloyne.

COOPER, W. E. & HILL, C. F. Further Observations on Pulmonary Asbestosis, with Special Reference

to Asbestos Dust and the Curious Bodies found in the Lungs. *J. Roy. Microscop. Soc.* 1930, v. 50, 15-19, 3 pls. (1 coloured). [2 refs.]

Continuing a communication made to the *Journal of the Royal Microscopical Society* in 1927, the authors find three elements from dust in the lungs of asbestos workers: (1) fine black granular dust, much of which is carbonaceous; (2) large fragments, black, blue, brown and translucent (coloured illustrations are given) which are strictly comparable with fragments in the original dust; (3) the so-called curious bodies.

Further to study these bodies the authors digested asbestosis lungs with trypsin, and, by keeping the specific gravity about 1.070, they were able to obtain in the supernatant fluid, after centrifuging and washing, curious bodies "in a pure state." When submitted to X-ray examination in films it was found that the composition of these bodies was largely of non-mineral origin. The authors suggest, therefore, that the so-called curious bodies are formed in the lung as follows. The fine spicules of asbestos cause, by mechanical action, either minute extravasations of whole blood, or serous exudates which envelop them. Solution of any soluble fraction of asbestos takes place. This fraction is considered to be extremely small, but in the case of chrysotile workers some solution is suggested by the iron free reaction.

Any surface in contact with a colloidal solution may act as an adsorbent, and in the present case the fine spicules must be considered to do so. Inter-action between the soluble fraction of chrysotile and plasma proteins takes place, syneusis occurs and with the loss of water the adsorption is rendered irreversible. The adsorbent is permanently ensheathed with stable colloidal aggregates which become moulded into the familiar shapes by alveolar and bronchial currents.

S. Roodhouse Giloyne.

LYNCH, K. M. & SMITH, W. A. Asbestosis Bodies in Sputum and Lung. *J. Amer. M. Ass.* 1930, v. 95, 659-61, 1 figs. [6 refs.]

The authors record two cases of pulmonary asbestosis. The first was a Negro who, at the time of his death, had been a worker in an asbestos mill, for twenty-eight months during a period of about three years. In microscopic examination of the tissues the asbestosis bodies were found in the sections from both lungs, in alveoli, associated with fine black granular pigment and mononuclear cells, some being intimately associated with large mononuclear phagocytes, in the bronchioles, where there was also the black granular material and some mononuclears, in the alveolar walls, which were thickened, and within the connective tissues of the interlobular areas along the course of vessels and bronchi. Here there was a definite increase of fibrous tissue and much accumulation of black granular pigment.

The second patient was also a Negro who had worked in an asbestos mill almost continuously for a period of four and a half years, and died of lobar pneumonia. In this case, also, it was in the micro-

scopical examination of the lungs only a few upper lobes revealed the alveolar in the nodules, pigmented alveoli where fibrous

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DEWING, A. C.

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At the bottom of the lung and in the

scopic study of the tissues from the autopsy that the asbestosis was discovered, gross examination revealing only massive pneumonia of the whole right lung and upper left lobe. Sections of all parts of the lungs revealed the asbestosis bodies. There were great numbers of them in the alveoli, the walls of the alveoli, the deeper pleural tissues, the bronchi and the interlobular framework tissues, and they even occurred in thrombi of veins and in the peribronchial lymph nodes. Associated with them was the black granular pigment as in the former case. In the walls of the alveoli and bronchi and in the framework structures where these bodies lay was a cellular increase in fibrous tissue.

As the authors had not, at that time, read the early accounts of writers on this subject the asbestosis bodies were first suspected of a being mycelia and spores of a fungus, possibly *Aspergillus*. They subsequently devised a technique for the examination of sputum somewhat resembling the technique of Stewart and Haddow. The technique is as follows—the sputum is digested with a 10 per cent sodium hydroxide solution kept warm at about 80°C. until the mucus was well digested and the mixture watery, and then sedimented. The asbestosis bodies were then found in wet slide preparations. The authors describe the asbestosis body as having a central filament of a transparent, slightly greenish tinged, needle-like crystal which they take to be an asbestos crystal.

S. Roodhouse Gloyne.

DEWITZ, A. P. Asbestwarzen. [Asbestos Warts.] *Arch. f. Dermat. u. Syph.* 1930, v. 161, 1-5, 2 figs.

The author describes briefly the histology of warts occurring in asbestos workers, and known as asbestos warts. These warts or corns are round or irregular in shape with a rough surface and occur at the places where asbestos fibres penetrate the skin. They are found on the flexor aspects of the fingers, the palm of the hand or the sole of the foot (the latter only in the summer when the workers wear no shoes). [In British factories they are also found on the shin owing to asbestos fibres penetrating thin stockings.] Their size varies from that of a millet seed when they first appear to that of a pea when older. The time taken for one of these warts to appear depends upon: (1) the protection afforded to the workers; and (2) the thickness and resistance of the skin. As a rule the warts are noticed soon after the operative begins asbestos work, and they are liable to cause pains especially when walking. They occur mainly in workers employed in asbestos mines, but are very rarely seen in those employed in other divisions of the industry. [They are common in British factories.]

At the site there is intense proliferation of the collagen elements with formation of giant cells (foreign body giant cells, uncommon in the asbestosis lesions) and the keratinization of the skin. A chronic inflammatory process occurs in the underlying tissues. It is to be noted that the author does not record the presence of asbestos bodies in these warts.

S. Roodhouse Gloyne.

SIMSON, F. W. & STRACHAN, A. S. Asbestosis Bodies in the Sputum: a Study of Specimens from Fifty Workers in an Asbestos Mill. *J. Path. & Bact.* 1931, v. 31, 1-4. [8 refs.]

Sputum was examined from fifty workers in a South African asbestos mill, where the atmosphere was at times so overcharged with dust that objects at a distance of 15 or 20 ft. could not be distinguished. In forty-eight of the specimens, asbestos bodies were found. The best time to take the sputum was first thing in the morning. At night, after coming off the shift, the mouth and nasal pharynx were so loaded with dust as to mask the picture. The bodies were, in every case, found to be intra-cellular, contained within dust cells or phagocytes originating from the epithelium of the alveoli. The stages of formation of these asbestos bodies are that a dust fibre becomes coated with a greenish-yellow substance with bulbous enlargements at the extremities; next this deposited material increases when segmentation appears, and becomes deeper and even complete with fracture of the fibre. The claim is made that in the case of other dust particles, and in particular quartzite, similar material may be so deposited. The sputum was always mucoid, and resembled egg albumen. The bodies were easily demonstrated by direct thick films.

E. L. Collis.

GARDNER, L. U. & CUMMINGS, D. E. Studies on Experimental Pneumoconiosis. VI. Inhalation of Asbestos Dust: its Effect upon Primary Tuberculous Infection. *J. Indust. Hyg.* 1931, v. 13, 65-81; 97-111, 21 figs. [21 refs.]

This is a preliminary report on a series of animals which have been experimentally exposed to asbestos dust for a period of two years and five months. The asbestos employed was chrysotile, a member of the serpentine group of minerals, and was obtained from Thetford, Quebec, the sample used being known in the trade as "King's floats" grade of asbestos.

The general plan of the experiment was the same as that previously employed by the authors in the study of other siliceous substances. The animals were kept in cages along the walls of a room 6 ft. by 8 ft. by 8 ft. provided with two 3 ft. by 5 ft. windows. A cloud of dust was maintained in the atmosphere of this room by means of an apparatus located in an alcove 6 ft. from the nearest animal, the apparatus consisting of a rotating metal paddle operating in a horizontal drum. The daily period of exposure of the animals was eight hours but as they remained in the room during the night whilst the dust was settling the actual exposure was really longer. The dust concentration of the room was measured with a Greenough-Smith impinger apparatus and a table of the dust counts is given in the article.

One hundred and twenty-eight guinea pigs, eighteen white rats, and seven rabbits had been used up to the time of the writing of the article; sixty-three of the

guineapigs were infected with tubercle bacilli four days before the dust inhalation was begun, in an effort to determine the influence of the dust upon tuberculosis, forty of these animals being placed in the dusting room and twenty-three being kept as controls. The remainder of the animals were used to study the uncomplicated effects of inhaled asbestos dust, and the results were as follows—

(a) Non-tuberculous guineapigs. Apart from twenty-nine of these animals which succumbed to pneumonia, enteritis and peritonitis, etc., the majority of the animals are still alive, but a number were killed after 30, 60, 90, 351, 610, 782, and 847 days from the commencement of the dust inhalation. From the eighth month the effects of the exposure to asbestos dust have been followed by means of radiograms of the living animals.

The pulmonary localization of the asbestos dust differed from that of other dusts studied by the authors, presumably because the dust is composed of long fibres, and is carried only as far as the distal respiratory bronchioles where the major portion of the material remains. No asbestosis bodies were found in animals killed before sixty days of dust exposure. When first found the bodies were small, atypical and generally contained within the cytoplasm of the phagocytes. During the next sixty days the bodies increased enormously in number, size and complexity of structure. Occasionally they were found in the tracheo-bronchial lymph nodes. At first there is an accumulation of phagocytes and giant cells in the bronchioles and adjacent alveoli. Proliferation of fibroblasts was first noted on the 505th day and 160 days later true fibrosis was demonstrable.

(b) Rabbits. In the five rabbits killed up to the time of writing (330 days) phagocytosis but no fibrosis was noted. No typical asbestosis bodies were discovered.

(c) Albino rats. Widespread incidence of pneumonia, frequently complicated by abscess formation, among the rats exposed spoiled the first experiments, but a second set of animals produced one which, when killed on the seventieth day, showed two asbestosis bodies but no more.

The forms of asbestosis body found in the lungs of the guineapigs resembled in every way those in human cases. The presence of ferric iron may be demonstrated by the Prussian blue reaction. The authors deduced from their observations that the asbestosis body develops as a result of "chemical changes taking place within or about inhaled asbestos fibres." The earliest forms differ from those seen later, consisting of iron containing sheath-like or nodular swellings along the sides or at the ends of the fibre. Later the coating substances, either through movement or other stress, crack, separating into segments. A number of microphotographs showing different stages in the formation of the body in guineapigs' lungs and the atypical bodies in the lungs of rabbits are included in the article.

Comment is made on the scarcity of asbestosis bodies in the tracheo-bronchial lymph nodes in spite

of the fact that after two years large masses of fibres were found to have accumulated there. There were, however, only very occasional bodies, and probably these were formed in the lung and carried to the lymph node. The authors suggest the following possible explanations of these facts: either (1) while in the lung the fibres may have been deprived, by solution, of iron or some other substance necessary to the formation of bodies; or (2) the environment furnished in the lung may be especially favourable to the formation of the bodies. To test this last point numerous injections were made into the peritoneal cavity of the guineapig. At 110 days a few very small typical bodies were found.

Attempts have also been made to form asbestosis bodies in the subcutaneous tissues, with fair success.

The next series of experiments dealt with primary tuberculous infection in pulmonary asbestosis. Animals exposed to asbestos dust were infected by causing them to inhale small numbers of tubercle bacilli of an attenuated strain (R1). One lot of sixty-three animals were subjected to inhalation infection, and four days later forty of them were placed in the dusting room where they were kept until death occurred. The remaining twenty-three were kept in a normal atmosphere as controls. A second group of twelve guineapigs, which had been exposed to asbestos dust for two years, were infected with an approximately equal dose of R1 strain of tubercle bacilli. Twelve normal animals were also infected as controls. Both these groups were set aside in the general animal room and allowed to live as long as they would.

Of the forty guineapigs infected and then placed in the dusting chamber, thirty-one were dead at the time of writing (seven were killed and the remainder died of various causes). In ten animals some evidence of the spread of the tuberculous process was observed (six involving the lungs and four the abdominal viscera in addition). Pulmonary cavitation developed in four animals. In all the animals the lesions tended to be fibrous rather than exudative in type. Of the twenty-three controls twenty were dead at the time of writing, one dying, after 595 days, of generalized chronic tuberculosis, and the remaining nineteen succumbing for other reasons (pneumonia, etc.). By the 244th day the tuberculous lesions in the lungs had healed to such an extent that all evidence of caseation had disappeared (with the exception of the case noted above).

The distribution of the primary tuberculous foci in the lungs of the asbestos group of animals was somewhat atypical. Many of the primary tubercles were independent of foci of dust reaction and the normal process of resolution took place in them. Other foci were related to dust areas around respiratory bronchioles and in such cases a much more marked reaction than that produced by either asbestos or tubercle alone resulted. In some instances there was merely an interference with the usual process of resolution so that excessive fibrosis and calcification resulted. In other cases there appeared to be definite spread of the tuberculous process.

Of the small group of twelve guineapigs infected after two years' exposure, six died and three were killed. Three of those dying presented an acute non-tuberculous pneumonia and two an acute haemorrhagic pleural effusion. In the others the majority of the tubercles occurred in areas where dust reaction had already been established. The infectious process appeared to exercise a very noticeable effect upon the action of the dust. In all but one the amount of fibrous tissue about the respiratory bronchioles was much more marked than in the non-tuberculous animals. The development of caseation in an area of reaction containing asbestosis bodies led ultimately to destruction of the bodies. They lost their golden-yellow colour, failed to give a Prussian blue reaction and apparently became so disintegrated that not even a supporting fibre remained.

The writers showed that the outer coating of the asbestosis body contains both iron and magnesium and conclude that the asbestosis body therefore is a derivative of the crystalline asbestosis fibre which has been oxidized and hydrolysed to its well known golden-yellow amorphous structure.

In man and in the guineapig the lungs appear to furnish the most favourable environment for the development of the asbestosis body. Practically no asbestosis bodies were found in the lungs of rabbits and albino rats, and in subcutaneous tissues the period of incubation was nearly twice as long as that required in the lung. That the long continued inhalation of asbestos dust is responsible for the pulmonary fibrosis found, the authors now regard as unquestioned. It still remains to be demonstrated whether the dissolved substance is the factor responsible for the multiplication of fibroblasts in pneumoconiosis. If after the proper period of exposure typical asbestosis bodies should still be found to be lacking in the rabbit and if fibrosis should likewise fail to develop, it seems to be logical to the authors to conclude that fibroblasts are not stimulated because no solution of the dust has occurred.

S. Roodhouse Gloyne.

KRÜGER, Elisabeth, ROSTOSKI & SAUPE. Ueber Lungenasbestose. [Pulmonary Asbestosis.] *Arch. f. Gewerbepath. u. Gewerbehyg.* Berlin, 1931, v. 2, 558-90, 8 figs. [13 refs.]

After an exhaustive survey of the work on pulmonary asbestosis in other countries the authors give an account of the work done in Germany together with a short record of cases of the disease which have come under their own observation in Dresden.

The first record in Germany was a demonstration by FAHM to the Medical Society of Hamburg in 1911 of specimens and photomicrographs of a case of pneumoconiosis in an asbestos worker. FAHM mentioned the occurrence of a large number of crystals in the lung but did not describe them more closely. He stated, however, that they had been seen by MAYERHOF and RIESEN in 1906, who had speculated as to whether they were due to the inhalation of

asbestos dust or were a haemoglobin derivative. In 1931 BÜTNER-WONST and THILLITZSCH described nine cases occurring in two asbestos factories near Dresden. Meanwhile the authors of the present paper had begun to collect cases. They have now examined fifty-two (eighteen male and thirty-four female) workers, of whom thirty showed definite lung changes. A short analysis of the history of these cases is given. The longest exposure to the dust was thirty-one years in a worker aged 60.

The commonest initial complaint was dyspnoea. Cough occurred in forty-three cases. Night sweats were recorded in twelve cases. Abdominal complaints were rare but loss of weight in the late stages was found in fifteen instances with rheumatic pains, headache and general nervous symptoms. Amongst the thirty-four female cases abortions were recorded in ten. Conjunctivitis was found in sixteen. Pharyngeal symptoms were not infrequent. Enlargement of the thyroid was seen on six occasions, with definite Basedow symptoms in five. There were four cases of kyphosis and four of scoliosis.

The pulmonary signs were as follows. The respiratory excursion was diminished. In sixteen cases there were alterations in percussion note and auscultation at the apex, whilst in the rest diminished breath sounds with fine râles, etc., were more marked in the lower lobes. In some cases there was also evidence of pleural thickening. Sputum was present in twenty-eight, twelve showing asbestos fibres and eight asbestosis bodies; there was no blood, and no tubercle bacilli or elastic fibres could be found. Cardiac enlargement was noted in three instances, one case displayed an aortic systolic bruit and six a mitral bruit, but they were apparently compensated lesions. The blood pressure was never below 100 and in eight cases was between 150 and 170 mm. The haemoglobin in two cases fell to 60-70 per cent, and in fourteen others was between 70 and 80 per cent. Clubbing of the fingers was only noted once. The urine was frequently alkaline or neutral (twenty instances); traces of albumen were noted in eighteen cases. A strong urobilinogen reaction (red coloration with benzaldehyde in the cold) was obtained.

For X-ray films the following exposure data are given—focus-film distance 1.50 m., 300 mA., 45 kV., 0.05 to 0.08 sec. Especial emphasis is laid on the importance of short exposure. Three stages in the development of the radiological picture are defined—(1) an increase of the normal lung striation with the appearance of a fine network often difficult to determine except by a long series of films; (2) a thicker network with delicate sharply defined spots of opacity ("Fleckenschatten"); (3) an intensification of this network to form a shadowy veil covering the lung. The signs begin to appear and are most marked in the mid zone and lower lobe areas of the radiological picture. The contour of the heart shadow became ill-defined in the second stage. The root shadows were not affected in this stage but showed enlargement in the third stage. The infraclavicular areas remained clear and there was no "snowstorm" appearance such as characterizes the typical silico-sis film. In six cases signs of obsolete tuberculosis were recognized (primary complex). Tuberculous foci were generally thicker than asbestosis foci and more easily distinguished than in other forms of pneumoconiosis. Signs of old pleurisy were frequent.

Four short statistical tables are given showing the relationship of the asbestosis to the period of exposure, type of work, etc. The general conclusion is that moderately severe asbestosis takes some five years to develop. Of the workers examined who had had ten years or more exposure none were free from signs of the disease. In correlating their findings with the different types of work in the two asbestos factories concerned the authors point out that the numbers are too small for very definite conclusions to be drawn. The four most advanced cases were found in the spinning and twining (Zwirnerel) sections. A summary of fifteen cases classified into Stages I, II and III of the disease is given (see X-ray findings). Several radiograms are reproduced.

(BÜTTNER-WOBST and TRILLITZSCH's article referred to above appeared in January last (BÜTTNER-WOBST, W. & TRILLITZSCH, O. Die Bergflachslunge (Asbestosis) und was der deutsche Arzt von ihr wissen muss. *Die Tuberkulose*, 1931, January, 11.). The authors give an account of eight cases from a factory near Dresden. They found that the histories of these cases point to a definite association between asbestosis and tuberculosis. The diagnosis was made on radiological appearances and a history of exposure to asbestos dust. No search for asbestosis bodies was made, the authors believing that their presence proves no more than the fact of exposure to asbestos dust. With regard to the X-ray picture, in the early stages the authors found circumscribed patches about the size of a millet seed and in later stages confluent shadowing of the lower lobe. In their opinion asbestosis is a type of silicosis whose particular characteristics are due almost entirely to the chemical composition and to the shape of the particles of the asbestos dust. From their observations they conclude that if the disease is recognized in time and the patient is removed from the factory, the symptoms may subside, but sanatorium and other treatment would appear to have no effect. They suggest that all those who wish to enter an asbestos factory should be examined before beginning, and if at work should be radiologically examined on the appearance of catarrh or shortness of breath.]

S. Roodhouse Gloyne.

BEINTRER, E. Die Asbestosis der Lungen. [Pulmonary Asbestosis.] *Arch. f. Gewerbepath. u. Gewerbehyg.* Berlin. 1931, v. 2, 345-58, 10 figs.

The author records two cases, with post-mortem examination, of pulmonary asbestosis occurring in a factory concerned with the crushing, cleansing and spinning of asbestos and the manufacture of insulation materials.

The first had been exposed to asbestos dust from 1902-22, and from 1922, when symptoms first appeared, until his death in 1929 as a porter. On X-ray examination the heart shadow was increased and one of the lung roots showed enlargement. The lung itself showed diffuse shadowing with small nodules scattered over the whole of the lung. The second case was a woman who had been employed in the left lower lobe. The patient died

of heart failure. Histological examination of the lung showed increase of connective tissue with extensive inflammation of the lung together with asbestosis bodies.

The exposure in the second case began in 1900. There was a long period of dyspnoea and the patient finally died of heart failure. The X-ray appearances were chiefly confined to the lower lobes.

In discussing the formation of the asbestosis bodies, the author is in agreement with the general opinion that they are formed from the asbestos fibre *in situ* in the body tissues, probably as the result of a biochemical action with silica contained in the raw material. He attributes the diffuse character of the X-ray shadowing to the fact that the asbestos fibres penetrate impartially throughout the lung tissue and are not aggregated together as they are in the other forms of silicosis. He believes that the asbestos loses its magnesium portion in the tissues and that pure SiO_2 remains, which stimulates the formation of connective tissue.

In conclusion, the author notes that asbestosis of the lung differs from silicosis in its radiological picture as well as in anatomical findings in that the connective tissue increase is very diffusely distributed. It is arranged in nodules in silicosis, whereas in asbestosis it is distributed diffusely throughout the lung. The actual morbid anatomy picture appears to depend upon the distribution of the asbestos fibres in the lung tissue, and it is assumed that the asbestos fibres which gain access to the tissues probably do not begin their development into bodies until they reach the tissues. They are apparently the accumulation of the silica-containing material. The author believes that the X-ray picture in all types of silicosis, including asbestosis, depends not so much on the quantity of the thickened tissues as its distribution in the lung. Diffuse distribution does not give the same intensity of shadow to the radiological picture as does the nodular distribution. He suggests that the fibrosis of the lung tissue develops, in asbestosis, through the breaking down of the material of the asbestos fibres into SiO_2 .

S. Roodhouse Gloyne.

WOOD, W. B. & GLOYNE, S. R. Pulmonary Asbestosis complicated by Pulmonary Tuberculosis. *Lancet*. 1931, Oct. 31, 951-6. [5 refs.]

In this article the authors give some account of a series of fifty-seven cases of pulmonary asbestosis, with special reference to those complicated by pulmonary tuberculosis. Twelve out of these fifty-seven showed evidence of pulmonary tuberculosis (two adolescent, and ten active). Four of the twelve had died and at post-mortem examination evidence of adolescent tuberculosis was found in two and of active tuberculosis in the other two. Of the non-fatal cases, seven had tubercle bacilli in the sputum and the eighth had a well-marked apical cavity. Clinically, the ten active cases were classified as follows: generalized tuberculosis as a terminal event (one female); acute phthisis (two females); extensive subclavicular

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infiltration of a less acute type (two females); chronic fibroid phthisis (four females, one male). The total number of females with pulmonary asbestosis was thirty-nine, nine of whom had active tuberculosis; the total number of males was eighteen, of whom only one had active tuberculosis.

With regard to the length of exposure to asbestos dust, of the nine females with active tuberculosis, one had worked for three months picking up bobbins where she was not exposed to dust, then she had discontinued work for eighteen months, and returned for a further three months to spinning and weaving. One had had fifteen months' exposure and the remaining seven periods varying from four to thirteen years. The male patient had had seven years' exposure.

The authors suggest that since eight of the total thirty-nine cases of females with pulmonary asbestosis were young girls between the ages of eighteen and twenty-one, and since it is well known that adolescent and young adult females are specially susceptible to pulmonary tuberculosis, any occupation which exposes the lungs to risk of damage at this period of life is undesirable. They further suggest that there seems to be a case for excluding them whenever possible from the industry. [Draft Regulations have now been issued by the Home Office excluding "young persons" (i.e. those under 18 years of age) from the industry.]

S. Roodhouse Gloyne.

GERBIS & UCKO. Ueber Asbestosis der Lungen. [Pulmonary Asbestosis.] *Deut. Med. Woch.* 1932, v. 58, 285-7.

The authors have examined thirty-three asbestos workers in the Deutschen Asbestwerken A.-G., of whom eighteen were females and fifteen males, between the ages of 20 and 65. Only two of these workers had been employed for more than fifteen years, viz. one woman for seventeen years and one man for thirty-two years. A table is given showing the age, number of years employed in the asbestos factory, and the stage of the disease in these thirty-three workers. The workers examined were those who were specially exposed to the dust or those who complained of symptoms.

Nearly all the patients examined showed symptoms which might be expected of such a lung disease, e.g. cough and sputum, dyspnoea, especially on exertion or in foggy weather, sixteen complained of lack of appetite, ten had loss of weight, five had pain on breathing, five had palpitation, others complained of faintness and of increasing pallor. Cough occurred in twenty-three cases. The sputum was tenacious, scanty, generally mucoid and occasionally mucopurulent.

Previous history included pulmonary catarrh in four cases, pleurisy in two, and in one case peritoneal tuberculosis. In only one (a female) was there any family history of tuberculosis and the authors state that they can trace no close connexion between asbestosis and tuberculosis.

The general condition of the patients was poor. Clinically in ten cases percussion and auscultation of the lungs gave no significant findings. In the remainder there were signs of bronchitis, frequently with peculiar, coarse, indeterminate breath sounds. The X-ray picture showed in thirteen cases no definite changes attributable to asbestosis although six of them had bronchitis. In three cases well-marked X-ray changes were present without clinical signs on auscultation and percussion. The well-recognized X-ray picture of silicosis with the "snowstorm" effect or tumour-like shadowing was not seen. In one patient, at the right base, near the asbestotic changes, were nodules. This man, had, however, worked in a weaving factory where he was exposed to the dust of kieselguhr as well as asbestos, so that a mixture of silicosis and asbestosis was present. In the early cases there was an increase of the fine reticulation of the lung with fine mottling. In the second stage this reticulated appearance was thicker, and showed numerous diffuse mottled shadows in which the bronchial branching appeared to stand behind the network. In this stage the characteristics of the asbestosis were already clearly recognized. They were present mainly in the lower part of the lung fields. There were very rarely important changes in the hilum of the lung. Diaphragmatic changes take place early and in the peripheral outer parts and in the centre. In the early stages fine mottling was present, such as is not seen for example in bronchitis and bronchiectasis. In the third stage the different findings were very marked. A cloudy veil occurred with a white faded-looking mottling. In the most advanced stage the shadows appeared moderately dense. Shadows due to calcification the authors do not regard as part of the picture of asbestosis. The authors confirmed in a few cases the findings of the Dresden workers, i.e. that in advanced cases it was no longer possible to differentiate clearly between the cardiac and diaphragmatic margins.

With regard to age, the severity of the disease did not appear to be dependent on the age of the worker, but, on the contrary, on the "employment age" (i.e. the number of years the workers have been in the factory), and on the amount of asbestos dust inhaled, which varies considerably in different processes. The authors found that in every instance where a patient had been working for more than ten years, asbestosis could be demonstrated radiologically. Personal disposition also appeared to play a part in the production of the changes.

Of diagnostic importance was the finding of asbestosis bodies in sputum, in lung puncture fluid, or post-mortem in material from the cut surface of the lung or in sections of the tissue. The authors quote the views of BEINTEKER and TRIMMELMANS to the effect that the bodies arise through the deposition, due to the solution of the asbestos, of a colloidal form of liberated silicic acid on the central core of the asbestos fibre. With potassium ferrocyanide and dilute hydrochloric acid the bodies give the Prussian blue reaction.

The marked discrepancy between the clinical

appearances and symptoms on the one hand, and the X-ray picture on the other, the authors regard as a characteristic peculiar to asbestosis. Even in the most severe cases asbestosis did not give as marked a picture as that of silicosis; indeed in the third stage of asbestosis there was present only a degree of shadowing which in silicosis would have little clinical significance.

It is probable that in asbestosis the silicic acid acts as a chemical irritant which leads to fibrosis. It has been demonstrated that connective tissue is especially sensitive to the action of silicic acid and it is suggested that when the silicates of the asbestos are dissolved in the lung tissue, silicic acid is liberated; the latter is then taken up by the connective tissue and stimulates increased growth. This absorption may possibly be further promoted when more strain is put on the tissue by the act of respiration; probably herein lies the explanation of the fact that parts of the lung are specially affected. With regard to the severity of the disease the authors assume that a constitutional factor is important, (Keloidosis, cf. SCHMIDT [this *Bulletin*, 1929, v. 4, 1039]), and believe that on some factor of this kind the extension of the disease is dependent.

The authors think that the statement that asbestosis is formed on the soil of a tuberculous infection is contradicted by the facts. It is well recognized that the asbestosis patient has an increased sensitiveness to acute inflammation of the lung and bronchopneumonia, which fact gives rise to a bad prognosis. In conclusion, they summarize their findings by the statement that asbestosis is a serious specific occupational disease which is well differentiated from other illnesses and which is easily diagnosable by consideration of the occupational history. Radiologically asbestosis shows a widespread uniformity with changes which KOELSCH and LUDERER have found in plate glass grinders. The X-ray appearances produced by asbestosis as well as those of diseases produced by glass dust may be distinguished from silicosis by the term "silicatosis."

S. Roodhouse Gloyne.

GLOYNE, S. R. The Asbestosis Body. *Lancet*, 1932, June 25, 1351-6, 74-75. [23 refs.]

During the past two or three years observations on the asbestosis body have been published with such frequency that it is very difficult to keep track of them all. In this article the author has endeavoured to bring together, as far as possible, all the work from different sources and at the same time to add such facts as have come under his personal observation. The first accounts of the asbestosis body were given by COOKE and HILL and by STUART McDONALD in 1927 [this *Bulletin*, 1928, v. 3, 228] though there is evidence that the bodies may have been seen by MARQUAND and RUSSELL in 1901 and FAIR in 1911 in their demonstrations of pneumoconiosis occurring in asbestos workers. Diversity in shape makes it

impossible to write an adequate description of all forms of the asbestosis body. The following is a brief summary—Marked variation in length (21-60 μ) and breadth (12-21 μ); golden-yellow colour; homogeneous structure when viewed by ordinary transmitted light (by cutting down the light a suggestion of a central fibre can often be seen which may also sometimes be seen projecting beyond the body); no differentiation with polarized light; tendency to be arranged in irregular clumps and clusters; very early forms unsegmented; later forms crenated, segmented, or resembling a series of oval discs, or beads strung together in a necklace form (sometimes, later, a short length of fibre is seen between the segments); bulbous or pointed extremities (or one bulbous and one pointed suggesting "heads and tails"); generally quite straight, occasionally curved, very rarely S-shaped; forms seen "end-on" look like knobs.

STEWART and HADDOW [this *Bulletin*, 1930, v. 5, 217] first found the bodies in sputum by digesting with an equal quantity of undiluted antiformin, centrifuging, washing the deposit, and examining a dried film. In sections they stand out well unstained against the stained background of haematoxylin and eosin, but they are really best seen in an unstained section. On one occasion the author found asbestosis bodies in the faeces by emulsifying with formolsaline, centrifuging and examining the deposit. The bodies do not stain with the ordinary aniline dyes. COOKE and HILL and STUART McDONALD, in their original descriptions, noted that the bodies could be stained by means of the Prussian blue reaction. The author describes a method of staining with ammonium sulphide.

No asbestosis bodies have been found in crude asbestos or in asbestos dust, and it seems practically certain that they are only produced when the fibres gain access to living tissues and remain there for a considerable period of time. The asbestos fibre which forms the central core of the bodies was identified by the author by dissolving the bodies in concentrated sulphuric acid. GARDNER and CUMMINGS [this *Bulletin*, 1931, v. 6, 602] showed that the golden-yellow material which covers the fibre contained iron; SIMSON and STRACHAN [this *Bulletin*, 1931, v. 6, 405] and the author have confirmed this. The asbestosis body would appear, therefore, to be formed from the original fibre by a process of (1) deposition of some material around the fibre so as to thicken it; (2) fissure or cracking of this material giving rise to the appearance of segments; (3) fragmentation or the separating off from the asbestosis body of fractured portions of the deposited material.

The bodies resist artificial gastric juice, trypsin, and autolysis for a considerable period. Gardner and Cummings noted that caseation led ultimately to the destruction of the bodies. They resist heat, and decalcifying fluid which contains 7½ per cent of nitric acid. Concentrated sulphuric acid leaves only a mere semblance of a globular body with a central fibre. Hydrochloric acid has the effect of bleaching the bodies; the yellow colour is taken out almost

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immediately leaving a colourless skeleton of the body, suggestive of a minute hyaline urinary cast. Sometimes the body becomes swollen and the segmentation is lost; at others the segments seem to remain intact. The effect of hydrochloric acid is interesting in that the golden-yellow colour is discharged but the ghost-like structure of the body remains. The inference here would appear to be that the body consists of at least two portions surrounding the fibre—viz. a resistant material which forms a framework and gives the body the characteristic shape, and a golden-yellow pigment which is readily bleached. Nitric acid has less effect; glacial acetic acid appears to have no effect and the bodies also resist 20 per cent caustic soda. Gardner and Cummings have succeeded in preparing bodies superficially resembling asbestosis bodies *in vitro*.

From the presence of the asbestosis body in the sputum certain deductions can be made—(1) their presence is an indication of exposure to asbestos dust; (2) their formation is the result of some tissue reaction in the body—probably a colloidal reaction in which the iron plays a part; (3) asbestosis bodies have been found in the guineapig (MAYROGORDATA, Stewart, Gardner and Cummings, Gloyne); (4) the presence of the asbestosis body implies a tissue reaction to the fibre, but it does not necessarily follow that this reaction is accompanied by fibrosis: all that can be said at present is that the asbestosis body is an expression of tissue reaction to a benign irritant, and that fibrosis of an appreciable extent may or may not be a part of that tissue reaction.

The bodies are not easily produced in the subcutaneous tissues of animals. They have not been found in the skin of man or animals. Gardner and Cummings record that the lung of the rabbit apparently offers a much less favourable environment for the production of the bodies than does the lung of man and of the guineapig. SCHUSTER has found the bodies in a dog, and Gardner and Cummings and the author in rats.

S. Roodhouse Gloyne.

STEWART, M. J., TATTERSALL, N. & HADDOW, A. C.
On the Occurrence of Clumps of Asbestosis Bodies in the Sputum of Asbestos Workers. *J. Path. & Bact.* 1932, v. 35, 737-41, 3 figs. on 1 pl. [10 refs.]

The authors describe two cases in which, in addition to single asbestosis bodies, a large clump of some twenty to thirty bodies, more or less radially arranged with their bulbous extremities outwards, were found. The appearance of the clumps was similar to what is seen in histological sections of the lung in cases of pulmonary asbestosis, where clumps of bodies occur either within the lung alveoli or embedded in fibrous tissue.

The authors suggest that the finding of a large clump or clumps of asbestosis bodies in the sputum is a clear indication of disintegration of lung tissue, whether by a process of simple suppurative broncho-

pneumonia, or as a result of secondary tuberculous infection. They believe that the fact that the sputum is rather roughly treated may account for the rarity of these clumps; on the other hand they have never found broken up portions which might be expected to result from rough treatment. The radial arrangement of the bodies with the bulbous extremities at the periphery, identical with that of the majority of the clumps in lung sections, shows, the authors consider, that such clumps are not artefacts but formations built up *in situ* within the lung alveolus from which they can only escape as a result of some secondary disintegrative process.

The authors conclude that since these clumps, which are only rarely encountered, point to disintegration of lung tissue their presence in sputum is of far greater significance than the finding of single bodies.

S. Roodhouse Gloyne.

GLOYNE, S. R. The Morbid Anatomy and Histology of Asbestosis. *Tubercle*. 1933, v. 14, 445-51; 493-7; 550-58, 7 pls. (1 coloured). [29 refs.]

The author emphasizes the following points in considering the morbid anatomy of asbestosis—(1) the differences in structure and chemical composition between the different varieties of the asbestos used in commerce, and the possibility of different types of lesion occurring in workers in the various kinds of asbestos; (2) the variation of conditions in the asbestos industry, which means that some workers undergo rapid exposure to massive doses, and others slow and gradual exposure to small doses; (3) lack of uniformity among operatives, the workers varying from strong, able-bodied Europeans and natives in Africa, negroes in America to adolescents of both sexes. (It should be noted that in Great Britain "young persons" under the age of 18 may not now be employed in the industry); (4) asbestos is a mixed substance and it is not known to which part of it the various tissue reactions should be attributed. The proportion of particulate to fibrous matter varies, whilst ferrous iron may constitute as much as 10 per cent of the product as it occurs in nature; (5) In some of the workers a history of exposure to asbestos is an inconspicuous event, often unrecognized even, and the lesions are only detected by accident; (6) the size, weight, concentration in the atmosphere and the shape of the inhaled particles may have some bearing on the lesion; (7) the asbestos worker is prone to other respiratory diseases which may confuse the anatomical picture, viz.: pulmonary tuberculosis, broncho-pneumonia and septic bronchitis.

The result of dust inhalation in pulmonary asbestosis is different from that seen in other dust diseases owing to the peculiar long needle-like shape of the asbestos particles. The fibrosis is diffuse and the nodules characteristic of silicosis are not seen. In the pleura the disease is marked by the obliterative nature of the process, pleural thickening being com-

The lung of the uncomplicated case (as seen post-mortem) is characterized by dense blue-black areas corresponding to the secondary lobules, surrounded by thick bands of interlobular connective tissue, generally with a reddened background of terminal broncho-pneumonia in the less affected portions of the lung. There are few naked-eye changes in other organs.

Five different kinds of particles are to be seen in the lung of an asbestosis case—(1) carbon pigment, common to all town dwellers, particularly in large quantities in the regional drainage glands where the asbestos dust is usually scanty; (2) an amorphous brown pigment lying around the asbestos fibres and asbestosis bodies. There is some evidence that this is blood pigment; (3) black irregular particles, probably carbonaceous in nature; (4) asbestos fibres; (5) asbestosis bodies. When the fibre gains access to the lung three reactions take place: (1) the fibre becomes thickened owing to the deposition of iron containing material along its course, forming an asbestosis body; (2) cellular changes occur of which the chief are the accumulation of large phagocytic dust cells and asbestosis giant cells; (3) fibrous tissue formation. The asbestosis giant cells are foreign-body giant cells and probably result from partial degeneration of small collections of phagocytes and are not single cells in the true sense of the word. Sometimes faint outlines of the degenerated phagocytes can be seen. When seen in early lesions in the guinea-pig the cytoplasm has a pigmented stippled appearance due to the presence of numerous minute asbestos fibres and pigment; in this way it differs from the almost structureless tuberculosis giant cell. It also differs in the fact that the nuclei of the asbestosis giant cells are large and not so numerous and are not so constantly arranged round the periphery of the cytoplasm. The immobilization and long persistence of the phagocytes, and especially the asbestosis giant cells, are characteristic of the disease.

The most marked feature in the histology of the asbestosis lung is the holding up of the fibre at the distal end of the respiratory bronchiole, and in the alveolar ducts with a cellular reaction of large mononuclear phagocytes, and the occurrence of asbestosis giant cells. In the later stages of the disease the blockage of the lymphatics with asbestos dust and phagocytes, and the filling up of the adjacent air sacs with the same material is seen. Finally there follows an increase of connective tissue around the bronchioles, alveolar ducts, air sacs, capillaries and venules, and in the interlobular septa and beneath the pleura. These changes eventually result in a complete obliteration of all lung configuration.

The lesions found in experimental animals are described. In the case of a dog (recorded by SCHUSTER) acquiring asbestosis in a factory no asbestosis bodies were found and although there was evidence of phagocytosis there was no sign of acute inflammation. In the case of rats caught on factory premises asbestos fibres were plentiful but the cellular reaction was insignificant and only one or two asbestosis bodies were found.

The complications and sequelae of pulmonary asbestosis may be divided into two groups, viz.: those which are definite results of the damage done to the lung by the asbestos fibre with its resulting fibrous reaction, and those which appear, as far as

can be determined with present knowledge, to be incidental and unrelated to the disease. In the former group the following have been noted—purulent bronchitis, broncho-pneumonia, pulmonary tuberculosis, empyema, and bronchiectasis; in the latter—abdominal carcinoma, mitral stenosis, cerebral haemorrhage and cholelithiasis. Pulmonary tuberculosis and broncho-pneumonia are common complications of the disease. Broncho-pneumonia is best seen in the parts of the lung least affected with the asbestosis, which explains why broncho-pneumonia is such a fatal disease in asbestosis, viz.: it puts out of action the functioning portions of the lung.

[An account of the clinical and radiological appearances, etc., of pulmonary asbestosis has recently been written by Philip ELLMAN, *J. Indust. Hyg.* 1933, v. 15, 165-83.]

S. Roodhouse Gloyne.

MEREWETHER, E. R. A. A Memorandum on Asbestosis. *Tubercle*. 1933 & 1934, v. 15, 69-81; 109-18; 152-9. [48 refs.]

This memorandum reviews the subject of asbestosis in the light of all the recent knowledge obtained concerning the disease. The first serious attempts to employ commercially the fire-resisting properties of asbestos were made in the latter part of the nineteenth century, but some years elapsed before difficulties in manufacture were overcome. In 1880 the world production of asbestos was a little over 500 t.; in 1929 it had reached over 430,000 t. The fibrous materials commercially known as asbestos are silicates, the silica being combined with metallic bases, chiefly of magnesium or iron, with calcium, sodium and aluminium in smaller amounts. Practically speaking all that goes under the name asbestos in commerce is either fibrous serpentine or a fibrous mineral of the hornblende group, of which the most important are crocidolite, amosite and tremolite. Serpentine asbestos or chrysotile is essentially a hydrated silicate of magnesium containing little iron and almost no calcium. The hornblende varieties contain less magnesium and usually more calcium, aluminium and iron. New uses for asbestos are constantly being found; for example, the phenomenal expansion of the motor-car industry has caused an increased demand for asbestos for brake linings, clutch rings, etc. It is estimated that the number of workers employed in the manufacturing processes in England lies between two and three thousand.

The first recorded case of asbestosis was that of a patient who died in 1900, the record of the case being included in the evidence of Dr. Montague MURRAY to the Departmental Committee on Compensation for Industrial Diseases in 1906. No evidence of additional cases was obtained, but in the same year MARCHAND & RUSSEL noted the presence of unusual bodies in the lungs of an asbestos worker and, again in the same year, the French official *Bulletin de l'Inspection du Travail* reported on the high mortality in an asbestos textile factory and

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considered it as probably due to a pneumoconiosis from the asbestos dust. In 1910, following another death, the British Factory Department made a survey of the industry which did not disclose any evidence of a serious health-hazard, nor were the replies to inquiries made to the Canadian Government suggestive of the existence of such a condition amongst the workers in the quarries and mills. In 1912 some experimental work by BEATTIE indicated that the inhalation of asbestos dust would cause a mild degree of fibrosis in animals. In 1914 FAHR demonstrated to the Medical Society of Hamburg the lungs of an asbestos worker with pneumoconiosis and mentioned the occurrence of a large number of crystals in the lungs but did not describe them more closely. In 1917 the British Factory Department again considered the matter, but no further evidence incriminating asbestos had come to light, and it was not until 1924 that another death revealed at the autopsy evidence of pulmonary fibrosis of a diffuse nature, which was attributed to the effects of asbestos dust. This case was fully described by COOKE, STUART McDONALD & HILL. A few weeks later another case was described by SEILER. This was important as being the first in which the essential relationship between inhalation of asbestos dust and the development of pulmonary fibrosis could be demonstrated. A comprehensive inquiry was therefore instituted in Great Britain and the investigation involved the clinical examination of 363 workers. The results of this inquiry were published in 1930 by the author. (See the abstract of this at page 117.)

Pulmonary asbestosis is insidious in its onset, irregular in its course, and variable in its mode of termination. The fibrosis produced is of a fine reticular variety which is contrasted with that of silicosis. The fatal issue is determined by the onset of some acute infection with which the remaining undamaged lung tissue is quite unable to cope. This is commonly a low grade broncho-pneumonia, bronchitis or tuberculosis. In the absence of intercurrent infection the fibrosis may progress to an extreme degree and bronchiectasis, non-tubercular cavitation and spontaneous pneumothorax may occur. Intermittent attacks of dry pleurisy are common.

With regard to clinical signs, the most important is that of diffuse bilateral impairment of the percussion note; this is best elicited by the back of the chest. The commonest symptom is undue shortness of breath. In common with other forms of pneumoconiosis the diagnosis of the disease is fraught with difficulty. Radiographic examination of the chest is invaluable. The picture is that of a diffuse ground glass appearance or veining, together with fine pin-head mottling of the film. The author believes that asbestosis cannot be diagnosed with absolute certainty, however, either on clinical or radiological examination alone, but that with the aid of both diagnosis is possible.

The asbestosis bodies found in the lungs have now been described by numerous workers. They have a central core which consists of the asbestos fibre. As they are not present in the raw material these bodies are evidently produced in the tissues but unfortunately

their presence does not give any clue as to whether the exposure has been recent or long past.

Within certain high and low limits the concentration of asbestos dust in the air of workrooms is the determining factor in the onset of disease. The asbestos fibres may be split longitudinally apparently to an indefinite degree since no ultimate fibre comparable to the vegetable fibre has yet been demonstrated. Any manipulation of asbestos, therefore, is liable to produce dust which is easily projected into the air. Exposure to asbestos for less than five years can result in the development of fibrosis sufficient to cause death but this is unusual. The incidence rates for the period of employment naught to four years, five to nine years, ten to nineteen years and twenty years and over found from examination of 1,512 workers were proportionate to the figures, 1, 5.6, 30.8, and 53.2. Unfortunately it cannot be assumed that provided the exposure does not exceed five years the risk of contracting asbestosis is almost negligible. The fact that a dense concentration of asbestos dust over a comparatively short period will lead to fibrosis has to be recognized.

The author answers in the affirmative the question—Does asbestosis shorten life? and gives a series of tables emphasizing this. These tables show that the average duration of employment sufficient to cause a fatal degree of asbestosis was 15.2 years. The shortest length of exposure was 4.4 years. Tuberculosis was found accompanying asbestosis in 35.7 per cent of deaths, as compared with 59.4 for silicosis.

Inquiry into the relative dustiness of various processes in the asbestos industry enabled the author to classify the operations into six groups—(1) crushing, opening, disintegrating and mixing; (2) carding; (3) spinning, twisting, doubling, plaiting, etc.; (4) insulating mattress making; (5) weaving and associated processes; (6) miscellaneous. The groups of processes differ in their average levels of dust production, that of group (3) being easily the lowest in the absence of any dust suppression devices. A table is given showing how much more serious is the risk in the more dusty processes.

With regard to the risk from tuberculosis, the available data are meagre owing to the comparatively small population at risk. BURTON WOOD & GLOYNE'S figures of ten cases of active tuberculosis in fifty-seven cases of asbestosis probably represent a maximum. Of 371 workers examined whilst actually at work only four showed signs of active tuberculosis. On post-mortem examination it is possible to divide the cases into three groups: (1) those with rapid tuberculosis and very slight or no signs of asbestosis; (2) those with much fibrosis due to both diseases; (3) those with advanced asbestosis and slight amount of active tuberculosis. Of these groups (1) probably contains most of the cases of the adolescent type. The experimental work of GARDNER & CUMMINGS indicates that coincident inhalation of asbestos dust does not affect the ultimate healing of lesions produced by a tuberculous infection of low virulence. On this hypothesis the author suggests that it may be reasonable to dismiss the whole of the deaths in group (1)

In addition to preventive measures compensation of industries is awarded under the Workmen's Compensation Act, 1923, extended by the Workmen's Compensation Schemes and Act, 1948, Act, 1949.

What, then, is the outlook for the future? The author tentatively accepts for practical purposes as a safe criterion of dust concentration the "dust datum level," which is defined by the Joint Committee mentioned above, as "the conditions arising from flyer spinning carried on without exhaust under good general conditions." If a particular process appears to give rise to dust in excess of that associated with such flyer spinning the need for preventive measures is regarded as established. If dust in the more dusty processes can be suppressed to this general level and the standard continuously maintained, the author considers the outlook bright. Some years hence

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elapse, however, before the cases representing the accumulated risk disappear from the industry. The goal is not the prevention of minimal and microscopical effects of asbestos dust which must occur however slight the exposure, but the abolition of the risk from the development of diffuse fibrosis and of any residual added risk from tuberculous infection. In grappling with this problem the asbestos industry starts with considerable tactical advantages. The control is finite as compared with the control of silicosis and the leading manufacturers have already made remarkable progress.

S. Roodhouse Gloyne.

WOOD, W. B. & GLOYNE, S. R. Pulmonary Asbestosis. A Review of 100 Cases. *Lancet*. 1931, Dec. 22, 1383-5.

The authors give an analysis of 100 cases of pulmonary asbestosis seen at Vic Park Hospital since 1928. The cases are divided into four chief groups—(1) *Pulmonary Asbestosis*: fifty-three cases (nineteen males, thirty-four females), twelve deaths (four males, eight females), including two with carcinoma of the lung and one with a few deposits of growth in the pleura. In the cases still alive and under observation diagnosis rested upon (a) typical appearances of the radiogram, (b) symptoms and physical signs of fibrosis, and (c) presence of asbestosis bodies in the sputum. These three diagnostic points are arranged in order of merit. (2) *Pulmonary Asbestosis with Active Tuberculosis*: twenty-one cases (four males, seventeen females); of these eleven were fatal (three males, eight females). Of the ten patients still alive, all had tubercle bacilli and asbestosis bodies in the sputum. (3) *Pulmonary Asbestosis with Obsolescent Tuberculosis*: nine cases (four males, five females). This group emphasizes the fact that obsolescent tuberculosis is not necessarily reactivated by asbestosis. Three cases (one male, two females) were fatal. (4) *Doubtful Cases*: seventeen cases (six males, eleven females) under observation. All but one had suggestive symptoms and signs but the radiograms were indeterminate, and with two exceptions the sputum, where available, contained no asbestosis bodies. Of the two exceptions, both have asbestosis bodies in the sputum, but one has indefinite symptoms, signs of emphysema and a negative radiogram and the other has no physical signs or symptoms and a negative radiogram.

With regard to the clinical picture, the symptoms are those of stubborn cough with little expectoration, discomfort or dull pain in the chest, and dyspnoea. The last named is so great that the disease might almost be described as monosymptomatic. Malnutrition is very evident in the terminal months when the patient may pass into a condition of extreme cachexia. The physical signs are those of a broad fibrosis with dry crackles heard over the fibrotic areas, not confined to those often heard over the bases of the lungs. In advanced cases the character of the crackles and a slight

The radiological picture is that of a fibrosis of fine type affecting the lower two-thirds of the lung fields, the scarring, as it were, being etched in. The exact diagnostic significance of the asbestosis bodies in the sputum is still regarded as doubtful. The formation of the asbestosis body is evidence of tissue change but with the clinical methods at present available this may not be of a sufficiently advanced character to be detected.

With regard to prognosis, the authors have somewhat modified their original ideas. In a previous article they stated that the cessation of exposure to asbestos dust did not avail to check the spread of disease. Although this is often true, cases have now been noted by them in which the condition appears to have remained stationary since ceasing work in a factory and even serious damage to the lungs appears to be not incompatible with many years of tolerably comfortable existence. A quiet life, preferably in the country, and avoidance of risk, not only of dust inhalation but of catarrhal infection, provides the best safeguard against an aggravation of incipient disease. Septic bronchitis, broncho-pneumonia and pulmonary tuberculosis are the commonest terminal complications.

With regard to occupation and exposure, all the sixty-seven women in the series had been exposed to asbestos dust in the same factory (spinning twenty-four, weaving five, mattress making nine, carding and opening eleven, miscellaneous or unstated eighteen). Twenty-two of them began work before the age of 18; this is now no longer permitted. The shortest exposure was six months and the longest fifteen years. About two-thirds of the thirty-three men were employed in the same factory as the women. Of the others there was a small group who had been employed in work not hitherto definitely regarded as an asbestosis risk, e.g. a man who had been employed handling asbestos mattresses in the open air at an aerodrome, and one who had worked in a shop where asbestos was used for lagging pipes.

Of the cases examined at autopsy, fibrosis was best seen in the lower lobes. Adherent pleura was common, but no silicotic nodules were encountered. Histologically the disease begins in the respiratory bronchioles and alveolar ducts and is characterized by a cellular reaction of mononuclear phagocytes and asbestosis giant cells followed by the formation of a reticular fibrosis.

S. Roodhouse Gloyne.

LANZA, A. J., MCCONNELL, W. J. & FERNER, J. W. Effects of the Inhalation of Asbestos Dust on the Lungs of Asbestos Workers. A Preliminary Study. *Pub. Health Rep. Wash.* 1935, v. 50, 1-12.

In 1929 the Metropolitan Life Insurance Co. was approached by officials representing the asbestos industry in the United States, who were desirous of ascertaining whether asbestos dust was an occupational hazard, and if so, what the nature of this hazard and what should

be done to prevent or control it. This article is an account of the investigations.

In places where asbestos is mined or fabricated in North America there does not appear to be present the clear-cut clinical picture which is so unescapable in communities with a true silicosis hazard, such as hard-rock mining communities. It may be that some of the asbestos plants are of too recent origin for the typical effects of a silicate dust to become manifest, but this would not apply to the older mines or to all of the fabricating plants. The following investigations were undertaken during the period October 1929 to January 1931—(1) A study of dust conditions in asbestos mines and mills in Canada and in fabricating plants along the Atlantic Seaboard in the United States; (2) Physical examinations of asbestos workers, including X-ray films; (3) A study of dust exhaust systems designed to eliminate asbestos dust.

With regard to dust studies, both the impinger and the electric precipitator were used. Chemical analyses were made and total particles per cubic foot of the corresponding weight of the dust in milligramme were estimated, but since no relationship between dust counts and corresponding weights were found, the weights are not included in the tabulations. A table is given showing dust counts in various departments of asbestos works which shows that whereas the dust in preparation rooms is practically all due to asbestos, the contrary is frequently the case in other departments. In dealing with the condition of the asbestos plants the report notes that in America they are similar to those operating in cotton mills in general.

The asbestos is received in bags which are emptied upon the floor, shovelled into pug mills and thence transferred to textile mills for spinning, weaving, etc. Various measures of dust control are noted, such as oiling, humidification and local exhaust, but they were only partially successful in operation.

X-ray films were made of 126 persons (108 men and eighteen women) working on asbestos plants in the United States and all but five of them were given also a physical examination, the cases being selected more or less at random from amongst those having more than three years' employment in the industry. Of the total 126 X-ray examinations, four were diagnosed as second-degree asbestosis, sixty-three as first degree, thirty-nine as doubtful and twenty as negative. The cases of asbestosis were divided into two classes: (1) those whose radiogram warranted a diagnosis of pneumoconiosis but who had no definite symptoms; (2) those who had more marked radiological signs together with definite symptoms. A table is given classifying the cases according to their years of exposure.

The incidence of tuberculosis based on X-ray films is shown in the table below.

A short list is given of (a) death claims and (b) old and permanent disability claims made by the operatives to the Insurance Company.

In conclusion the report confirms observations in other parts of the world that the pulmonary fibrosis reported by asbestos workers is of a type different from silicosis. No predisposition to tuberculosis and

no marked disability was noted amongst the workers but cases of definite cardiac enlargement were frequently found. It is recommended that the

	Total examined	Tuber- culosis (healed)	Tuber- culosis (active)
Positive for asbes- tosis	67	7	1 ¹
Doubtful for asbes- tosis	39	1	0
Negative for asbes- tosis	20	2	1

¹ Case diagnosed as probably active on X-ray findings.

asbestos industry in the United States should seriously face the problem of dust control in asbestos plants.

S. Roodhouse Gloyne.

GLOYNE, S. R. Two Cases of Squamous Carcinoma of the Lung Occurring in Asbestosis. *Tubercle*. 1935, v. 17, 5-10, 5 figs. (4 on 2 pls).

BRIDGE and HENRY have proposed that cancer, in order to be classified as of industrial origin, must fulfil the following two conditions: (1) that the incidence rate in the occupation under review should exceed that in the general population, to a significant extent, and (2) that in the occupation concerned there should be sufficient association of the worker with a substance proved experimentally to have carcinogenic properties. Various writers have suggested that carcinoma of the lung is liable to supervene upon pneumoconiosis but the author considers it to be still an open question.

Two cases of squamous carcinoma occurring in pulmonary asbestosis are recorded; both were women. One, aged 35, survived nine years after eight years' exposure to asbestos dust as a spinner. The other, aged 71, lived fifteen years after two periods of six and thirteen months' exposure in the mattress and "opening" department of the factory. The growths were in each case very small and were not recognized during life. The growth appeared to arise in the wall of a small bronchus and to extend along the lumen as a continuous prolongation. The line of march was limited by the pneumoconiosis, but eventually the prolongations of neoplasm pushed their way through the fibrosis and death occurred before the growth had become very large. Pigment, asbestos fibres and asbestosis bodies were pushed aside by the advancing growths.

S. Roodhouse Gloyne.

HUBBERT, C. S., JR. & WILLIAMS, C. R. The Mineralogy of Asbestos Dust. *J. Indust. Hyg.* 1935, v. 17, 289-303, 2 figs.

Asbestos is a term applied to several fibrous minerals, of which chrysotile, hydrous magnesium silicate, is

the most common. It is a silicate of magnesium and iron, and is found in a variety of forms. The most common is the chrysotile, which is a fibrous mineral. It is found in a variety of forms, and is used in a variety of ways. The most common use is in the manufacture of asbestos products, which are used in a variety of ways. The most common use is in the manufacture of asbestos products, which are used in a variety of ways.

BRIDGE, I. K. and HENRY, J. A. The Asbestos Industry in the United States. *Am. J. Hyg.* 1935, v. 31, 1-10, 10 figs.

This article covers the covering of the asbestos industry in the United States. It is a comprehensive review of the industry, covering the history, the present state, and the future. It is a valuable contribution to the knowledge of the asbestos industry in the United States. The article is written by two of the leading experts in the field, and is a must-read for anyone interested in the asbestos industry.

BRIDGE, I. K. and HENRY, J. A. The Asbestos Industry in the United States. *Am. J. Hyg.* 1935, v. 31, 1-10, 10 figs.

the most plentiful. Its dust is injurious when inhaled over long periods. Petrographical analyses were made of rafter dust from six factories where asbestos is manipulated. They disclosed that in respirable sizes, i.e. below 10 μ , asbestos particles formed a relatively unimportant constituent of the samples. The great bulk of the particles was composed of talc, serpentine, magnetite, calcite, dolomite and magnesite. Asbestos itself breaks into almost infinitely slender fibres, still retaining their original length. Comparatively few of such can enter the bronchioles. The question is raised as to how far the impurities named in the dust originate the lung damage.

E. L. Collis.

BEGER, P. J. Neue Beobachtungen an Asbestosis-körperchen. [Observations on Asbestosis Bodies.] *Arch. f. Gewerbepath. u. Gewerbehyg.* 1935, v. 6, 349-92, 9 figs. [18 refs.]

This article is a full statement of the author's views on the composition of the colloidal coating or gel covering (gelhülle) of the asbestosis body. [The word gelhülle is evidently regarded as meaning the whole of the asbestosis body except the central asbestos fibre. It is not used in the sense of a cell envelope.] This gel, which covers the asbestos fibre to form the golden-yellow asbestosis body, is regarded by the author as being of a protein nature and not, as KOPPENHÖFER has stated, of the nature of a silicic acid gel. Indeed the whole article is a refutation of KOPPENHÖFER's view. The argument and the experimental data with which the author advocates his theory are highly technical in the mineralogical sense and only a very brief summary can be attempted. (1) Measurements of the index of refraction of the gel coating of the asbestosis body made both before and after the removal of its iron constituents yield figures very closely approximating to those of the red blood corpuscle similarly treated. These figures are slightly higher than those for kiesel gel. (2) This gel coating can be dissolved by acids and alkalis to the same extent as and in similar fashion to the red blood corpuscle and other protein bodies in tissues. (3) When the asbestosis bodies are incinerated, only the central asbestos fibre remains. (4) Treatment with iodic acid causes the asbestosis body to liberate very minute bubbles of nitrogen.

S. Roodhouse Gloyne.

DONNELLY, J. Pulmonary Asbestosis: Incidence and Prognosis. *J. Indust. Hyg. & Toxicol.* 1936, v. 18, 222-8.

This article records 34.4 per cent of cases of pulmonary asbestosis in a series of 151 workers in an asbestos industry. Of these 151 workers, ninety-nine showed no positive evidence of asbestosis; five had worked in asbestos for six years, three for seven, three for eight,

four for nine, six for ten, one for eleven, and one for fifteen years. All the others had worked for periods varying from a few months to five years. Since the percentage of those in the series who were affected was so high, it seemed to the author remarkable that so many could be entirely free from the condition even after years of exposure. The X-ray films of these 151 workers showed that four probably had active tuberculosis of the adult type. One of these had been in service for five months, and one each for fifteen months, for six years, and for ten years. Since one patient had worked only five months and another fifteen months, it was thought to be improbable that this type of work could be the cause of their active disease, particularly as the films of both cases indicated a chronic type of disease and apparently not an acute exacerbation. There remain for consideration two active cases with six and ten years' service respectively. Agreeing that the work in asbestos may have aggravated their pulmonary condition, two cases of active tuberculosis in 151 workers seemed a decidedly low percentage, if this type of industrial occupation had any tendency *per se* to exacerbate old tuberculous lesions. In the author's experience, tuberculosis of an active type may be found quite as frequently in the routine examination of workers in any industry, regardless of whether or not the occupation be dusty.

Four cases are recorded in some detail, all of them still alive.

S. Roodhouse Gloyne.

McPHEETERS, S. B. A Survey of a Group of Employees Exposed to Asbestos Dust. *J. Indust. Hyg. & Toxicol.* 1936, v. 18, 229-39, 3 figs.

This paper reports the result of a survey of 210 persons exposed to asbestos dust from various departments, including the process of grinding, crushing, mixing, spinning, weaving, etc.

The types of lesion noted in the X-ray films were as follows—Of the 210 persons examined, forty-five were negroes. The films of 123 (58.5 per cent) were regarded as showing lung fields that were normal, except for a small primary tuberculous focus in one. Of the 210 films, fifty-three (25.2 per cent) were regarded as showing definite or questionable evidence of asbestosis; of the fifty-three, twenty films were classed as questionable. Had stereoscopic retakes been allowed, it is believed that this number could have been greatly reduced. The indispensability of a competent roentgenologic technique is emphasized. Thirty-three films (15.7 per cent) showed definite asbestosis, in twenty-five (11.8 per cent) the process was moderate in extent, and in eight (3.8 per cent) more advanced. In the remaining thirty-four films various types of thoracic lesions were noted, none of which were ascribable to asbestos dust.

A table is also given showing the incidence and extent of asbestosis from increasing periods of exposure in the several departments. From this analysis it appears that of nine persons exposed for more than fifteen years to dust concentrations effective in

producing disease, four (11 per cent) escaped asbestosis; of thirty-two persons exposed for more than ten years to similar concentrations, fourteen (43 per cent) escaped; of seventy persons so exposed for more than five years, forty-five (64 per cent) escaped, and of twenty-eight persons exposed for more than two years and less than five, twenty-four (85 per cent) escaped.

The average exposure to dust for the entire group with asbestosis was 10.2 years. Only two cases occurred where the exposure had been less than five years.

Apical tuberculosis infiltration was noted in the films of seventeen employees. In four of these, asbestosis was noted, two with moderate disease and two with more advanced. Tuberculous lesions of clinical significance were noted in six cases. Twenty-four films showed abnormalities of the heart and aortic shadows, eleven of these being in negro employees.

In conclusion the author notes—(1) There is a personal idiosyncrasy in the response to inhalation of asbestos dust. (2) Asbestosis is infrequently found before five years' exposure to industrial concentrations of dust. (3) Workers with advanced asbestosis lesions in X-ray films were not necessarily unable to work at the process in which the disease was acquired, though continued work at such process was advised against. (4) A dust-eliminating device is now available for factory use, and should reduce significant asbestosis to vanishing point. (5) No activating or aggravating effect of asbestos dust or asbestosis on tuberculosis was observed. (6) No marked tendency on the part of asbestosis to obstruct the lesser circulation was noted. (7) No increase of respiratory infections was reported in this group. (8) There is some evidence to suggest that asbestosis develops more rapidly in young persons than in older.

[Conclusions (5) and (7) are at variance with the experience of English observers. Conclusion (1) would also seem to be a little premature.]

S. Roodhouse Glynne.

SHULL, J. R. Asbestosis: a Roentgenologic Review of Seventy-one Cases. *Radiology*. 1936, v. 27, 279-92, 30 figs.

According to Shull, asbestosis is a disease characterized by an early interstitial fibrosis, this fibrosis resulting from the chemical irritation of the silica in the dust and the mechanical irritation of the asbestos fibres. Right heart enlargement is a common finding in moderately advanced cases, and the presence of asbestos bodies in the lungs is another characteristic finding. Dyspnoea, insidious in onset and progressive, is the chief symptom.

In an examination of seventy-one of 100 workers who had been dismissed from an asbestos plant, sixteen were grouped as slightly advanced cases, thirty-five as moderately advanced cases, and twenty as markedly advanced cases. Fifty-six were white

males, six white females, and nine were negroes. The average age of the group was 31.4 years, and the time of exposure from sixteen months to twenty-one years. In the series, eight cases of tuberculosis were recognized of which only two cases appeared active. In the group of slightly advanced cases the roentgen film could not be considered as diagnostic, and a history of exposure would be necessary to arrive at a diagnosis. In the sixteen cases of slightly advanced asbestosis beginning interstitial fibrosis was noted in the roentgenogram. Right-sided cardiac hypertrophy occurred in 37.5 per cent of them and the emphysematous type of chest in only 6.3 per cent; no pericardial thickening, and in none was the trachea displaced. The average age and exposure for this class was 32.2 and 5.4 years respectively. Definite interstitial fibrosis producing ground-glass appearance and pericardial and pleural thickening was noted in the roentgenograms of the moderately advanced cases; right-sided cardiac hypertrophy was present in 62.8 per cent; emphysematous type of chest in 65.7 per cent and high left diaphragm in 28.6 per cent. For this class the average age and exposure were 37.1 and eight years respectively. In the markedly advanced group right sided cardiac hypertrophy was present in all but one case; 95 per cent showed an emphysematous type of chest; pericardial and pleural thickening in 45 per cent, and nearly all showed a high left diaphragm. The average age and exposure for this class was 37.1 and 8.7 years respectively. In the whole series only six showed displacement of the trachea, and of these three had X-ray evidence of tuberculosis. In the re-examination of twenty-one cases a fair number of the slightly advanced cases showed some improvement; the moderately advanced cases also tended to improve and their disabilities lessened after removal from the dust. An account is given of the autopsies performed on two patients from the markedly advanced group.

Shull concludes that asbestosis is a definite disease entity; that inhalation of asbestos dust produces the characteristic lung changes; that the time required for the development of the disease is variable (one case developed after sixteen months' exposure); that asbestosis differs from silicosis clinically, pathologically and roentgenologically; that while the roentgenogram is the most reliable diagnostic aid, the interpretation and correlation with physical signs is often difficult, and without the history of exposure a certain number of slightly advanced cases will not be recognized; that asbestosis does not predispose to tuberculosis; that asbestosis is not a primary progressive disease.

The radiographic signs in asbestosis are—

(1) Emphysematous type of chest; (2) Flaring of lower ribs; (3) Trachea not displaced; (4) Diffuse fine to coarse fibrosis reaching to the periphery, interstitial in character, differentiating it from the roentgenological appearances in silicosis; (5) Hazy ground-glass appearance of lung fields; (6) Increased density of all pleural markings; (7) Shaggy appearance of the cardiac outline; (8) Tendency towards

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right-cardiac enlargement; (9) Dis-proportionate rise of left diaphragm; (10) The degree of cardiac involvement is not always consistent with that of the pulmonary involvement.

R. Winston Evans.

PROCKAT, F. Zur Verhütung der Asbestose in der Industrie. [The Prevention of Asbestosis in Industry.] *Staub. Halle.* 1937, Apr., v. 5, 133-62, 25 figs.

The use of asbestos for various purposes increased five times between 1912 to 1929. It has been calculated that the total amount of asbestos used in the world in 1928 was 356,000 t. Of the 16,500 t. imported into Germany in 1936, 6,398 t. were from Canada, 3,751 from Russia and 2,501 from Rhodesia. The fineness of the fibres varies; those of Canadian asbestos have an average diameter of 1.0 μ , those of Russian 0.75 μ and African (West Griqualand) 0.9 μ . There are two chief kinds of asbestos, hornblende asbestos and chrysotid asbestos, the former contains 57.82 per cent SiO_2 and the latter 43.56. This paper deals particularly with the preparation of asbestos cement and asbestos paste. In the preparation of asbestos cement the proportion of the raw materials is about one part of asbestos to nine of cement. The asbestos is crushed and torn in pieces in special mills and mixed with cement and water to form a paste which by drying processes is converted into sheets. In the crushing of asbestos much dangerous dust is given off, as also in the mixing with cement.

Excellent illustrations are given showing methods of covering machinery used in connexion with asbestos with exhaust ventilation attached to the covers. In works where masks have been provided the workmen seldom wear them. Asbestos is utilized largely as a heat preserving material for boilers, etc., and considerable dust arises in the filling of the cases used for this purpose. These cases may be as large as 3 m. by 1 m. and contain about 50 kg. asbestos.

The author's investigations show that in practically all processes all danger from asbestos dust can be eliminated by well-covered machinery provided with exhaust ventilation. It is necessary in rooms where asbestos is filled into cases for the air to be changed fifteen times in an hour. Only such persons should be employed on asbestos work who have been found suitable by medical examination and any person who shows the slightest signs of asbestosis should be permanently taken off the work.

A. J. Collie.

HOME OFFICE. Report on Effects of Asbestos Dust on the Lungs and Dust Suppression in the Asbestos Industry. Part I. Occurrence of Pulmonary Fibrosis and Other Pulmonary Affections in Asbestos Workers. Part II. Processes giving Rise to Dust and Methods for its Suppression

[MEREWETHER (E.R.A.) & PRICE (C.W.).—31 pp. 1930. London: H.M.S.O.]

This is a Home Office report on the effects of asbestos dust on the lungs and on the dust suppression in the asbestos industry. The first part, by Dr. E. R. A. Merewether, deals with a medical investigation of a section of the employees in those factories using more or less pure asbestos. The population at risk in this group of the industry is unknown, but a rough estimate at 2,200 employees. A certain amount of selection was used in the examination, new-comers and those workers who had been longest in the industry being chosen where possible. The total number examined was 363, or 16.5 per cent of the estimated total number of workers in the industry. A radiogram of the chest was taken in 133 cases. Of the 363 workers 95, or 26.2 per cent showed a diffuse fibrosis of the lungs attributable to the inhalation of dust. An additional 21 were found with precursive signs of the disease. Of the 133 persons of whom radiograms were made, 62 showed X-ray signs of diffuse fibrosis and 25 suggestive but not absolutely definite signs. Of these 363 workers there were no cases of fibrosis in those who had been employed under 4 years, 30 in cases in those employed from 5-9 years, 27 cases in those employed 10-14 years, 15 cases in those employed 15-19 years, and 17 cases of those employed over 20 years. The largest number of cases are in the age-groups 30-39 and 40-49. The concentration of dust and length of exposure appear to be the most important factors in the production of the fibrosis. The cases appear to go on for a long time and then die from a terminal broncho-pneumonia or other acute infection. Up to the end of 1929 particulars have been collected of 10 cases in which an advanced degree of asbestos fibrosis without tuberculosis was the primary cause of death, 9 of these being verified by post-mortem examination. The length of exposure in these cases varied from 9 to 21 years.

In the second part of the paper Mr. Price discusses the technical details of ventilation in the factories and makes the following recommendations: (1) application of efficient localized exhaust ventilation at dust-producing points; (2) substitution of enclosed mechanical methods for hand conveyance, and for dusty handwork generally; (3) effective enclosure of dust-producing machines and plant; (4) substitution of wet methods for dry; (5) elimination of certain dust-producing appliances; (6) abandonment of settling chambers in manufacturing processes, to the utmost extent; (7) effectual separation of processes to prevent unnecessary exposure to dust; (8) wide spacing of dust-producing machines in new factories and, as far as practicable, in existing works; (9) use of sacks of close texture material for internal work; (10) efficient cleaning system with wide use of vacuum methods; (11) storage of asbestos and other goods to be outside workrooms; (12) exclusion of young persons from specially dusty work.

S. Roodhouse Glynn.

PNEUMOCONIOSIS ABSTRACTS

VOLUME II

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LONDON
SIR ISAAC PITMAN & SONS, LTD.

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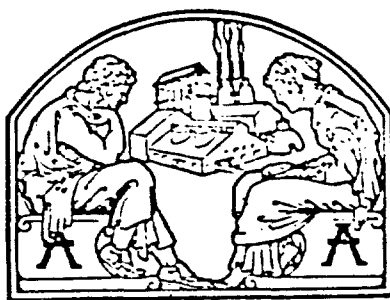
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Industrial Hygiene Digest

INDUSTRIAL HEALTH NEWS

LITERATURE ABSTRACTS

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SEPTEMBER, 1950

(Vol. 14, No. 9)

INDUSTRIAL HYGIENE FOUNDATION

4400 FIFTH AVENUE -- PITTSBURGH 13, PA.

- 1052 Other Lung Diseases Due to Dust. A.T. Doig.
Postgraduate Med. J. 25, 639-649 (Dec. 1949).

A review is given of the effects on the lungs of various dusts, mainly mixed dusts. These often contain a proportion of silica and it is questioned whether their effect can be attributed to it. Among these dusts are those derived from carborundum, aluminum, graphite, iron, tin, manganese oxide, and beryllium. The mode of action of vegetable dusts is obscure, although a variety of pneumoconioses have been attributed to them.

-- Condensed from Bull. Hyg.

- 1053 Asbestosis. H. Wyers. Postgraduate Med. J.
25, 631-638 (Dec. 1949).

Asbestos and talc are the only two silicates which have been shown to produce pneumoconiosis. Gardner, in 1938, suggested, on the basis of animal experiments that the effect produced by asbestos was mechanical, since it was produced only by long fibers. A later authority made the observation that workers exposed to very short-fiber asbestos were not affected by it. Asbestosis was officially recognized as an industrial disease in 1930. The condition is thought to be due to blocking of the finer bronchioles by long fibers which seem to irritate the bronchial wall and cause fibrosis. Tuberculosis and carcinoma of the lungs may follow, as complications. Recognition of the disease, and precautions which have been taken have lessened its severity and incidence.

-- Condensed from Bull. Hyg.

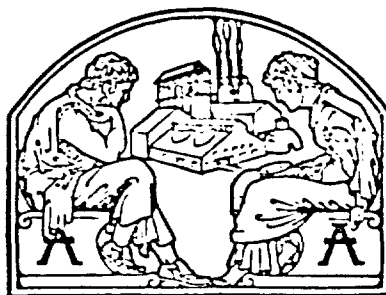
- 1054 A Review of Dust-Allaying Practices at Working Faces in Some Bituminous Coal and Lignite Mines. J.J. Forbes, R.K. Franklin and S.T. Reese.
U.S. Bur. Mines Inf. Circ. 7566 29pp (May 1950).

Data on dust-allaying practices were compiled from the reports of Federal inspectors on 1,637 bituminous coal and lignite mines in 23 states, employing nearly 300,000 men. Most of the information is presented in tabular form. It is shown that approximately one-third of the mines employing 25 or more men provide no protection, or inadequate protection, against dust from the working face. In a still greater number of mines, the dust produced during loading and transportation is not being allayed effectively. Rock-dusting will reduce the dust explosion hazard in such mines, but dust allaying will reduce the explosion and pneumoconiosis hazard and provide better visibility. Generally dust allaying was practiced to a greater extent in mechanical-loading mines than in hand-loading mines with fewer workmen. Mines employing less than 25 men were not included in the study, but probably dust allaying is not practiced in many of them.

-- Condensed from Authors' Summary and Conclusions

- 1055 Shuttle-Car Tire and Roadbed Study. R.H. Nicholas, J.S. Whittaker, D.D. Dornenburg, J.P. Harmon and W. Bank. Bur. Mines Rept. of Invest. 4624, 28pp. (December 1949).

The investigation revealed that "hard rock lug" tires had a knocking action that caused vibration and noise more rapidly and effectively with the floor material, thus tending to diminish one potential source of dust. Another type of tire, with "smooth tread" tires, caused less vibration, and less noise, and less dust. The study also showed that the roadbed material, when it was "smoothed" or "graded" with a roller, caused less dust than when it was "rough" or "loose".



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everybody working in dust-producing places is carefully watched from the time of his work placement to its discontinuation, there will be enough material at hand to clarify what is generally known as the human factor in silicosis. --Cond. from Arch. Ind. Hyg. & Occ. Med.

- 82 Frequency and Clinical Symptoms of Cancer of the Lung in Silicosis.
E. Westermann. Beitrage z. Silikose--Forschung, No. 12, 33pp., (1951). (In German).

Lung carcinoma does not occur more frequently in coal miners than in the general working population. Among 13,900 necropsies at a hospital in the Ruhr coal mining area, 200 cases of lung carcinoma were found. Records of fifty-one cases had been preserved. The diversity of ages of the men, of localization of the tumor, and of complications such as pleuritis, metastases, tuberculosis, bronchitis, pneumonia, etc., all suggest that there is no causal relation between silicosis and tumor.

The data on which these conclusions are based are given in detail. Various case histories and radiographs are given to demonstrate the difficulties of recognizing the carcinoma in the presence of silicosis, especially if tuberculosis is also present. Only six of the fifty-one were, in fact, correctly diagnosed at an early stage of the tumor. As regards therapy, pneumonectomy is recommended for stage I silicosis only. -- Cond. from Bull. Hyg.

- 83 Results of Periodical Examinations of Workers in an Asbestos Factory.
A. Bohme. Beitrage z. Silikose Forschung No. 11, 27-34, (1951). (In German).

Since radiological supervision and control measures were adopted in an asbestos factory in 1936, the dust hazard has been greatly reduced, as shown by comparing results of surveys in 1936, 1940, and 1949. A comparison of different working places shows that the risk is low in spinning and weaving, but high in preparation, carding and brake polishing. A table shows results for 14 cases from 1936 to 1949. Some progressed, others did not. Inquiries among former workers reveal little if any tendency to progression after the dust exposure has ceased. This is in contrast to silicosis. On the other hand a personal factor exists, as in silicosis, as a number of workers do not get asbestosis in spite of high dust exposures.

Progressive tuberculosis is rare, only two cases being found, both started in the parts of the lung least affected by asbestosis. One combination of asbestosis and carcinoma of the lung was found. The main result of this study is the demonstration that the hazard can be reduced by dust control. --Cond. from Bull. Hyg.

- 84 Research into Pulmonary Asbestosis in Belgium. J. Clerens.
Arch. Belges Med. Social et Hyg. 8, 557-565, (November, 1950).

The investigation concerns the fibro-cement industry, in which asbestos is crushed and mixed with cement. Enclosed apparatus prevents most of the dust from escaping; in the most dusty locations, 20 to 40 million particles per cubic foot were found, with 50% under 5 microns. The workers have been examined periodically over a period of three years. Out of 75 men employed for seven to over thirty years, there were four doubtful cases, and only one presented x-ray shadows indicating pneumoconiosis. The man died of progressive circulatory insufficiency, and details of post-mortem findings are given.

Indurated nodules and asbestosis bodies were found throughout the lungs, but no tubercle bacilli. The bodies were seen in fibrous zones, in the alveoli, and even included within giant phagocytes. This man, aged 49, had been totally incapacitated with dyspnea on exertion and cardiac failure. In others, asbestos particles were found in 10 out of 12 samples of sputum, and asbestosis bodies in 3 samples, but the findings were not associated with x-ray shadows indicating fibrosis. The evidence is against much danger arising from the manufacture of fibro-cement.

-- Cond. from Bull. Hyg.

- 85 The Pneumoconiosis of Slag Mills. P. Gengoux. Arch. Belges Med. Sociale et Hyg. 8, 514-518, (October, 1950).

The slag produced in the basic, or Thomas, process of steel manufacture is used as a fertilizer and for this purpose is reduced to a very fine powder. Out of 93 workers with at least 10 years' exposure to slag dust 15 showed radiographic changes which could have been caused by dust. In only one case did the lung appearance go beyond the micro-nodular stage; there was no evidence of massive shadows, in spite of the frequent association of tuberculous infection in the more or less active state (5 cases). The conclusion is that the health of basic slag workers is not bad.

-- Cond. from Bull. Hyg.

- 86 Roentgenologic Aspects of Pulmonary Changes Caused by Ocher.
R. Haubrich. Fotschr. Geb. Rontgenstrahlen 73, 682, (December, 1950).
(In German).

Numerically the pneumoconiosis caused by the earth pigments (metallic oxides occurring in clay) are of minor significance, because the ocher industry, which processes these pigments, employs a limited number of workers. However previous reports on several small groups of patients indicate that the pneumoconiosis caused by these pigments has certain characteristic aspects. After briefly discussing the minerologic aspects of these pigments and some earlier reports on the



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- 1007 Findings of Bronchoscopy in Silicosis and Silico-Tuberculosis.
E. Concina and O. Orlandi. *Rass. med. ind.* 20, 424-426
(Nov.-Dec. 1951) Italian.

The importance of the existence of bronchial lesions in silicosis has been underestimated. Bronchoscopy allows direct observations of changes in the tracheal and bronchial mucous membrane, deviations in the trachea and main bronchi, and modifications in the orifices of the lobes and segments. Lavage, aspiration of the bronchial section, and endo-bronchial administration of adrenaline and antibiotics may be conducted during the process. Inflammation of the mucous membranes and other changes characteristic of silicosis are disclosed by this method. Findings in 25 patients are reported. -- Cond. from Bull. Hyg.

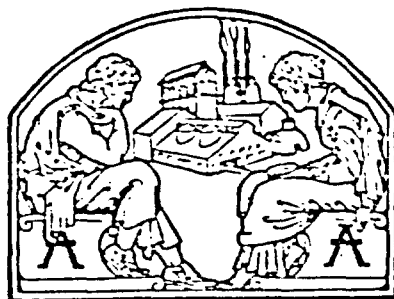
- 1008 The Value of the Electrocardiograph for Examining Anthraco-Silicotics.
F. Lavenne. *Institut d'Hygiene des Mines, Hasselt, Belgium,*
Communication No. 90, 5pp. (1951). French.

The author used the electrocardiograph to examine 11 cases of anthraco-silicosis with clinical signs of loss of compensation of the right ventricle, and 200 cases of anthraco-silicosis, compensated for invalidity but still ambulant, who were doubly classified according to the extent of fibrosis present and according to the amount of emphysema. The findings are presented in somewhat cryptic symbolism. They are held to justify the claim that the electrocardiograph may be of considerable value in establishing early strain on the right side of the heart.

-- Bull. Hyg.

- 1009 Asbestosis Associated with Bronchiogenic Carcinoma. R. Stoll, R. Bass, and A. A. Angrist. *Arch. Intern. Med.* 88, 831-834 (Dec. 1951) German. ✓

Data for statistical proof of any association of asbestosis with pulmonary carcinoma are hard to collect, but three investigators have found carcinoma in 7.5 to 14.8% of cases of asbestosis. A case is reported in which a worker had been exposed to asbestos for 6 years and had refused to wear a respirator. He came under notice with weakness and a persistent cough. Clumps of malignant cells were seen in the bone marrow, and x-ray showed generalized large discrete oval shadows indicative of pulmonary metastases. After death, modules varying to 4 cm. in diameter were found scattered throughout both lungs, with interstitial fibrosis. Large areas of necrosis existed throughout the lungs, and typical asbestos bodies were seen inside and outside the tumor areas. Metastases were found in the kidneys, brain, and liver. The opinion is suggested that the silicate in asbestos must itself be directly carcinogenic. It establishes an additional reason for preventive measures in the use of asbestos.



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siderosis, berylliosis, asbestosis, and the organic dust diseases are discussed briefly in relation to diagnosis. The importance of personal and occupational history is emphasized. The factors to be considered when deciding whether a man should be taken from his job are discussed.

- 604 The Clinical Picture and Pathology of Asbestosis. W. Behrens, Jr.
Z. Unfallmed. u. Berufkrankh. 45, 129-140 (June 15, 1952); 179-189
(Sept. 15, 1952). German.

This paper presents an extensive review of literature on asbestosis including distribution and types of asbestos, its mining, treatment, and use, dust hazards, and effects of length of exposure of the dust in different concentration. Symptomatology, diagnosis, and x-ray findings in the different stages of asbestosis are described. Special mention is made of the association of asbestosis with carcinoma, which is much more frequent than that of silicosis. Post-mortem reports from the literature indicate that in 309 cases of asbestosis there were 44 lung carcinomas (14.2%), whereas in 2,204 cases of silicosis only 32 carcinomas were found (1.4%). The experience of the association of tuberculosis and asbestosis varies greatly in different countries. English investigators have recorded a high rate of tuberculous infection in asbestos workers, but it is a rare complication in America and the rate is low in Germany. The macroscopic and microscopic appearances of the lungs are described, and the nature and significance of asbestosis bodies are discussed and an extensive reference list dealing with that controversial subject is given.

-- Cond. from Bull. Hyg.

- 605 Lung Carcinoma Caused by Asbestos Inhalation. F. Boemke.
Med. Monatsschr. 7, 77-81 (1953) German.

The relation between fibrotic changes caused by asbestos deposits in the lung and carcinoma is discussed. The lower lobe is the site of predilection. Characteristic are the multicentered developments of flat epithelium carcinoma.

-- Chem. Absts.



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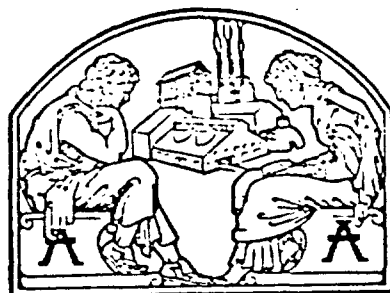
silicic acid with a high degree of polymerization distinctly inhibited mobility and phagocytosis, that freshly prepared polysilicic acid had very little effect, and that monosilicic acid had no effect at all on phagocytosis.
-- Bull. Hyg.

- 854 The Reactivity of Finely Ground Quartz. C. Claeys and E. Quinot. Staub, No. 37, 393-403 (Sept. 15, 1954). German.

The surface layers of finely ground quartz and of silica were dissolved in distilled water. Optical, electrical, and chemical properties of the solutions were investigated, and their visible and ultraviolet absorption spectra were examined. Anomalies in the quartz spectra are attributed to carbon dioxide. The carbon dioxide content of the solution, estimated by Van Slyke's method, was greater than could be accounted for by carbon dioxide dissolved in the distilled and degassed water used in the experiments. The abnormal reactivity of finely ground quartz particles is ascribed to the presence of carbon dioxide, in the shape of carboxyl groups forming a complex with the silica. It is claimed that several biological effects of fine quartz may be explained by means of this hypothesis.
-- Cond. from Bull. Hyg.

- 855 Primary Cortical-Cell Tumor of the Peritoneum in a Case of Asbestosis. F. Leicher. Arch. Gewerbepath. Gewerbehyg. 13, 382-392 (1954). German.

A case of asbestosis following long exposure to asbestos is described. In addition to typical symptoms and findings, leptomenigitis was present and tubercle bacilli were found in the spinal fluid. The patient died with cachexia. Autopsy showed tuberculosis of the lumbar spine with bilateral psoas abscess and mixed infection in both lungs. Asbestosis, stage two, was found in the lungs with definite fibrosis; there was slight asbestosis in the lymphatic glands, and asbestos bodies were found in the spleen. On the peritoneum of the mesentery and over the peritoneal cavity there were thickened patches and many small nodules; a flat tumor, half the size of a hand and 1 cm. in thickness, was attached to the peritoneum on the under side of the diaphragm. The results of the examination of the tumor are fully described and illustrated. Asbestos was found in the tumor tissues by x-ray diffraction. It is uncertain how the asbestos reached the peritoneal cavity; the most probable route was thought to be by direct penetration of the asbestos fibers from the lung through the pleura and thence through the diaphragm.



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the common aspects of tuberculosis were seen instead of the features characteristic of silicotuberculosis. It is suggested that the term "tuberculosilicosis" be used for such patients. Active tuberculosis was found in eight patients with stage 3 silicosis, but most of the patients in that stage did not show signs of tuberculosis or other infection. The authors conclude that the transition from the nodular to the massive stage can take place without the superimposition of infection.

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

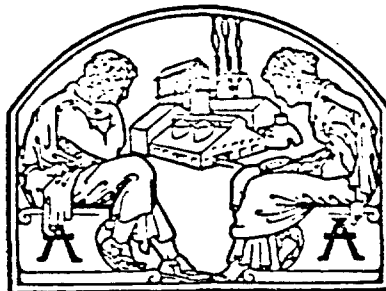
✓ 1113 Mortality from Lung Cancer in Asbestos Workers. R. Doll. Brit. J. Ind. Med. 12, 81-86 (Apr. 1955).

In necropsies of 105 persons who had been employed at an asbestos works, lung cancer was found in 18 instances. In 15 cases asbestosis was also found. These 15 workers were employed at least nine years before 1923, when dust control regulations became effective. An additional 113 men who had been exposed to asbestos dust for 20 years were followed up and their mortality was compared with that of the whole male population. Thirty-nine deaths occurred in the group whereas 15.4 were expected. The excess was entirely due to excess deaths from lung cancer (11 against 0.8 expected) and from other respiratory and cardiovascular diseases (22 against 7.6 expected). All the cases of lung cancer were confirmed histologically and all were associated with asbestosis. From the data it is concluded that lung cancer is a specific hazard of asbestos workers and that the average risk among men employed for 20 years or more has been of the order of ten times that experienced by the general population. The risk has become progressively less as the duration of employment under the old dusty conditions has decreased.-- Cond. from author's summary

1114 Primary Lung Cancer in South Wales Coal Workers with Pneumoconiosis. W. R. L. James. Brit. J. Ind. Med. 12, 87-91 (Apr. 1955).

Primary lung cancer was found at necropsy in 3.3% of 1,827 South Wales coal miners and in 5.4% of 1,531 South Wales non-miners. In 12 cases with massive pneumoconiosis the tumor was in the mass, or touching it, in five. In the other seven the tumor was remote. Lung cancer in South Wales miners is similar to that in non-miners with respect to the ages at death, the distribution of the histological variants of the tumor, and the distribution of metastases. The significance of these findings is discussed. Attention is drawn to the difficulty of diagnosing lung cancer in the presence of massive pneumoconiosis.

-- Author's summary



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- 1188 A Study of Respiration in Pulmonary Asbestosis. H. Bastenier, H. Denolin, A. de Coster, and M. Englent. *Arch. maladies profess.* 16, 546-553 (1955). French.

In order to test the respiratory value of lungs affected with asbestosis nine cases were closely studied. The seven men and two women had been exposed to asbestos dust, 1,000 to 2,000 particles per cu. m., for 18 to 30 years. The patients displayed definite symptoms of asbestosis with troublesome cough and dyspnea, and all showed x-ray shadows like ground glass extending over both lungs. No tubercle bacilli were found in any case. A definite reduction was found in vital capacity, but the maximum expiratory volume was satisfactory. Breathing, however, was accelerated by hyperventilation. At rest breathing was sufficient and satisfactory, but on exertion dyspnea appeared, varying considerably according to the pathological lesions in the lungs. These functional changes were in no way different from those seen in other cases of pneumoconiosis. Varying emphysema was found, but no special strain was thrown upon the heart.

-- Cond. from Bull. Hyg.

- 1189 Asbestosis: Report of a Case. E. R. Wiese and W. E. B. Hall. *Diseases of Chest* 30, 229, 230 (Aug. 1956).

The history and autopsy findings in a fatal case of asbestosis are reported. Conditions described include: absence of the middle lobe of the right lung; greatly enlarged heart; wide spread, sharply demarcated development of fibrosis; and degeneration of collagen in extensive irregular fields. These and other conditions are described fully. Fine needles representing the original asbestos fibers were seen. Small asbestos bodies were seen in a few areas of focal fibrosis, although they had not appeared in the sputum.

- 1190 New Viewpoints on Pulmonary Cancer in Asbestos Workers. H. Bohlig and G. Jacob. *Deut. med. Wochschr.* 81, 231-233 (Feb. 17, 1956). German.

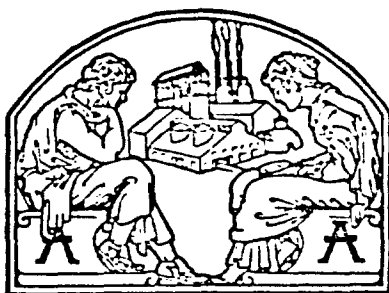
The following distinguishing features have been attributed to the lung cancer that has been recognized as an occupational disease of asbestos workers: (1) increased incidence; (2) development at an early age; (3) dependence on duration of exposure to asbestos dust; (4) a latent period between onset of exposure and the appearance of the cancer; (5) the localization; (6) the histological structure; and (7) the multicentral origin. The authors discuss each of these points, and show that there is little clear evidence to support any of these assumptions, with exceptions noted. Women workers in the asbestos industry have lung cancer more often, and at an earlier age than do other women, but the same is not true of men. Malignant growths of the pleura seem to occur more often in asbestos workers than in other persons. The multicentral development is observed also in workers exposed to cobalt and to chromates. The study of the pathogenesis is still in the state of hypotheses, and the theory of mechanical pathogenesis is given most consideration. Microtraumas and asbestos bodies are always found in the pulmonary cancers of asbestos workers, but the authors feel that this does not necessarily prove the mechanical theory. They cite several factors that speak against a purely mechanical pathogenesis of asbestos cancer, but they concede that the development of so-called asbestos warts proves the irritating effect of asbestos on human tissues.

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

- 1191 Nasal Penetration of Particles of Small Inertia in Experimental Animals. Gabrielle Asset, L. E. Gongwer, and Stella Ryan. *Arch. Ind. Health* 13, 597-601 (June 1956).

Experiments were carried out to determine the nasal penetration of particles of small inertia in dead rabbits, dogs, and guinea pigs. The heads of the animals, or the entire bodies, were exposed in a wind tunnel to an aerosol consisting of particles of 1.3 microns with density of 1.2 g. per cc. and moving at a rate of 2.5 mph. The concentrations of the aerosol entering the nasal passages and of that leaving the nasal passages were determined. It was found that there was a significant difference in nasal penetration between the guinea pigs, on the one hand, and the rabbits and the dogs, on the other hand. Wind direction had no influence on the nasal penetration of droplets of low inertia.

-- Authors' summary



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the light microscope. Incidentally, it seemed that a particle with sharp angles, such as a quartz particle, could easily pierce the layer. It was limited on both the air-space side and the connective tissue side by an osmium-staining cell membrane; a basal membrane was not found. The partition between the blood and the air space consisted of seven layers. In places where the capillaries were not in immediate apposition to the alveolar wall the cellular tissue space was filled with connective tissue fibrils, lattice threads, elastic fibers, and connective tissue cells. Various cells, detached from the alveolar walls, and septal cells were found, but a definite decision could not be reached on their origin. -- Cond. from Bull. Hyg.

- 757 Silicosis. 11. Effect of Sex Hormones on the Amount of Silicon Excreted into Urine. M. Anne. Nagasaki Igakkai Zassi 31, 381-385 (1956).

Urinary excretion of silicon before and after castration was investigated. In the case of male rabbits silicon increased after castration while in the case of females it decreased. Silicon returned to the normal level after the administration of male hormone or follicular hormone. Corpus luteum hormone showed no effect. -- Chem. Absts.

- 758 Silicosis. 12. Influence of Thyroid Hormone on the Amount of Silicon Excreted in the Urine of Rabbits. R. Kakita. Nagasaki Igakkai Zassi 31, 438-445 (1956).

Thyroidectomy increased the urinary excretion of silicon by 2 to 3 times, and silicon returned to normal level after the administration of thyroid hormone. Injection of methylthiouracil to normal rabbits increased silicon slightly. Diiodotyrosine and anterior hypophyseal hormone showed no effect. -- Chem. Absts.

- 759 The Neutralization of Silica Toxicity in Vitro. J. Marks. Brit. J. Ind. Med. 14, 81-84 (Apr. 1957).

Phagocytic cells were protected in vitro against the toxic effect of silica dust by compound 48/80, a histamine-releasing agent formed from p-methoxy-phenylethyl-methylamine. The health of the cells was studied by direct microscopy and by measurement of their glucose consumption and dehydrogenase activity. The mode of action of compound 48/80 is not known but may depend on a reduction in silica solubility. A slight protective action was also exhibited by certain alkylmono-amines and polymyxin B. -- Author's summary

- 760 Pulmonary Fibrosis and Giant-Cell Reaction with Altered Elastic Tissue. Endogenous "Pneumoconiosis". R. L. Walford and L. Kaplan. Arch. Pathol. 63, 75-90 (Jan. 1957).

The clinicopathologic findings in 12 autopsied cases of a peculiar pulmonary elastica disease are presented and discussed. It is concluded that injured pulmonary elastic tissue may act as a foreign body or sequestrum and produce a progressive "pneumoconiosis". -- Cond. from authors' summary

- 761 Asbestosis with Pleural Calcification among Insulation Workers. J. Frost, J. Georg, and P. F. Moller. Danish Med. Bull. 3, 202-204 (Nov. 1956).

In Denmark only a few persons manipulate insulation products including asbestos, kieselguhr, magnesia, glass wool, and rock wool. The first two have been regarded as fibrogenic to the lungs when their dust is inhaled. In order to ascertain any occupational risk in the work 31 workers with more than 20 years' exposure, of 52 years average age, were carefully examined clinically and by x-ray. Abnormalities were found in the surprising number of 22. A total of nine exhibited fine mottling indicative of pulmonary asbestosis. In 19 patients pleural changes were seen, which were due to adhesions and extensive thickening with calcification. The abnormalities in the pleura were so widespread in some instances as to obliterate other pathological changes. The calcification is unusual and may be ascribed to combined exposure to calcium and magnesium in the presence of fibrogenic asbestos dust. Sample analyses of the kieselguhr in use did not reveal the presence of alpha-quartz. The finding of pronounced bilateral pleural changes in the present series definitely points to an occupational origin. -- Cond. from Bull. Hyg.

SECTION III

ASBESTOSIS

Abstracts Arranged in Chronological Sequence

DREESSEN, W. C., DALLAVALLE, J. M., EDWARDS, T. I., MILLER, J. W. & SAYERS, R. R., with the assistance of H. F. EASON & M. F. TRICE. A Study of Asbestosis in the Asbestos Textile Industry. *Pub. Health. Bull. No. 241*. Wash. 1938, Aug., pp. ix + 126, 65 figs. [Bibliography.]

This monograph is an official publication of the Division of Industrial Hygiene of the National Institute of Health of the U.S. Public Health Service. The authors have been modest in their choice of title. In addition to their record of asbestosis in the asbestos textile industry in the particular factories under observation, the work is an excellent account of pulmonary asbestosis in general with an annotated bibliography which abstracts succinctly the chief publications during the last ten years or more.

The investigation was made in asbestos textile factories of North Carolina. Four plants were investigated, two which convert crude asbestos and raw cotton into asbestos yarn and woven goods, and two which purchase asbestos yarn and unfinished woven asbestos tape and convert the purchased material into finished goods (e.g. brake bands). "Flow sheets" are given summarizing the various processes from the reception of the crude asbestos to the production of the finished article and comparing the technique with British practice. Dust counts were made by the impinger method, using ethyl alcohol and distilled water mixtures containing from 25-50 per cent alcohol as a collecting fluid. Sampling was made of settled dusts collected at breathing level, and of air-suspended dusts collected by vacuum cleaner. To determine the particle size of dust an Owens jet apparatus was employed. Chemical analyses of dusts were also made. The data are given in a long series of statistical tables, and correlation of medical findings with dust exposure is expressed by multiplying the average dust count (in million particles per cu. ft.) by the duration of the worker's exposure in years. The numbers of workers examined was 511 (123 men and 118 women), five-sixths of them being native-born Americans of Anglo-Saxon stock. The group consisted of workers who were much younger than the average industrial employee and had been employed in the industry for relatively short periods. An elaborate clinical, radiological and pathological investigation was made. Excluding those with no asbestos exposure the radiological examination of 117 workers (sixty-nine former workers and 48 employed in three factories at the time of

study) yielded 16.3 per cent with asbestosis. This did not represent the true incidence because some 150 employees had been discharged fifteen months before the study was made. Only three cases, all doubtful or borderline, were found to have been exposed to dust concentrations of less than five million particles per cu. ft. Above five million numerous cases were found. It is suggested that if the dust concentration of factories could be kept below five million, new cases would probably not arise. The engineering section of the monograph considers that such a low concentration can be attained.

S. Roodhouse Gloyne.

SAUPE, E. Weitere Beiträge zur Röntgendiagnose der Lungenasbestose. [Further Contribution to the Radiological Diagnosis of Pulmonary Asbestosis.] *Arch. f. Gewerbepath. u. Gewerbehyg.* 1939, v. 9, 391-406, 10 figs.

The author published his earliest observations on this subject with KUDGER and ROSTOSKI in 1931 [this *Bulletin*, 1931, v. 6, 861]. In the present paper he gives further details on the radiology of this disease, his series of workers examined having now reached 420. Four stages of radiological appearances are described, viz. (0-I) a prodromal stage with a sharp delineation of normal markings in middle or lower fields, which is not definitely diagnostic; (I) as above with very small delicate shadows; (II) increasing density of radiogram with the formation of numerous minute shadows beginning with diminished penetration in the middle and lower fields and especially around the heart shadow, with broadening of the hila without, as a rule, any signs of calcification; (III) intensification of the appearances of (II) with increased penetration in upper fields and more marked changes around the heart shadow with still further broadening and thickening of the hila. [British writers on the subject emphasize the ground-glass appearance of the middle and lower lung fields with an ill-defined woolly margin to the heart shadow, as the most characteristic feature.]

S. Roodhouse Gloyne.

VIOBANI, E. C. Due casi mortali di asbestosi polmonare. [Two Fatal Cases of Pulmonary Asbestosis.] *Rass. Med. Ind. Torino*, 1940, v. 11, 26-32, 2 figs. [1939-40.]

Two cases are described in considerable detail and in particular the post-mortem findings. An interesting discussion on the pathology and pathogeny follows. The first was a woman of 56 years whose work entailed for thirty years inhalation of asbestos dust. There was resultant pulmonary fibrosis which, however, seems not to have given rise to any recognizable symptoms and the patient continued at work till an influenzal attack started a progressing illness ending in death four months later.

The second was, in some respects, the opposite of the first. The patient was a woman of 50 years, who, between her 14th and 21st years, was engaged in work which necessitated inhalation of asbestos dust. Pulmonary fibrosis resulted with troublesome cough, a liability to attacks of bronchitis, though for fifteen years she was able to carry out heavy work. Thereafter her pulmonary condition became aggravated and for the last twelve years of her life she was practically an invalid, with persistent cough, asthma and dyspnoea. Radiographs show the conditions present. A valuable list of references cited is given.

H. Harold Scott.

MOTTURA, G. & FAGIANO, E. Anatomia patologica e patogenesi dell'asbestosi polmonare. [Pathogeny and Pathology of Pulmonary Asbestosis.] *Russ. Med. Indust.* Torino. 1940, v. 11, 233-84, 16 figs. (11 on 8 pls.) [118 refs.]

Though the subject of asbestosis is dealt with, as the title shows, purely from the pathological and the morbid anatomy and histology aspect and not from that of public health, attention is drawn to the article here because, for those interested, it gives an excellent account of the changes set up and of the relations between asbestosis and silicosis, gained from personal observations and from a study of the literature. Illustrations are clear and well reproduced and there is a fairly full bibliography, in which British workers are given their full share.

H. Harold Scott.

STONE, M. J. Clinical Studies in Asbestosis. *Am. Rev. Tuberculosis.* 1940, v. 41, 12-21, 6 figs. [12 refs.]

This is a clinical record of 180 patients who had been employed for three years or more in a factory manufacturing brake lining for cars, and who had worked in the cutting, spinning and weaving rooms. Many of them were also engaged in the more dangerous work of crushing the crude asbestos, and the great majority of them had been employed from five to fifteen years. Some had, indeed, worked for more than twenty-five years. The cases came to medical examination through disability claims, and none was employed in the asbestos factories at the time of,

or after, medical examination. Of the 180 patients, thirty-two were diagnosed as negative, both on X-ray examinations and on physical signs. The remaining 148 patients were classified as follows—

Stage I	78 patients
Stage II	51 "
Stage III	16 "

In Stage I were included cases in which there was definite limitation of chest expansion (less than 2 in.) in addition to roentgenological evidence of increased lung markings. Stage II comprised those who had definite symptoms and whose X-ray films revealed evidence of pulmonary fibrosis. Stage III comprised those patients who had both symptoms and roentgenological evidence of marked pulmonary involvement.

The outstanding symptom in all patients was dyspnoea. Physical signs in the chest were chiefly those of basal fibrosis with accompanying emphysema at the apices. The most marked being diminution of chest expansion. As to radiological examination, in the early stages there was only a slight relative increase in density in the lower zones of the film, producing a hazy appearance of the bases. The shadows were much finer and lighter than the nodular or patchy type of infiltration found in silicosis. As the disease progressed, there was an increase in the density in the lower lung zones, the diaphragm became indistinct in outline, and showed limitation of movement, whilst the costo-phrenic angle was obliterated by the thickened pleura. The characteristic picture, however, was a granular or "ground-glass" appearance of the film with more or less obliteration of the usual linear pulmonary markings, this being localized in most cases to the mid-lung region and bases. All these changes were associated with the author's classification of Stage II. He reserves Stage III for films showing a marked parenchymatous change with frequently associated bronchitis and bronchiectasis.

It is noted that the heart and pericardium were affected much more than in any other types of pneumoconiosis. X-ray films showed the increase in the transverse diameter of the heart with prominent pulmonary vessels.

With regard to tuberculosis, out of 180 films taken in this series, only nine showed evidence of parenchymatous tuberculous infection, two active, seven inactive, whilst in sixteen cases of advanced asbestosis, only one had active tuberculosis. The author is therefore not impressed with tuberculosis as a serious complication of asbestosis.

Follow-up studies were made on thirteen patients, two and three years after their first examination, and the impression was gained that in advanced fibrosis due to asbestosis, the disease will progress even after exposure ceases. This was not so, however, in the early cases. Since the entire group was first examined, eighteen patients had died.

S. Roodhouse Glynn.

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EIMHARDT, W. Untersuchungen ueber die Bedeutung des Staubbindungsvermögens der Nase bei Asbestose. [Experiments upon the Importance of the Dust Filtration Capacity of the Nose in Asbestosis.] *Arch. f. Gewerbepath. u. Gewerbehyg.* 1910, Nov. 5, v. 10, No. 3, 309-26, 3 figs. [65 refs.]

This article gives the results of an investigation into the capacity of the nasal passages to filter out dust particles from the respired air, in a group of workers in Berlin asbestos factories. The number of completed tests was 121, and the subjects included numerous types of workers, spinners, weavers, etc. The apparatus used for the experiments was that of LEHMANN, which consists of an elaborate dust filtering apparatus fitted to the nose and containing a konimeter. As the result of numerous experiments Lehmann had concluded that nasal filtration of 40 per cent of respired dust particles could be regarded as the dividing line, persons giving readings above that figure being normal, below abnormal. The author, however, found in his investigation of asbestos workers, that this dividing line of 40 per cent between the normals and abnormal did not hold good. The group below 40 per cent contained healthy workers as well as some with asbestosis; on the other hand there were workers suffering from severe asbestosis with readings above this figure. A graph of the whole group investigated shows that readings above 40 per cent were not common and the largest number fell between 15 and 30 per cent filtration.

S. Roodhouse Gloyne.

HANNESSON, H. A Case of Pulmonary Asbestosis Accompanied by Tuberculosis. *Tubercle.* 1911, Feb., v. 22, No. 2, 40-44, 3 figs.

Pulmonary tuberculosis is found complicating asbestosis less often than it complicates silicosis, and appears later. Of ninety cases of death from asbestosis reported between 1933 and 1939, tuberculosis was present in thirty-two.

In a typical case the radiogram shows a fine diffuse fibrosis, beginning at the bases, and when complicated by tuberculosis the latter is distinguished as in cases of silicosis; the present case is of more than usual interest, first because the diagnosis was made during life, secondly because the radiogram did not show any definite evidence of pneumoconiosis, and thirdly because there was no macroscopic evidence of pneumoconiosis at autopsy.

The patient was a man of 41 years who gave a history, dating from five years back, of winter colds, bronchitis, loss of weight and once a large emphysema. He was admitted with a diagnosis of primary tuberculosis. For nine years he had been employed as an "asbestos blower," a dusty occupation involving asbestos fibre through a cleaning machine. When provided with a respirator he did not use it. Physical examination revealed impairment of note in both lungs, diminution of breath sounds at the bases, crepitations fairly generally distributed;

sputum contained tubercle bacilli and asbestosis bodies. X-ray yielded no evidence of pneumoconiosis, but widespread nodular tuberculous infiltration with cavitation. The fingers were markedly clubbed. Twenty-five days after admission the patient had a spontaneous pneumothorax and died the same day.

Autopsy revealed thickened pleurae, collapsed right lung with a cavity in the upper lobe which had perforated; macroscopically, the appearances were those of a pure tuberculosis. It will be seen, therefore, that the case recorded in this paper differs considerably from a typical case of pulmonary asbestosis; in the latter the pleural sacs may be completely obliterated by fibrous adhesions; the bases adhere firmly to the diaphragm; bronchiectasis is frequent, the lungs appear honeycombed, but firm, tough and airless. The upper lobes may be spongy, crepitant and emphysematous, strongly contrasting with the lower parts of the lungs. Microscopically, in this patient there were seen caseous tuberculous areas, reticular fibrosis of asbestosis most marked in the subpleural region, and a thickened pleura. Dr. Roodhouse Gloyne reported "Asbestosis bodies were numerous and large, many of them were in clumps with a radial arrangement. The presence of the asbestosis bodies implies a tissue reaction to the fibre, but it does not necessarily follow that this reaction is accompanied by fibrosis. The asbestosis bodies are an expression of tissue reaction of the nature of a benign irritant, and fibrosis of an appreciable extent may or may not be a part of that tissue reaction. Asbestosis bodies are the sign of tissue reaction to a foreign body just as much as phagocytosis, but the bodies should not be regarded as indicative of asbestosis unless they are accompanied by reticular fibrosis."

From the radiological aspect four stages of pulmonary asbestosis are distinguished: in the first, movement of the diaphragm is restricted; "the root shadows are unusually heavy and the basal linear striation on one or both sides is increased. The two sides of the chest are equally involved . . . some loss of translucency and a fine homogeneous opacity or haze at one or both bases."

In the second stage the homogeneous opacity becomes more obvious and a fine punctate stippling may be detected at one or both bases, while the basal linear striation is more obvious, with very definite restriction of diaphragmatic movements and sometimes blurring of the diaphragmatic angles. The interlobar pleura is usually thickened and may be drawn down to the base by the fibrosis.

"In the third stage definite evidence of pleural involvement may be present, with or without mediastinal displacement, depending upon the irregularity of fibrosis in the two lungs."

"In the fourth stage the fine punctate mottling has spread beyond the limits of the lower zone to the middle and even upper zone, but the apices usually remain free. This fine diffuse mottling stands out in definite contrast to the coarse nodular mottling which is seen in silicosis."

H. Harold Scott.

KERN, J. Uebermikroskopische Untersuchungen an Asbeststaub und Asbestlungen. [Uebermikroskop Investigations on Asbestos Dust and Asbestosis Lungs.] *Arch. f. Gewerbepath. u. Gewerbehyg.* 1911, Apr. 16, v. 10, No. 5, 473-85, 13 figs. [16 refs.]

Using the Siemens "Uebermikroskop" the author has made a comparison of the asbestos fibres and asbestosis bodies in lungs exposed to serpentine (chrysotile) and hornblende (amosite). Hornblende fibres were larger and the author suggests that the smaller serpentine fibres are more readily dissolved and may therefore be more responsible for the resultant fibrosis.

S. Roodhouse Gloyne.

BÜHME, A. Untersuchungen an den Arbeitern einer Asbestfabrik. [Examination of Workers in an Asbestos Factory.] *Arch. f. Gewerbepath. u. Gewerbehyg.* 1912, Nov. 10, v. 11, No. 4, 433-52, 8 figs.

This is a record of clinical and radiological observations made in an asbestos factory during the years 1936-7 and the year 1940. The factory handled raw asbestos and manufactured a variety of asbestos products. It employed up to 500 workers. Of 132 persons examined, 29 per cent showed radiological evidence of asbestosis. Correlating these findings with exposure, it is stated that there were in workers with less than three years of exposure 5 per cent of cases, in those with three to five years of exposure 12 per cent, in five to ten years 56 per cent, and in over ten years 79 per cent. Five cases of pulmonary tuberculosis were noted. The clinical histories of these are recorded.

S. Roodhouse Gloyne.

WELZ, A. Weitere Beobachtungen ueber den Berufskrebs der Asbestarbeiter. [Further Observations on Occupational Carcinoma in Asbestos Workers.] *Arch. f. Gewerbepath. u. Gewerbehyg.* 1912, Nov. 10, v. 11, No. 4, 536-59, 6 figs. [14 refs.]

This article is a record of two cases of asbestosis complicated by cancer of the lung. The first patient was aged 13, with an exposure of eleven years in an asbestos factory; death was due to squamous cell carcinoma. The second worker had had thirty years' experience in asbestos work and showed at autopsy an atypical epithelial cell new growth.

The author suggests there is a causal relationship between asbestosis and carcinoma.

S. Roodhouse Gloyne.

RUSKA, H. Uebermikroskopische Untersuchungen an Asbeststaub und Asbestlungen. [Uebermikroskop Investigations on Asbestos Dust and

Asbestosis Lungs.] *Arch. f. Gewerbepath. u. Gewerbehyg.* 1912, Dec. 31, v. 11, No. 5, 575-8, 2 figs.

WEDLER, H. W. Asbestose und Lungenkrebs. [Asbestosis and Pulmonary Carcinoma.] *Deut. med. Woch.* 1913, Aug. 6, v. 69, No. 31/32, 575-6.

The author has collected the published autopsy records on asbestosis from various countries and finds that there have been fourteen instances of malignant disease of the lungs and pleura in ninety-two post-mortem examinations (16 per cent). This is in excess of the proportion of lung carcinomata in autopsies generally (2-8 per cent). Carcinoma as a complication of asbestosis occurred most frequently in males between 35 and 41 and was generally in the part of the lung most affected with asbestosis. Development of the lesion was slow but corresponded with the length and intensity of the exposure (twelve to forty-two years). There was often a long interval between the cessation of exposure and the development of the cancer, which, in the author's view, must now be regarded as an occupational cancer.

S. Roodhouse Gloyne.

HOMBURGER, F. The Co-incidence of Primary Carcinoma of the Lungs and Pulmonary Asbestosis. Analysis of Literature and Report of Three Cases. *Amer. J. Path.* 1913, Sept., v. 19, No. 5, 797-807, 10 figs. on 1 pl. [17 refs.]

"A review of the literature on the association of pulmonary asbestosis and carcinoma revealed that there are at least nineteen known cases (including the three herein reported) of asbestosis associated with primary pulmonary carcinoma. In this laboratory the association of the two conditions is remarkably high. In eight cases of asbestosis there were four instances of primary pulmonary carcinoma."

ALDEN, H. S. & HOWELL, W. M. The Asbestos Corn. *Arch. Dermat. & Syph.* 1914, May, v. 49, No. 5, 312-14, 4 figs.

Men employed in lagging pipes in shipbuilding yards with the use of "amosite," a natural form of asbestos, were found to develop corns on their fingers. Investigation revealed that ninety-nine out of 167 men presented one or more of these lesions. Small splinter-like bits of amosite penetrate the skin; about ten days later, if the foreign body is not removed, a small hard corn-like tumour appears and slowly grows, often attaining the size of a small split pea. The affected area does not become normal again until the hard central plug has been removed. Fibres of amosite may be detected in an excised corn. Under the microscope a corn is seen to be formed of layers of cells, without evidence of inflammation.

The author finds that the lungs of asbestosis have without corns or nodules of special ventilation. Since a serious condition in it.

NORO, L. d. 3. 53-9.

This article asbestosis has been exposed country. elastic tissue especially sion from the asbestos very short. The chemical as follows: (Al₂O₃) 2 (CaO) 0.2 The asbestos found to be described by the cellular fibre, the are given, accepts the causation factors in phase."

SKAVLUM, Pulm. Path. on 6.

LUTON, P. The Body of the

The authors recall the reaction which takes place in the lungs to dust particles of asbestos; but no case of asbestosis was found among the men. Some men have worked with amosite for so long as seven years without developing corns; but the majority developed corns within the first three or four months. Removal of spicules with forceps after work is useful in prevention. Cure can be obtained by simple paring of the cornified areas until all excess keratin is removed. Since a corn is relatively innocuous and leaves no serious sequelae, there is often little interest taken in it.

E. L. Collis.

NORO, L. On the Histology of Asbestosis. *Acta Path. et Microb. Scandinavica*. 1946, v. 23, No. 1, 53-9, 6 figs.

This article gives a short account of the histology of asbestosis as seen in two workers in Finland who had been exposed to the amphibole asbestos of that country. This variety of asbestos is harder and more elastic than others and therefore is considered to be especially dangerous. [The reviewer's general impression from experimental work is that the more brittle the asbestos fibre the more likely it is to break up into very short lengths and to penetrate lung tissue.] The chemical analysis of this Finnish variety is given as follows: silicic acid (SiO_2) 56.27, aluminium oxide (Al_2O_3) 2.50, ferrous oxide (FeO) 4.18, calcium oxide (CaO) 0.25, magnesium oxide (MgO) 31.44 per cent. The asbestos needle-like particles of this variety were found to be "noticeably smaller" than those described by some other workers. Brief accounts of the cellular and connective tissue reaction to the fibre, the asbestosis giant cell and the asbestosis body are given. With regard to the last named the author accepts both the mechanical and chemical theories of causation but is inclined to think that "the mechanical factors are the most important, although the chemical factors may have some significance in a later phase."

S. Roodhouse Gloyne.

SHAVLEM, J. H. & RITTERHOFF, R. J. Coexistent Pulmonary Asbestosis and Sarcoidosis. *Amer. J. Path.* 1946, May, v. 22, No. 3, 493-517, 11 figs. on 6 pls. [29 refs.]

LA FAY, P., CHAMPEIX, J. & FAURE, P. La signification de la présence de corps asbestosiques dans l'expectoration des travailleurs de l'amianté. [The Significance of the Presence of the Asbestosis Body in the Expectoration of Workers in Asbestos.] *Arch. Malad. Professionnelles*, Paris. 1947, v. 5, No. 1, 56-68, 7 figs. [33 refs.]

A detailed historical introduction to the subject. The authors give their experience of four years'

observation of workers in the asbestos industry with special reference to the study of the significance of the asbestosis body. They classify their conclusions under four headings—(1) Asbestosis bodies are difficult to find in the early months of exposure owing to the fact that the workers have no sputum unless an attack of influenza or bronchitis produces expectoration. In one worker asbestosis bodies were indeed found after twenty days' exposure, but this is unusual and four to five months is the average time. Four illustrative examples are cited. (2) In 162 workers (observed over a period of four years) who had neither radiological signs nor clinical symptoms of the disease, asbestosis bodies were ultimately found in all cases. At first the bodies were short, thick and non-fragmented, but later longer specimens were found with typical clubbed extremities. The numbers of bodies increased with the exposure, they occurred singly in the sputum and were accompanied by asbestos fibres. (3) The finding of clumps of asbestosis bodies first recorded by STEWART, TATTERSALL & HADDOW [this *Bulletin*, 1933, v. 8, 27] is confirmed. Two cases are recorded at considerable length in which there were definite radiological signs of the disease and in which the sputum showed these clumps. (4) Lastly the fact of the persistence of asbestosis bodies in the sputum after the exposure has ceased is stressed, but the authors are convinced that the finding of these bodies is only one of the diagnostic features of asbestosis and that it cannot be accepted alone for purposes of diagnosis from a medico-legal point of view.

S. Roodhouse Gloyne.

BOARD OF TRADE. German Industry. F.I.A.T. Final Report No. 1670. Technical and Scientific Developments related to the Asbestos Industry in Germany. 42 mimeographed pp., 7 figs. 1947. Mar. 23. London: H.M. Stationery Office.

This report is a description of the machinery and installation of the German asbestos industry which is considered to be of interest to American industry, and is a supplement of previous reports especially Fiat Final Report 460 and Bios Final Report 401, Item 22. The main problem for the German asbestos industry is regarded at present as one of lack of material, in which the British Zone is not so badly off as the American. The report consists broadly of three sections, one dealing with industrial plant, another with problems of dust control and a third with some experiments made by German scientists during the war to prepare a synthetic asbestos. The present position with regard to the plant and installation is solely an engineering problem. The preparation of a synthetic product has been held up by the collapse of German industry, and not a great deal appears to be known about it, but the basic idea seems to have been "gelling" of sodium silicate with hydrochloric acid, washing out of the gel to remove NaCl by liquefying it under steam pressure, evaporating the sol to 11 per cent SiO_2 with the addition of 5-10 per

cent sugar, introducing a spinning process and finally ageing the fibre, washing the sugar residue and drying. The section on dust control has a direct bearing on general industrial hygiene.

For many years before the war, insurance (*Berufsgenossenschaft*) against the risks of dust and accidents was compulsory. The use of respirators was recommended only in extreme cases, reliance being chiefly placed on an efficient dust control organization. The report gives a translation of the Regulation for Dust Prevention in Asbestos Processing Plants issued by the German Government in 1940. This lays down general engineering precautions for dust control, with detailed instructions as to the protection of machines and the provision of exhaust equipment. [Many of these are already in use in Britain, but the details are too technical for abstraction.] An official centre for advising on dust prevention, especially in the case of the installation of new plant, was provided by the Government. Children under the age of 18 were not considered suitable for dusty occupations [no details are given, however, as to the regulations for their exclusion]. It was forbidden to eat, or to remain, in dust-endangered rooms during rest periods. Outdoor clothes were not to be kept in workrooms and work clothes had to be cleaned at regular intervals [time not stated].

The writer of the report also interviewed Dr. Luise HOLZAPFEL who had had charge of an organization in Berlin for the investigation of silicosis problems, before the collapse of Germany. She stated that she and her staff had been engaged for some time on the isolation of organic silicon compounds. Two important ones had been discovered, but their chemical composition has not been completely determined when the war ended. One was a silicon compound of the lipid group obtained from the lungs of patients suffering from silicosis accompanied by tuberculosis, the other was a Si-N compound present in normal blood. The isolation of these compounds had been extremely tedious, taking from two to three years and when the Russians took over that section of Berlin they had ordered the destruction of all material on the ground of risk of infection. Dr. Holzapfel considered that there was no risk of tuberculosis provided that silica metabolism in the body was normal, and she regarded disturbed fat metabolism in undernourished workers as a predisposing cause of tuberculosis. She was of the opinion that the compound isolated from healthy blood might have some therapeutic value both in tuberculosis and tuberculo-silicotic patients. The striking resemblance between the tissue of a silicotic lung and vulcanized rubber suggested to her the presence of long-chain organic silicon oxygen compounds, probably formed when the fresh surface of quartz grains reacted with some unknown constituent of the blood. The presence of oxygen was necessary, she believed, for that reaction to take place and she further expressed the view that "a compound in which the silicon atoms are completely surrounded by organic radicals probably cannot cause silicosis because such a compound will be insoluble and unreactive." Dr. Holzapfel had tried

to cultivate the tubercle bacillus on SiO_2 gel containing various nutrient substances, but without success.

The writer of the report states that further information on the two substances mentioned can be obtained from the Kaiser-Wilhelm Institut für Silikat Forschung in Berlin-Dahlem. The substance formed in normal blood had 1.3 per cent SiO_2 , 6.5 per cent N, but no iron or cholesterol; it was water-soluble, strongly alkaline, with a melting point over 250° [presumably Centigrade] and had been isolated from the lecithin fraction in the blood. The second was a water-insoluble substance from the lung tissue, and could be concentrated in the ester fractions. The lecithin compound, on the other hand, was almost completely absent from lung tissue. In silicosis the melting point of the extracted mixture of ester-free fat was found to increase in relation to the severity of the disease. Early cases of silicosis yielded a mixture melting at 45° whilst the material extracted from more advanced cases melted at $72-81^\circ$. Extraction of silicotic lungs gave a higher proportion of lipoids (esters, free fatty acids and phosphatides) than was obtained from healthy lung tissue.

S. Roodhouse Gloyne.

WEGELIUS, C. Changes in the Lungs in 126 Cases of Asbestosis observed in Finland. *Acta Radiologica*. 1947, Apr. 30, v. 28, No. 2, 139-52, 10 figs. [16 refs.]

This article is a record of 126 radiologically manifest cases of asbestosis among 476 workers in Finland employed by the Finska Mineral A.B. Firm. Of the workers affected, thirty-four were employed in the Company's dressing works at the mine in N.-Eastern Savolax, while ninety-two were working in the factory for finished products near Helsinki. There were ninety-four (75 per cent) instances of mild asbestosis of stages I and I-II (with an average mean exposure 3.4 years), twenty-three (18 per cent) of medium stages II and II-III (with an average mean exposure of 7.9 years), and nine (7 per cent) of advanced stage III (with an average mean exposure of 11.5 years).

During the observation time of two years, twenty-seven of the thirty-six patients in the ante-primary stage progressed to stage I; of the stage I cases, four of thirty-two patients progressed to the intermediate stage I-II, and the same number passed to stage II; of the stage II cases, two out of ten advanced to intermediate stage II-III. Two deaths occurred before the commencement of the examination; since then no reliable information has been forthcoming with regard to others, although it is probable that some deaths have occurred. The method of radiological classification used was that of SÄPPÄ, viz. ante-primary stage; Stage I, extremely fine network in the middle of basal fields; II, denser picture with numerous extremely small nodular shadows; III, marked shadow of middle and basal fields with confused contour of heart shadow.

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No instances of carcinoma or tuberculosis were met with. [With regard to this last point, three different sets of records now exist in the literature, relating to the incidence of tuberculosis, viz. (a) operatives examined at work; (b) those seeking advice at out-patient clinics or under treatment in hospitals; (c) autopsy records. Obviously the last group is the most reliable one as to the incidence of tuberculosis accompanied by asbestosis.]

S. Roodhouse Gloyne.

OLLIVIER, H., MORAND, P. & BRETZ, R. Considérations à propos des granulomes cutanés de l'amiante. [Granulomata of the Skin due to Asbestos.] *Arch. Malad. Professionnelles*. Paris. 1949, v. 10, No. 5, 516-17, 2 figs.

A man whose work lay in applying asbestos sheets to lag heating stoves wounded the palm of his left hand. The injury was slight and almost passed unnoticed. A fortnight later he came under notice complaining because at the site of the prick a swelling which was increasing in size had appeared. There was no inflammation and the swelling was hard at the centre. When this core was excised, a small white nucleus was dissected out which was seen under the microscope to be formed of needles of asbestos together with a mass of crystalline matter. In order to examine this matter, other samples from other asbestos scars were ablated and so 6 mg. were obtained for analysis. Then the matter was identified as cholesterol. One point of some interest is that this formation of cholesterol would seem to indicate a fundamental and biochemical defensive process of the body against aggression by asbestos.

E. L. Collis.

CARTIER, P. Contribution A l'étude de l'amiantose. [A Contribution to the Study of Asbestosis.] *Arch. Malad. Professionnelles*. Paris. 1949, v. 10, No. 6, 589-95.

For over three years the author has been in medical charge of 3,242 men employed in mining asbestos at mines in Canada. At these mines over 70 per cent of the world's supply of asbestos is obtained. Forty per cent of the men have been employed for ten to forty years. The minerals mined consist of asbestos in the form of chrysotile and serpentine. That from serpentine has been found clinically and experimentally to be a nuisance rather than to be a cause of pneumoconiosis. But it is known that chrysotile causes asbestosis, at least when its dust is inhaled while the mineral is being spun and woven into cloth. Cases of asbestosis were found only in men who had been employed for at least fourteen years and exposed to air containing five million or more fibres of asbestos fibres per cu. ft. of air. The fibres being from 10 μ to 250 μ in length. The striking feature of this report is the mildness of

any pulmonary trouble found among the miners resulting from inhalation of asbestos dust, compared with what has been reported in the United States and Great Britain as occurring in factories where asbestos is spun and woven. Clinically none of the symptoms of pulmonary fibrosis—cough, dyspnoea, cyanosis and loss of weight—were present. No case of pure asbestosis was detected in those under age 60, and most of them were carrying on their work without any physical incapacity. The mining neighbourhood would seem to be unduly "infected" with tuberculosis, but cases of that disease were not found to be any more frequent among the miners than among the clerical staff and the rest of the community. Having regard to the late age at which asbestosis appeared, it was difficult to ascribe any cardiac affections present to the asbestosis rather than to the ordinary wear and tear of life. Post-mortem findings and X-ray examinations indicate that asbestosis is undoubtedly a pathological entity; but among these miners it develops so slowly as not to shorten working life, and there is no evidence that it predisposes to tuberculosis. The conclusions arrived at are supported by the opinions of experts from Saranac.

E. L. Collis.

FRANCHINI, A. & CANEPA, G. Contributo allo studio anatomo-patologico dell'asbestosi polmonare. [A Contribution to the Study of the Pathology of Pulmonary Asbestosis.] *Med. d. Lavoro*. 1949, June-July, v. 40, Nos. 6/7, 161-72, 7 figs. [17 refs.] English summary.

The only previous publication on this subject in Italy was on two fatal cases described by MOTTURA and FAGIANO in 1910; a case of asbestosis with tuberculosis was described in an unpublished thesis by CASTAGNERI in 1910. The cases described by Mottura and Fagiano were of special interest and they are discussed in comparison with the case now described.

A man, aged 40, who had been employed for twenty-two years applying insulating material containing asbestos, sustained fatal head injuries in a street accident. A remarkable feature of the case was the absence of incapacity from asbestosis, and the only symptoms recorded were cough and bronchial catarrh which apparently were ascribed to smoking. Post-mortem examination showed thickened pleura, extensive involvement of both lungs, especially the middle and basal portions, in a diffuse fibrosis with thickening of the inter-alveolar septa and hyaline changes, and patches of emphysema. Numerous asbestosis bodies were found, singly and in clumps, in all parts of the lungs, presenting the usual features of a central fibre with a segmented coating of a brownish-yellow deposit; these bodies were also found in the cortical tissue of the pulmonary lymphatic glands. The lungs were the seat of acute broncho-pneumonia which had developed between the time of the accident and death eight days afterwards.

PNEUMOCONIOSIS ABSTRACTS

It is suggested that periodical medical examinations should be made of persons exposed to asbestos dust, including workers employed in the application of asbestos insulating material.

E. L. Middleton.

WYERS, H. Asbestosis. *Postgraduate Med. J.* 1949, Dec., v. 25, No. 290, 631-S, 4 figs. [27 refs.]

Asbestos appears to be an exception to the rule that nearly all pulmonary fibroses are due to silica, as it is a silicate. Other silicates, however, are not toxic, and GARDNER in 1938 therefore suggested, on the basis of animal experiments, that the effect was mechanical, since it was produced by long fibres and not by short. JOHNSTONE, in 1918, made the clinical observation that workers exposed only to very short-fibre asbestos were not affected by it. [It is unfortunate that the further experimental work that Gardner did before his death and which completely clinched the mechanical theory, has not yet been published.]

The use of asbestos goes back to the ancient Greeks, but it is only since the nineteenth century that it has been widely used. The name covers a group of fibrous silicates characterized by resistance to heat, acids, and sea water, which are obtained by mining and quarrying.

Asbestosis was first reported in this country in 1906, but was not officially recognized as an industrial disease until 1930. The condition is thought to be due to the blocking of the finer bronchioles by relatively long (about 20 μ) fibres which appear to irritate the bronchial wall and cause fibrosis. The typical asbestos bodies which were described by GLOXNE in 1929 [this *Bulletin*, 1929, v. 4, 977] are

evidence of exposure to asbestos inhalation, but not necessarily of disease. Dense pleural adhesions are common.

The clinical picture comprises dyspnoea and cough, with sometimes cyanosis and clubbing. The X-ray changes are often minimal when the disease is severe, but usually there is evidence of fibrosis and later of emphysema. The commonest complication is tuberculosis, but there is also an increased liability to carcinoma of the lung.

Since the recognition of the disease, and the consequent precautions which have been taken, it has become rarer and less severe.

The only other silicate which has been shown to produce pneumoconiosis is talc.

B. M. Wright.

LIVINGSTONE, R. & STREET, E. W. A Case of Pulmonary Asbestosis. [Memoranda.] *Brit. Med. J.* 1950, Apr. 22, 939.

The interest of this case is that asbestos bodies were found in the sputum some twenty years after the end of exposure to dust containing asbestos, which filled the air near the asbestos crushers with which the patient worked from 1924 to 1929. Respirators were not provided and the workmen took only simple precautions, such as tying handkerchiefs over their mouths and noses. In 1949 he was suspected of tuberculosis as a result of miniature radiography, and admitted to cough for the preceding ten years. There was fine, diffuse, mottling in the middle and lower zones of the lungs; no tubercle bacilli could be found, but asbestos bodies were seen in the sputum.

Charles Wilcocks.

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PNEUMOCONIOSIS

ABSTRACTS

P186.

VOLUME III—1951-1955

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Published for the
BUREAU OF HYGIENE AND TROPICAL DISEASES
by
PITMAN MEDICAL PUBLISHING CO. LTD

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General

INTERNATIONAL
CONFERENCE
ON DUST
Sydney
Vol. 1
Geneva

This Conference was held in Australia, Norway, Sweden, and the United Kingdom. It was the first of the I.L.O. expert conferences on dust, and is noteworthy as the first subject of a conference on dust. It is not published in an unabridged form, but has been in the form of an essential reference work of interest in the evidence of various types of experience.

The volume contains a suggested list of references. This is based on the classification of the collection of papers. Careful attention to the numbering of the references is graphically presented, such as the availability of the Conference volume and the papers in reference.

The volume is a valuable reference work, and is a valuable addition to the library of the dust control worker.

SECTION VI

PNEUMOCONIOSIS DUE TO SILICATES

Asbestos: Aetiology—Pathology—Radiology—Clinical Findings—Complications
Other Silicates: Kaolin—Talc—Mica—Fuller's Earth (Montmorillonite)—Feldspar—Sepiolite

VORWALD, A. J., DURKAN, T. M. & PRATT, P. C.
 Experimental Studies of Asbestosis. *Arch. Indust. Hyg. & Occupational Med.* Chicago. 1951, Jan., v. 3, No. 1, 1-43, 13 figs. [Refs. in footnotes.]

The findings are here summarized of many years of research inaugurated by the late L. U. GARDNER at Saranac. Much light is thrown upon the damage done to the lungs by inhaled particles of asbestos, which occurs in a number of minerals, all silicates varying in composition and composed of long, parallel, flexible fibres, capable of repeated longitudinal subdivision to units of molecular proportions. The commonest form is chrysotile, found in veins up to 6 inches in depth, occurring in deposits of serpentine. Guinea pigs, rats, mice, rabbits, and dogs received dust particles of asbestos either by inhalation, or by injection intratracheally, intravenously or intraperitoneally. Three forms of dust were used; (a) ordinary industrial dust, (b) ground dust of which the particles were 3 microns or less in size, and (c) long fibres from which the small particles had been separated. Both (a) and (c), and especially (c), originated characteristic peribronchiolar fibrosis which did not increase after the dust exposure was discontinued; if the animals were infected with attenuated tubercle bacilli, a temporary progression of the infection occurred, followed by subsequent healing, very different from the rapid progress of the infection in cases of silicosis. When the asbestos dust particles were 3 microns or less in size, there was little or no reaction of the living tissues to their presence; here again is a great change from the reactions to silica dust, which are greater as the dust particles become smaller. This difference supports the idea that the reaction to asbestos fibres is of mechanical origin, rather than of chemical origin as in the case of silica dust. Dust composed of brucite fibres which resemble asbestos in flexibility, but contain only 0.9 per cent. of silica, was also found to originate peribronchiolar fibrosis; but dust of glass fibres which are not flexible and cannot indefinitely be divided longitudinally, does not set up fibrosis, nor do fibres of asbestos after their physical characters have been altered by incineration. Injection experiments confirmed the inhalation tests; further, the suggestion that the

pulmonary reaction was due to irritation found support from the fact that somewhat similar fibrotic reactions were seen in the movable peritoneum, but not in the fixed organs like the liver and spleen.

The curious asbestos bodies associated with asbestos fibrosis are considered to be fibres of asbestos upon which have been deposited organic material rendering them innocuous; when such bodies were used alone no fibrotic reactions were induced. Dust of aluminium hydroxide, held to render silica dust innocuous, was not found to exert any influence upon asbestos fibres. Excellent illustrations of microscopic appearances support the conclusions drawn, and extensive tables contain experimental findings.

A further report is promised which will be concerned with human asbestosis. E. L. Collis

BEHRENS, W. Über experimentelle Asbestosis. [Experimental Asbestosis] Reprinted from *Schweiz. Ztschr. f. Allgemeine Path. u. Bakt.* 1951, v. 14, No. 3, 275-97, 9 figs. [65 refs.]

This report on the results of animal experiments is introduced by a discussion on the theories of the pathogenesis of asbestosis—the solubility theory and the mechanical irritation theory. The problem of causation is complex since asbestos used in industry is not a pure chemical substance but is a mixture of chrysotile-asbestos and horn blende asbestos, compounds which differ in their chemical and physical characters.

In the experiments here described in some detail, a pure chrysotile asbestos was used and the effects of its introduction, intraperitoneally into mice and intratracheally into rats, were studied. The unsuccessful attempts to secure fibres of standard length are described. The fibres used in these experiments ranged from 5.0 μ to 180.0 μ in length, but the majority were between 20.0 and 60.0 μ long.

A full description, illustrated by photomicrographs, is given of the macroscopic and microscopic appearances of the organs of the animals which had been killed at various intervals of time after the introduction of the asbestos. The general picture is one of non-specific focal fibrosis resulting from the introduction of foreign bodies. No solution or toxic

action of the asbestos could be demonstrated. Asbestosis bodies were not formed. These bodies are regarded by the author as products of a non-specific reaction of certain tissues, to long-fibred foreign bodies, and are considered not to have any significance in the genesis of asbestosis.

M. E. Delafield

CHAMPEIX, J. & BOUTEVILLE, J. Étude au microscope électronique des corps asbestosiques et des fibres d'amiante. [A Study with the Electron Microscope of "Asbestos Bodies" and of Fibres of Asbestos] *Arch. Malad. Professionnelles*. Paris. 1950, v. 11, No. 6, 607-12, 7 figs.

An attempt has been made, by using the electron microscope, to throw light on the composition of the "curious bodies" seen in the sputum and the lungs of those who have inhaled dust of asbestos. Magnifications beyond 2,000 times are beyond the powers of the ordinary microscope; but by using cathode rays it is possible to obtain magnifications of the order of 50,000. Chrysolite is the form of asbestos most used industrially, and some authorities have thought that, by reason of its feeble resistance to chemical changes, this form of asbestos undergoes absorption in the body. Certainly no short fibres, less than 10 μ , are encountered. Asbestos fibres are long and needle-like with a thickness about 0.5 μ and a length from 10 to 20 μ . A "curious body" seems to be a long fibre of that kind coated with a collar of colloidal gel, probably of protein. The pulmonary organic environment in which these bodies lie is eminently suited for molecular changes. The appearances of the free ends of the bodies suggest that such active changes are going on. Hence arises the question whether the bronchopneumonic fibrosis of asbestosis is a mechanical phenomenon, provoked by particles of amosite which is the other and more resistant form of asbestos, or whether it is a chemical phenomenon, provoked by the absorption of chrysolite.

E. L. Collis

RUTTNER, J. R. Über Asbestose- und Pseudoasbestosekörperchen. [Asbestosis Bodies and Pseudo-Asbestosis Bodies] Reprinted from *Schweiz. Ztschr. f. Allgemeine Path. u. Bakt.* 1952, v. 15, No. 5, 623-31. [12 refs.]

The literature on asbestosis bodies is reviewed. Similar products were found by the author in a lung which only contained carborundum and graphite; the bodies were formed around plates and needles of carborundum. The protein and iron which form the bulk of the "bodies" must come from the lung tissues and not from the material matter of the dust. Similar bodies could also be produced *in vitro* but they have not as far been found in animal experiments.

G. Nagelschmidt

KNOX, J. F. & BEATTIE, J. Mineral Content of the Lungs after Exposure to Asbestos Dust. *Arch. Indust. Hyg. & Occupational Med.* Chicago. 1954, July, v. 10, No. 1, Sect. 1, 23-9.

A study was made of the content in asbestos of 27 lungs from persons who had been exposed for varying periods and to varying amounts of asbestos dust during life. The lungs had been collected over 4 years. The identification of the mineral constituents of the ash obtained from the incineration of the lungs is presented. Opinions as to the pathological condition of the lungs were always compared with the mineral findings. Hilar tissue and tissue from the pleural and subpleural regions were examined separately. The object here was to get some estimate of the rate at which the dust particles were removed from the functioning tissue to the hilar glands. The survival time—the time interval between the last exposure to dust and death—was an important factor.

Asbestos fibres are removed from the lung parenchyma mostly by macrophages carrying them to the pleural surfaces and the glands; some may be absorbed in the body fluids—indeed, those undergoing such absorption may form the "asbestosis bodies". The amount of material under examination was not large enough for statistical evidence; but certain indications were definitely forthcoming. The mineral content tended to decline with increasing survival time, and the severity of the lesion was associated with a lengthening of the combined exposure and survival times, and not with increasing mineral content. No severe case of asbestosis occurred in persons with less than 29 years' exposure to dust, but all persons with such long exposure did develop severe asbestosis. Asbestos dust was cleared away relatively slowly, much more slowly than it was inhaled. The products of disintegration of asbestos bodies are a relevant pathogenic factor; it is a slow process and may take several decades. On removal from dusty conditions the fibrotic changes do not progress, but tend to regress.

The findings suggest that the onset of asbestosis is not determined by the absolute amount of mineral present in the lung parenchyma, but is related to changes occurring in the inhaled material after a time interval from first exposure which may be as long as 20 years. As a result of these changes a fibrogenic agent is released which is capable of exerting its effect under favourable circumstances.

E. L. Collis

KNOX, J. F. & BEATTIE, J. Distribution of Mineral Particles and Fibers in the Lung after Exposure to Asbestos Dust. *Arch. Indust. Hyg. & Occupational Med.* Chicago. 1954, July, v. 10, No. 1, Sect. 1, 30-36, 3 charts.

The particle size distributions in the incombustible and insoluble residues from the lungs of 27 persons who had been exposed to abestos dust were determined. The material was the same as that used in the previous work [see above].

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number of particles with a greatest length in 25 microns was found to have almost disappeared from the lung parenchyma when the surface—the period between last exposure to dust—was more than 8 years. Meanwhile no change showed in the number of particles of 5 microns and less and of 5 to 15 microns. The suggestion emerges that long fibres of asbestos are attached and converted in the parenchyma into asbestos bodies and then into small particles. This breakdown is associated with severe changes in the lungs. The product that exerts toxic effect is unknown. Anything which lymphatic drainage will assist its action.

E. L. Collis

K. M. Pathology of Asbestosis. *Arch. Inst. Health*. Chicago. 1955, Mar., v. 11, 3, 125-2, 4 figs.

In contrast to silicosis which is generally accepted as a chemical reaction between the pulmonary and fine particulate silica dust, asbestosis is held to be a physical reaction between relatively large asbestos fragments and the lung tissue. Free asbestos is held to be chemically poisonous to living tissues, whereas crystal fragments of asbestos traumatize tissues. Asbestos fragments in the lung are enveloped by giant cells and colloidal matter in characteristic asbestos bodies. The resulting asbestosis is divided into 4 grades; in the first grade there is an increase of lung fluid, but no "ground-glass" X-ray shadows. Grade 2 is grossly abnormal, but alveolar walls thicken and perivascular fibrosis appears. So far freedom from dust exposure permits entire recovery. Grade 3, marked by dyspnoea, the lung being of coarsely comb fibrous texture. Cessation of exposure halts further progress, but the condition will not return to *statu quo ante*. In grade 4 the patient becomes absolutely disabled as regards respiratory and circulatory functions. Pleural fibrosis is not reversible. [No similar reaction caused by any other dust is quoted in support of this reaction to asbestos dusts.] E. L. Collis

OSWANY, A. S., VENKATESH, D. S. & RAMA RAO, R. The Nature of Lesions caused by Asbestos and Mica in Experimental Pneumokoniosis in Guinea-Pigs. *J. Indian Inst. Sci.* 1953, Oct., 35, No. 4, 319-31 (Sect. A.), 2 text figs. & 15 figs. on 4 pls. [38 refs.]

In order to elucidate some of the puzzles connected with the production of silicosis a series of experiments were undertaken by subjecting guinea-pigs to intratracheal injections of suspensions of mica and asbestos. Stress is laid on the development, after long periods of lesions in other organs besides the lungs, chiefly in the adrenal glands. Mica dust was found to lead to some degree of nodular formation in

the lungs, but the asbestos dust set up diffuse fibrosis only. These differences are portrayed in a series of photomicrographs. Mica induced hypertrophy of the adrenal cortex with extensive foamy degeneration of the cortical cells; asbestos induced lesser changes, but small areas of necrosis were occasionally found in the zona fasciculata and zona reticulata.

A discussion of some interest follows, in which the atomic structure of asbestos and mica is illustrated, and accumulated evidence is claimed to show that the pathological lesions in the lungs and other organs due to dust are in some way intimately related to the crystalline lattice of the mineral. Exactly how this crystalline structure reacts with living protoplasm—as indeed it must—to form the scar tissue which becomes fibrous and pathological is not clearly set forth; nor is any suggestion made why the whorled fibrosis of silicosis is so bound up with tuberculous infection, whereas the more diffuse fibrosis of asbestosis is less associated with the infection, and the minor nodular fibrosis of mica has no such tendency. That miners exposed to mica and asbestos dusts experience anorexia, weakness, loss of weight and extreme prostration may be ascribed to the damage to the adrenal glands. Still we are left wondering how a dynamic interplay of hormone secretion is determined by the physico-chemical properties of the minerals.

E. L. Collis

KRAUSLER, J. & SEYSS, R. Zur Frühdiagnose der Asbestosen mittels Vergrößerungsaufnahmen. [Early Diagnosis of Asbestosis by Enlarged Radiographs] *Ztschr. f. Unfallmed. u. Berufskrankh.* 1954, Mar. 15, v. 47, No. 1, 59-64, 2 figs. on 2 pls. [15 refs.]

After a brief description of asbestosis and the changes in the lung tissue found in the early stages of the disease the authors describe a radiographic technique with a fine focus, in which Müller-Philips apparatus D A 400 is used, and an exposure time of 0.2 second. Of 17 asbestos workers, with employments varying in duration from 1 to 18 years, 8 showed changes in the lung tissues by radiography with the enlargement technique; 2 of these showed no change by normal technique, and in the 6 other cases the degree of change shown was minimal. Photographic reproductions of the radiographs of the least affected worker, with 7 years' exposure, show the more marked findings with the enlargement technique.

E. L. Middleton

BÖHME, A. Ergebnisse von Nachuntersuchungen bei Arbeitern einer Asbestfabrik. [Results of Periodical Examinations of Workers in an Asbestos Factory] *Beiträge z. Silikose Forschung*. 1951, No. 11, 27-34.

Radiological supervision in an asbestos factory started in 1933. Labour turnover was rapid, women chiefly being employed and only a small nucleus of

workers of either sex had more than 10 years' exposure. The average labour force was 200 but during the war it was more. X-ray changes were first seen in rare cases after 21 to 3 years of work, as fine reticulation in the middle and lower parts of the lung, usually associated with a dry cough.

That the dust hazard has been reduced can be seen by comparing results of surveys in 1936, 1940 and 1949. The incidence of asbestosis is given in percentages in the following table, the figures in brackets refer to the number of people examined.

Years at work	1936	1940	1949
2-5	13 (33)	8 (51)	3 (33)
5-10	58 (23)	50 (10)	35 (11)
Over 10	77 (9)	80 (10)	53 (31)

Stage 3 asbestosis is very rare, three cases only being seen between 1940 and 1949.

A comparison of different working places shows that the risk is low in spinning and weaving but high in preparation, carding and brake polishing. A table shows results for 14 cases from 1936 to 1949. Some progressed, others did not. Enquiries among former workers reveal little if any tendency to progression after the dust exposure has ceased. This is in contrast to silicosis. On the other hand a personal factor exists, as in silicosis, as a number of workers do not get asbestosis in spite of high dust exposures.

Progressive tuberculosis is rare, only two cases being found, both started in the parts of the lung least affected by asbestosis. One combination of asbestosis and carcinoma of the lung was found.

The main result of this study is the demonstration that the hazard can be reduced by dust control.

G. Nagelschmidt

SANDER, O. A. Asbestosis as differentiated from other Pneumoconioses. *Arch. Indust. Health*. Chicago. 1955, Mar., v. 11, No. 3, 203-11.

There is agreement that X-ray findings in cases of asbestosis differ from those seen in cases of silicosis. But these very differences are those all too often seen in badly taken X-ray films of more or less normal chests. Such films are especially common in overweight persons. Emphysema with one or more adhesions of the diaphragm due to past pleurisy may simulate an asbestosis film and the "ground-glass-appearance" is easily read into such a film. The effect of plenty of coal-dust may be hard to distinguish.

A history of exposure to asbestos dust must be found, but should not be invented merely because the patient may have done a little lagging with asbestos on a hot-water pipe. Asbestosis develops only after long periods of exposure to dust in considerable amounts. But we have no certain accepted maximum allowable concentration to guide us. Little attention should be paid to first-stage borderline cases with

little or no disability. The only persons to recommend to less dusty work are persons under the age of 40 with a clear-cut diagnosis, and cases where progression is seen on serial films, regardless of age. More attention should be directed to differential diagnoses, in preference to accepting asbestosis in every case of an obscure X-ray film and an even more obscure occupational history. E. L. Collis

SZCO, F. Asbestosis pulmonar. Contribucion al estudio de esta pneumoconiosis. [Pulmonary Asbestosis] 94 pp., 3 pls. [Bibliography.] 1950. Madrid: Ministerio de Trabajo.

CLERENS, J. Recherches sur l'asbestose pulmonaire en Belgique. [Research into Pulmonary Asbestosis in Belgium] *Arch. Belges Méd. Sociale, Hyg., Méd. du Travail et Méd. Légale*. 1950, Nov., v. 8, No. 9, 557-65, 13 figs. (7 on 2 pls.)

Asbestos is used in many industries, but in the present enquiry only the fibro-cement industry comes under consideration. In this work asbestos is crushed and mixed with cement. During the processes harmful dust is generated, but closed-in apparatus is used which prevents most of the dust from escaping into the air. Dust samples showed that, even in the places where there was most dust, only from 740 to 1,490 particles per cc. of air were found; of these, 50 per cent. were less than 5 microns in size. Such dustiness is not excessive. The workers exposed to the dust have been examined periodically over a period of three years. Out of 75 of these men who had been employed for varying periods (7 for over 30 years), 70 gave no signs of any dust troubles, 4 were doubtful, and only one presented X-ray shadows indicative of pneumoconiosis. This man died of progressive circulatory insufficiency, and details are given of the post-mortem findings. Throughout both lungs indurated nodules were found particularly at the pleurae, which were thickened, as were the rest of the pulmonary tissues. No tubercle bacilli could be found anywhere, but throughout the lungs there were "curious bodies" which are so distinctive of asbestos particles lying in living tissues. These bodies were seen in fibrous zones, in the alveoli, and even included within giant phagocytes. This man, aged 49, had been totally incapacitated with pronounced dyspnoea on exertion and cardiac failure. Particles of asbestos were found in 10 out of 12 samples of sputum and "curious bodies" in 3 samples; such findings, however, were not associated with X-ray shadows indicative of pulmonary fibrosis. The evidence is against much danger arising from the manufacture of fibro-cement.

E. L. Collis

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ON, P., CHAMPEIN, J. & FAURE, P. Un cas d'asbestose pulmonaire. (Évolution radiologique. Étude anatomo-pathologique.) [A Case of Pulmonary Asbestosis with its Development followed by X-Ray, and Its Post-Mortem Study] *Arch. Malad. Professionnelles*. Paris. 1951, v. 12, No. 6, 629-33, 8 figs.

The case reported is said to have been the first of asbestosis known to have occurred in France. The man, aged 62, came under observation in 1943 after having been exposed to asbestos dust for 11 years in a factory where asbestos cloth was woven. The number of particles in the working environment varied from 2,250,000 to 4,000,000 per litre of air, and the size was from 1 to 2 microns in diameter. At first he complained of dyspnoea on exertion, and showed some cyanosis of his lips. From then onwards during 7 years until he died, he was watched and the progress of the X-ray shadows of the lungs was noted. At first the network of both lungs, particularly in the lower two-thirds, was accentuated. At the end the shadows indicated pronounced fibrosis of the ground-glass variety in the lower parts of both lungs, contrasting with clear apices. No emphysema was present. After death the structure of the lungs showed general thickening throughout, especially of the pleurae, but with no localized nodules. Many asbestos bodies were seen, isolated or in groups, together with giant cells and mineral particles. These changes are well illustrated. No evidence of tuberculosis was found. The dust could be traced not only in the vessels of the lung, but also in the vessels of the liver, kidneys and spleen. In contrast to silica dust, asbestos particles seem to exert more of a mechanical than a chemical influence upon the pulmonary tissues.

E. L. Collis

tion was undertaken to discover any other points. The authors compared this case with those of uncomplicated silicosis; in the latter residual air is frequently increased; expiration is prolonged; the maximal respiratory capacity is reduced; but hypernoea is less, rapid breathing is not so intense, and anoxaemia is never so important during effort. These differences are stressed as important when necessity may arise in determining the occupational origin of some case with an obscure diagnosis.

E. L. Collis

BEHRENS, W., Jr. Über Klinik und Pathologie der Asbestosis. [The Clinical Picture and Pathology of Asbestosis] *Ztschr. f. Unfallmed. u. Berufskrankh.* 1952, June 15, v. 45, No. 2, 129-40; Sept. 15, v. 45, No. 3, 179-89. [150 refs.]

This is a general account of asbestosis introduced by mention of the uses of asbestos centuries ago for woven garments for the dead during cremation and as wicks for the lamps of the vestal virgins. The chief chemical and physical characters of different kinds of asbestos belonging to the 2 main groups of this mineral—amphibolite and chrysolite asbestos—are recorded. The world distribution of asbestos and its mining, treatment and use are shortly described as well as the industries in which dust inhalation hazards may be met with. Reference is made to the published work of a considerable number of authors who have studied asbestosis since the first records of the disease in about 1906, and give their observations on the effect of length of exposure to asbestos dust in different concentrations.

The symptomatology and diagnosis, and the X-ray findings in the different stages of the disease are given.

Special mention is made of the association of asbestosis with carcinoma, which is contrary to experience in cases of silicosis. Post-mortem reports from the literature indicate that in 309 cases of asbestosis there were 44 lung carcinomas (14.2 per cent.) whereas in 2,204 cases of silicosis only 32 carcinomas were found (1.4 per cent.).

The experience of the association of tuberculosis and asbestosis varies greatly in different countries. English workers have recorded a high rate of tuberculous infection in workers in asbestos, and the Home Office reports for 1933 to 1939 include 90 deaths from asbestosis, among which there was tuberculosis in 32. This is, however, to be compared with the silicosis deaths (1932 to 1939)—there were 797 tuberculous infections in a total of 1,397 fatal cases of silicosis. In America, tuberculosis is a rare complication of asbestosis. Some figures from the German experience record that among 500 definite and 200 doubtful cases of asbestosis there were found only 11 instances of active and 51 of inactive tuberculosis, whereas among cases of silicosis the incidence of tuberculosis was 35 per cent. in the slight and 63 per cent. in the severe degrees of silicosis.

The rest of the paper consists of a description of the

ENIER, H., DENOLIN, H., DECOSTER, A., CAMMAERTS, P. & DENOLIN-REUBENS, R. Étude clinique et physiopathologique d'un cas d'asbestose pulmonaire. [A Clinical and Pathological Study of a Case of Pulmonary Asbestosis] *Arch. Belges Méd. Sociale, Hyg., Méd. du Travail et Méd. Légale*. 1952, Feb., v. 10, No. 2, 61-70, 2 figs. [17 refs.]

diagnosis of asbestosis must depend upon a history of occupational exposure to the dust of asbestos, associated with symptoms of interference with the functioning of the respiratory organs. A case is reported of a woman who came under notice in 1931. She had worked for 25 years in a factory weaving asbestos with great exposure to dust and had been suffering from dyspnoea for six years which compelled her to take to her bed; she was of poor appetite, had cough, abundant grey sputum and marked dyspnoea on effort. X-ray showed a picture of generalized fine micro-nodules in both lungs, more pronounced at the bases. Asbestos bodies were found in the sputum. The diagnosis having been made, a close physical examina-

macroscopic and microscopic appearances of the lungs in asbestosis as well as a discussion, with an excellent reference list, of the nature and significance of the "asbestosis bodies" about which there have been so many differences of opinion.

M. E. Delafield

CARTIER, P. Some Clinical Observations of Asbestosis in Mine and Mill Workers. *Arch. Indust. Health*. Chicago. 1955, Mar., v. 11, No. 3, 204-7.

The author writes after 9 years of medical supervision of some 4,000 asbestos mining workers. Annual medical and X-ray examinations are brought under review; 53 cases came to autopsy; 123 cases of asbestosis were detected, and 28 of the patients are still alive. Consideration of the age distribution of the cases of asbestosis and of the causes of death of those who died suggests that asbestosis is not necessarily an incapacitating disease. Its victims often live to an advanced old age; in one pronounced case the patient was over 80. Six deaths due to bronchogenic carcinoma are of special interest and may suggest a possible relationship between asbestosis and pulmonary carcinoma though this remains questionable. To summarize the evidence: asbestosis is considered a serious disease in some instances, but more frequently it remains a disease which can be tolerated quite well for many years, even without appreciable symptoms, so long as some other serious disease does not complicate the position. Its presence, however, must always introduce medico-legal questions difficult to solve. Compensation boards may tend to give undue weight to the presence of any degree of asbestosis.

E. L. Collis

STOJADINOVIC, M. Prve azbestoze i prste pneumonizacije od uglja u našoj zemlji. [First Cases of Asbestosis and Simple Pneumoconiosis caused by Coal Dust in Yugoslavia] *Arhiv Hig. Rada*. Zagreb. 1954, v. 5, No. 1, 57-76, 3 figs. on 3 pls. [38 refs.]

The English summary appended to the paper is as follows:—

"The author's task was to find out whether in the asbestos mines and factory (the latter working only since 1947) at Korlače in the Ibar basin there were cases of pneumoconiosis so that the necessary technical protection could be introduced. Geomorphological, mineralogical, petrographical and chemical data pointed to the likelihood of that group of workers suffering from anthracosis-silicosis in addition to asbestosis.

"The author describes the production process and the method of work, he also discusses information on ecological and other factors on the various categories of workers. However, the bulk of the workers are with equivalent minor or professional miners. A severe respiratory organ damage among the workers from the lowest of the following problems: ventilation, hygiene

of housing, healthy vacations, food and clothing, organization of hygiene in the factory. The enquiry touched also on the problem of the fluctuation of workers in the various mines. That fluctuation may account for the large number of mixed pneumoconioses in that region.

"Only 80 workers (22.2%) were examined out of the total of 360. Radiographies on normal film were made of 76 workers (21.1%).

"The clinical and radiological part contains data obtained from examinations, radiographs and laboratory work. The objective findings include a high incidence of conjunctivitis (71.2%), goitre (31.7%), bronchitis (50%), diminishing of vital capacity (in 84.9% of cases), diminishing of the respiratory stretching of the thorax (in 84.9 per cent of cases) and changes in the orthodiagram of the heart.

"The author describes the radiographs, the classification of pneumoconiosis in the workers as well as its diagnosis. He discusses difficulties and errors relating to the interpretation of radiographs as well as the differences of opinions referring thereto.

"Out of the total of 76 radiographs 6 (7.8%) were found without changes, 17 (22.5%) were suspect, 22 (28.9%) had asbestosis, 29 (38.2%) anthracosis-silicosis, and 2 (2.6%) anthracosis-silicosis. Tuberculous lesions were diagnosed in 96.3% of cases of which 3.7% cases had active closed tuberculosis.

"The changes in the skin of the soles and palms could not be identified with certainty as asbestos warts. Hematuria was found in 58.5% cases. Its cause could not be identified but its incidence is in direct ratio to exposure during work.

"The sputum of 39 out of 52 examined persons contained asbestos needles and single, atypical asbestos corpuscles with a positive Perls reaction were found in 5 cases."

FARRIS, G. Verruche da amianto ed altre manifestazioni cutanee nei lavoratori dei "coibenti". [Asbestos Warts and other Dermatoses in Workers with Lagging Materials] *Rass. Med. Indust.* Turin. 1953, Jan.-Feb., v. 22, No. 1, 1-17, 12 figs. [17 refs.]

The author has followed up 29 such workers and found from 1 to 4 warts in every case, mostly on the palms; 3 showed warts on the dorsal aspect of the hands. The range of lagging materials in use includes asbestos cord, which is wound round pipes, etc., various asbestos-containing slabs, which are incorporated in or otherwise applied to partitions or other flat surfaces, and mixtures of asbestos and cement which are in the form of paste to be moulded to the shape of the tank or other object which is to be insulated.

The warts are due to asbestos fibres which penetrate into the epidermis or get lodged deeper still, in the corium or true skin and produce reactions in these tissues respectively. The epidermis shows acanthosis [thickening of the prickle-cell layer] and hyperkeratosis [increased horny tissue] and the corium shows

a granulation of giant cells.

Such warts are of a subcutaneous skin, and this condition (hygroscopic) the asbestos.

Clear appearance discussed.

STOLL, R.

Associa-

Intern

[14 refs.]

All previous asbestosis together.

data upon hard to collect.

of asbestos carcinoma, cent. of patients.

Among 40 cases of cent. in 11.

reported of pipes with.

He came a cough. No.

marrow was cells were discrete or metastases.

in diameter lungs, with in both kidneys.

areas of new club-shaped outside the.

lished the lung with numerous asbestosis.

in asbestos established measures asbestosis.

Warrington (Asthma) Dr. S. J. B. [14 refs.]

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Warrington (Asthma) Dr. S. J. B. [14 refs.]

granulomatous type of reaction with the appearance of giant cells in some cases.

Such workers may also show exudative dermatitis in a subacute form, with a dry, thickened and cracked skin, associated with vesicles and, later, pustules. This condition is attributed to the combined action of the anisotropic and alkaline (of cement and (irritant) of the asbestos fibres themselves.

Clear photographs illustrate both the naked-eye appearance and the histology of the lesions which are discussed.

J. Cauchi

STOLL, R., BASS, R. & ANGRIST, A. A. Asbestosis associated with Bronchogenic Carcinoma. *Arch. Intern. Med.* 1951, Dec., v. 88, No. 6, 831-4. [14 refs.]

All previous references to any association of asbestosis with pulmonary carcinoma are brought together. While they are in the bulk suggestive, data upon which statistical proof can be based are hard to collect. But in one enquiry out of 235 cases of asbestosis there were 31 instances of pulmonary carcinoma, or 13.2 per cent. to compare with 1.0 per cent. of pulmonary carcinoma in the general population.

Another worker found 7.5 per cent. among 40 cases of asbestosis; and yet a third found 14.8 per cent. in 115 cases of asbestosis. A new case is now reported of a man who had worked for 6 years covering pipes with asbestos, refusing to wear any respirator. He came under notice with weakness and persistent cough. Nothing definite was found until the bone marrow was examined, when clumps of malignant cells were seen. X-ray showed generalized large discrete oval shadows, indicative of pulmonary metastases. After death, nodules varying to 4 cm. in diameter were found scattered throughout both lungs, with interstitial fibrosis. Metastases were found in both kidneys, in the brain and in the liver. Large areas of necrosis existed throughout the lung. Typical club-shaped brown asbestos bodies were seen in and outside the tumour areas. The examination established the existence of anaplastic carcinoma of the lung with possibility of multicentric origin and numerous metastases, associated with pulmonary asbestosis. The opinion is suggested that the silicate in asbestos must itself be directly carcinogenic. It establishes an additional reason for preventive measures, with careful dust control, in the use of asbestos.

E. L. Collis

WERNER, M. Lungen-Asbestose und Karzinom. [Asbestosis and Carcinoma of the Lung] *Zent. f. Arbeitsmed. u. Arbeitschutz*. 1952, Nov., v. 2, No. 6, 179-83, 3 figs.

Report of a case.

STOLL, GEORGINA M., FAIRBANKS, J. S. & STEWART, M. J. Occupational Cancer of the Urinary Bladder in Dyestuff Operatives and of the Lung in Asbestos Textile Workers and Iron-Ore Miners. *British Medical Journal*. 1952, Feb., v. 2, No. 2, 1-3. [12 refs.]

After a short discussion of occupational cancer in general, the authors give a table classifying industrial cancers by their causes, indicating in which cases experimental proof has been obtained, and then proceed to discuss recent work on the groups in which they are specially interested.

Occupational Cancer of the Lung

In Asbestos Textile Workers: In 1925 one of the authors (M. J. S.) in a series of 72 (40 male and 26 female) autopsies on workers in two asbestos factories demonstrated an association between pulmonary asbestosis and cancer of the lung, which was found in 25.1 per cent. of males and 8.7 per cent. of females. The higher incidence in males may be accounted for by the fact that 7 of the women had died before the cancer age. There was no significant difference in average age at death, average period of exposure or average age of starting work between males with uncomplicated asbestosis and those with the complication of cancer of the lung, in contrast to the dyestuffs industry, in which death was accelerated by the supervention of cancer of the bladder. The degree of fibrosis was less in the lungs with cancer than in those without and the morbid anatomy and histology of 13 lung cancers, of which full notes were available, was unusually varied; 4 were large tumours near the hilum, 7 were situated in the periphery, 2 were pleural; there was one rhabdomyosarcoma, the rest were adenocarcinoma or oat-cell carcinoma. There were also 4 peritoneal anaplastic carcinomas, the primaries of which were not found.

Regulations for the control of asbestos dust were introduced in 1931 and will doubtless lead to the disappearance of severe degrees of pulmonary fibrosis and possibly of the associated cancer.

In Iron-Ore Miners: One of the authors (J. S. F.) has personally conducted autopsies on 192 Cumberland haematite miners during the last 20 years and in addition has performed autopsies on 2,378 Cumberland males, over the age of 20 years, unselected in regard to cancer or lung disease. He found cancer of the lung in 8.65 per cent. of the iron-ore miners and in 1.65 per cent. of the others; the difference of 7:2:1 is statistically significant. The age of onset is not significantly delayed, most of the miners having entered the mines under the age of 30; all their lungs contained much silica and iron at death, but there was no significant difference in the content of either mineral in the lungs with and without cancer; as in the case of asbestosis the degree of fibrosis was less in the lungs with cancer.

The common factor in these two types of occupational lung cancer is silica and it is suggested that this may be the carcinogenic agent, by causing pulmonary fibrosis which precedes the initiation of the malignant process. The fibrosis usually is of less degree, however, in those lungs in which cancer supervenes; on published evidence the case for an aetiological relationship between nodular silicosis and lung cancer is stronger than in the case associated with asbestosis and iron asbestosis. W. L. Barrett

JONES, R. Mortality from Lung Cancer in Asbestos Workers. *Brit. J. Indust. Med.* 1955, Apr., v. 12, No. 2, 81-6. [14 refs.]

Sixty-one cases of lung cancer have been recorded in persons with asbestosis since the first case was reported by LYNCH and SMITH (*Amer. J. Cancer*, 1935, v. 24, 56). In the Annual Report of the Chief Inspector of Factories for 1947 [this *Bulletin*, 1949, v. 24, 556] MEREWETHER reported that cancer of the lung was found at autopsy in 15.2 per cent. of cases of asbestosis [see also BONSEN *et al.*, *ibid.*, 1955, v. 30, 613]. Animal experiments are inconclusive.

Since 1935 records have been collected of all the coroners' necropsies on persons known to have been employed at a large asbestos works; 105 in all are summarized; there were 18 cases of cancer of the lung, 17 in males and one in a female, 15 persons with asbestosis present and 3 in persons without asbestosis. All the subjects in whom the two diseases were found together had been employed for at least 9 years before the national regulations for the control of asbestos dust were introduced in 1931. The mortality among a section of the male employees of the works referred to, who had worked for at least 20 years in "scheduled (i.e., dusty) areas" was compared with the mortality recorded for all males in England and Wales; the incidence of cancer of the lung among men employed for different periods under the pre-1933 conditions were compared. The numbers of men alive in each 5-year age-group were counted separately for each of the years from 1922 to 1953; the causes of death as given on the death certificate or as finally determined by necropsy were classified as lung cancer, with or without mention of asbestosis; other respiratory and cardiovascular diseases, with or without mention of asbestosis; neoplasms other than lung cancer; and all other diseases. The numbers in each category were then compared with those which might have been expected to occur, by multiplying the number of men alive in each 5-year age-group by the corresponding mortality rates for men in England and Wales over the same period. Because of the small numbers in each year the populations were added together to form groups—1922-33, 1934-38 and so on—the mortality rates used were those for the middle year.

The number of men studied was 113, and 11 deaths from lung cancer, all with mention of asbestosis, occurred against 0.3 expected; from other respiratory diseases, with mention of asbestosis, 14 against 0 expected; without mention of asbestosis, 6 against 7.6; neoplasm other than lung cancer, 4 against 2.3 expected; all other diseases 4 against 4.7. In all there were 30 deaths against 15.4 expected; the excess was therefore entirely due to excess deaths from lung cancer and from other respiratory and cardiovascular diseases. All the cases of lung cancer were confirmed by necropsy and histological examination and all were associated with the presence of asbestosis. The risk for men employed for under 10 years, 10 to 14 years, and for 15 years and over were compared and it was concluded that the risk of lung cancer over the

whole period among asbestos workers was of the order of 10 times that experienced by other men, but the risk was probably greater before 1933 and has become progressively less during recent years, as the duration of employment under the old dusty conditions has decreased. W. L. Harnett

ROMOLI, G. Asbestosi e carcinoma polmonare in una filatrice di amianto. (Spunti sul problema oncogeno dell'asbesto). [Asbestosis and Pulmonary Carcinoma in an Asbestos Spinner. (Notes on the Induction of Lung Cancer by Asbestos Fibres)] *Med. d. Lavoro*. 1955, Apr., v. 46, No. 4, 242-50, 1 fig. [40 refs.]

The English summary appended to the paper is as follows:—

"The first case of pulmonary carcinoma occurring in Italy in a subject affected by slight asbestosis is described. The malignant neoplasia was observed in a woman 49 years of age who for 29 years had worked as a spinner in an asbestos factory. The diagnosis formulated in life was confirmed by postmortem, the gross and microscopic findings of which are briefly reported. The present clinical, pathological and statistical knowledge on the capacity of asbestos to cause tumors are summarized. A tumor should be taken as occupational in nature only when the statistical data are correspondent to the experimental researches. Whilst there are many statistical data (though not concordant for all countries) experimental researches are few and not concordant. According to the author a hypothesis should be made whereby the capacity of the different types of asbestos to cause tumors differs according to their chemical composition."

LYNCH, K. H. & PRATT-THOMAS, H. R. Carcinoma of the Lung in Asbestosis: Report of Two Additional Cases. *Southern Med. J.* 1955, June, v. 48, No. 6, 555-8, 7 figs.

The evidence that there exists a correlation between the occurrence of asbestosis and carcinoma of the lung is collected. No such correlation has been found with other forms of pneumoconiosis like silicosis and anthracosis, or pulmonary tuberculosis. The pathology of asbestosis is unusual; silicosis and other pneumoconioses present reactions, usually chemical, between minute dust particles and the living tissues; but asbestosis seems to be due to traumatism between quite large particles of asbestos, too large to penetrate into the alveoli, and the pulmonary tissues. Further, no efforts to induce lung cancers in animals exposed to asbestos dust have been successful. Nevertheless, the statistical evidence is strong. Now two more cases of lung cancer occurring in association with asbestosis are reported. One man had worked in an asbestos factory for 25 years and the other for 36 years. In both cases X-ray showed the diffuse granular infiltration over both lungs characteristic of

asbestosis fibrosis disseminated succumbed to cancer of the lung seen 4 cases per cent., of cases taken

JACOB, G. Resonance [Incidence of Asbestos-Related Diseases] [Number]

This is in among asbestos references to of the lung recognized in Germany. exclusively on among asbestos and 17 per cent into cases of it appears that only a exposure to

In co-operative institutes the reported size in all stages females and stage II, 32. Silicosis was males active series the incidence. Four workers, who described, had been exposed to asbestos with asbestosis carcinoma of the were found; life, the has been regarded a man of 60 was diagnosed left lower lobe showed asbestosis transitional lobe, with lesion in the of 57 who died in 1930, for 3 years she died in solid, sprang bronchus, and widespread of 65 who patient, died

asbestosis and the lungs after death exhibited the fibrosis distinctive of asbestosis; but both patients succumbed to bronchogenic carcinoma. The appearances of the lesions are illustrated. The authors have seen 4 cancer cases in 49 autopsies of asbestosis, 8.2 per cent., compared with 0.7 to 2.4 per cent in autopsies taken at random.

E. L. Collis

JACOB, G. & BOHLIG, H. Über Häufigkeit und Besonderheiten des Lungenkrebses bei Asbestose. [Incidence and Characteristics of Lung Cancer in Asbestos Workers] *Arch. f. Gewerbepath. u. Gewerbehyg.* 1955, v. 14, No. 1, 10-23, 4 figs. [Numerous refs.]

This is a study of the incidence of lung cancer among asbestos workers in Dresden, with numerous references to and analyses of the literature. Cancer of the lung developing in asbestos workers is not recognized as an occupational disease in West or East Germany. The international literature is based exclusively on the results of autopsies; the incidence among asbestos workers appears to vary between 12 and 17 per cent. In Dresden, however, from research into cases at the clinic and among the asbestos workers, it appears to be a rare occurrence. It is estimated that only about $\frac{1}{2}$ of these workers have an effective exposure to the dust.

In co-operation with the radiological and radium institutes the authors reviewed the cases of asbestosis reported since the middle 1930s; they numbered 339 in all stages; in the first stage, O-I, there were 42 females and 61 males; stage I, 43 f. and 74 m.; stage II, 32 f. and 61 m.; stage III, 13 f. and 17 m. Silicosis was found in 8 males. In 5 females and 10 males active, open tuberculosis was found; in this series the incidence of active tuberculosis was 4.4 per cent. Four fatal cases of lung cancer in asbestos workers, which occurred in Dresden up to 1954, are described. The first patient was a woman of 46 who had been employed for 3 years, when young, as an asbestos weaver; autopsy showed typical asbestosis, with asbestos bodies, and with squamous-cell epithelioma of the right middle-lobe bronchus; no metastases were found; the asbestosis was not diagnosed during life, the radiographic changes in the lungs having been regarded as due to congestion. The second was a man of 49, an asbestos weaver, in whom asbestosis was diagnosed radiologically, with a tumour in the left lower lobe and one in the right radius; autopsy showed asbestosis and bronchial adeno-carcinoma with transitional squamous-cell epithelioma in the left lower lobe, with metastases, and a caseating tuberculous lesion in the left lower lobe. The third was a woman of 57 who had worked in asbestos, between 1922 and 1931, for 3 years as a moulder and 5 years as a weaver; she died in 1954; there was definite asbestosis and a solid, spreading carcinoma of the right upper-lobe bronchus, with infiltration of the lung parenchyma and widespread metastases. The fourth was a man of 66 who was known at the clinic as an asbestosis patient, diagnosed radiographically 5 years before;

he had been employed in asbestos as an opener from 1927 to 1930 and as a spinner from 1931 to 1948; autopsy, in 1955, showed a right-side bronchial carcinoma with widespread metastases in the lymph glands, liver and skeleton.

A long discussion of the literature on cancer among asbestos workers includes an examination of the characteristics of the disease: the duration of exposure to asbestos dust, and the latent period between exposure and diagnosis of cancer; the localization of the tumour, characteristically in the lower lobes; the histological nature of the tumours, the cell types and structure; and the statistical evidence. These characteristics are no longer convincing evidence of a high incidence of cancer in asbestosis. In future, cases of cancer of the lung in asbestosis should not be published individually but should always be considered in the framework of the whole asbestos industry in the region.

E. L. Middleton

LEICHER, F. Primärer Deckzellentumor des Bauchfells bei Asbestose. [Primary Cortical-Cell Tumour of the Peritoneum in a Case of Asbestosis] *Arch. f. Gewerbepath. u. Gewerbehyg.* 1954, v. 13, No. 4, 382-92, 10 figs. [Numerous refs.]

The case reported here was that of a man aged 53 who had been employed for 26 years, in the period 1919-51, spinning coarse yarn and asbestos; during 16 years of that time he had been exposed to high concentrations of asbestos dust. In 1937 slight asbestosis was diagnosed; in 1947 he had pleurisy with effusion, and in 1950, in a routine examination, calcified tuberculous foci were found scattered over both lungs, without active disease. In 1951 asbestos bodies were found in the sputum and severe symptoms occurred in the chest and back; in 1952 fresh infiltration in the lungs with haemoptysis occurred, and later leptomeningitis supervened, with tubercle bacilli in the spinal fluid, and he died with cachexia.

Autopsy showed tuberculous disease of the lumbar spine with bilateral psoas abscess and mixed infection in both lungs. Asbestosis, stage II, was found in the lungs with diffuse fibrosis; there was slight asbestosis in lymphatic glands and asbestos bodies were found in the spleen. On the peritoneum of the mesentery and over the peritoneal cavity there were thickened patches and many small nodules from a pin head to a millet seed in size; a flat tumour, half the size of a hand and 1 cm. in thickness, was attached to the peritoneum on the under surface of the diaphragm. The results of the histological examination of the tumour are fully described, illustrated and discussed; no typical asbestos fibres or asbestos bodies were found after careful search, but asbestos was found in the tissues of the tumour by X-ray diffraction examination. It is uncertain how the asbestos reached the peritoneal cavity; the most probable route was thought to be by direct penetration by the asbestos fibres from the lung through the pleura and thence through the diaphragm.

E. L. Middleton

PNEUMOCONIOSIS ABSTRACTS

80
EVES, R., SORS, C. & COLBERT, J. Silicatoses. [The Silicatoses]. *Semaine des Hôp. de Paris*. 1952, Oct. 2, v. 23, No. 73, 2936-40, 5 figs.

The term "silicatoses" is applied to pneumoconioses caused by dust containing silicates, but no free silica; such dusts are those of kaolin (magnesium silicate), talc (aluminium silicate), and asbestos. Observations are quoted which were made upon 2 men exposed industrially to dust of talc for 20 and 28 years respectively, and upon 3 men exposed to dust of kaolin for 20, 16 and 15 years respectively. The X-ray appearances of the lungs of each of these 5 men are illustrated. Fibrotic changes are present showing more in the central and hilar areas than in the apices and bases; they are symmetrical, and nodular, rather than reticular. In 2 instances there was superimposed tuberculous infection; one with talc and one with kaolin exposure. The first clinical sign was bronchitis with expectoration without any complaint; then dyspnoea developed; and finally cardiac insufficiency ushered in a fatal issue, sometimes preceded by spontaneous pneumothorax. Far more observations are needed before any definite conclusions can be drawn. But three hypotheses are advanced; first that silicatoses really exist, and here asbestosis may be instanced; second that silicatoses only exist as endogenous silicosis due to disintegration of silicates in the tissues with the freeing of silica, which then induces its recognized reaction; and third that silicatoses do not exist and that the manifestations seen are those of silicosis of exogenous origin, due to the presence, in the dusts of the silicates, of more or less free silica. Whatever hypothesis be selected to interpret the findings there is no doubt about these findings themselves, which medico-legally establish a claim to compensation.

E. L. Collis

LYNCH, K. M. & McIVER, F. A. Pneumoconiosis from Exposure to Kaolin Dust: Kaolinosis. *Amer. J. Path.* 1954, Nov.-Dec., v. 30, No. 6, 1117-27, 7 figs. on 5 pls.

The post-mortem findings are described of two men who had been exposed to considerable amounts of fine dust from kaolin, got from open workings, while it was being processed for various industries. Kaolin, or china-clay, is hydrated aluminium silicate in which particles less than 2 microns predominate. No special examination of the kaolin was made. Nearly all kaolins contain varying amounts of free silica, but silicates form the greater part. The men had been employed for 17 and 22 years respectively. X-rays before death gave diagnoses of (a) advanced pneumoconiosis with infection; extensive confluent consolidation and nodular infiltration; and (b) advanced pneumoconiosis with infection, confluent consolidation, nodular infiltration, cavitation and emphysema. Excellent illustrations show the microscopic appearances of dense hyalinizing fibrosis with alveolar obliteration. The massiveness of the involve-

ment of the upper parts of the lungs is remarkable.

The bluish colour created by the dust deposits in the lungs was a distinctive feature. Nodular fibrosis with massive whorled collagenous deposits formed the more bulky changes. During life respiratory difficulties were experienced by at least one of the men.

[Having regard to the pronounced pneumoconiosis described, exact findings of the kaolin dust are badly needed. Kaolin is an insoluble dust containing aluminium silicate which, as KING [above, p. 52] has pointed out, depresses the solubility of any free silica present, so that such dusts do not set up any marked fibrosis as here described. The exact infection mentioned is not stated, though the cavitation in one case suggests tuberculosis. Respiratory difficulties were experienced during life, but, although massive whorled collagenous deposits composed the bulky changes, these two cases do not establish the existence of 'kaolinosis'.]

E. L. Collis

McLAUGHLIN, A. I. G. Talc Pneumoconiosis. *Arch. Belges Méd. Sociale, Hyg., Méd. du Travail et Méd. Légale*. 1950, July, v. 8, No. 7, 451-60, 12 figs. (2 on pl.)

Talc is a hydrated magnesium silicate, similar in chemical composition to asbestos; it is a flaky mineral, but also occurs as fibres. When crushed it forms a smooth bland powder used for a wide variety of purposes, from toilet powders to a powder for "tacky" rubber tyres. In the production of tyres there is a regular exposure to plenty of dust. Doubt has been expressed whether talc dust can originate pneumoconiosis. Abnormal X-ray appearances have been reported with little or no fibrosis or respiratory incapacity. Two cases are now recorded. One patient, still alive, has dyspnoea, clubbing of the fingers, and an X-ray picture like that of early asbestosis. The second worked for 30 years powdering rubber tyres. When first seen he had aortic regurgitation (from childhood chorea) and signs of pulmonary fibrosis. He went steadily downhill and died 2 years later, death being ascribed to aortic regurgitation and pneumoconiosis. Throughout both lungs were small grey nodules; under the microscope diffuse fibrosis was seen and numerous "curious bodies" were found, similar to those found in asbestosis. These bodies may be formed from a fibre on which iron from the blood is deposited. The factory dust was composed mostly of flakes of talc with only a few fibres; but the particles in the lungs were in the form of straight fibres of talc, all being under 10 microns in length with an average of 5 microns. Without doubt the fibrosis in the lungs was definitely associated with the presence of the particles of talc dust.

Talc granulomata are said to have occurred in the abdomen as a result of contamination with talc glove-powder introduced at operation. [No evidence is adduced that pneumoconiosis due to talc predisposes to tuberculosis or that it incapacitates its possessor.]

E. L. Collis

BAVIER, J.
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BAADER, E. W. Neues über Talklunge und Talkgranulom. [Talc Lung and Talc Granuloma] *Deut. med. W'ch.* 1950, Jan. 6, v. 75, No. 1, 50-51. [12 refs.]

This is a study of the recent literature on pneumoconiosis caused by inhalation of talc dust, and granulomata produced in certain tissues by contact. Special reference is made to the radiographic appearances of the lungs, to the presence of the special "bodies" resembling asbestosis bodies, and to an increased tendency for tuberculosis to occur in the affected lungs. The disease has been described as resulting from exposure to talc dust in the mining and milling of the raw material and in its use in industry, and to the production of talc granulomata in wounds, especially operation wounds in the peritoneal cavity, from the use of talc as a dusting powder on surgical gloves. No new case material is added.

The condition of talcosis is regarded by the author as a distinct entity, and it is suggested that it should be regarded as an industrial disease for purposes of compensation as is done for silicosis, alone or accompanied by tuberculosis; and asbestosis, alone or associated with cancer of the lung. Talcosis would be described for the purpose of compensation as (a) talc pneumoconiosis (talcosis) with disabling impairment of the respiration or pulmonary circulation; (b) talc pneumoconiosis (talcosis) accompanied by active, progressive tuberculosis.

E. L. Middleton

BUUS-HANSEN, A., FROST, J. & GEORG, J. Talcosis pulmonum. *Ugeskr. f. Læger.* 1950, Dec. 7, v. 112, No. 49, 1691-7, 2 skiagrams. [26 refs.] English summary.

In 1940, the Danish public health authorities investigated the possibility of talc poisoning in two rubber factories, and in one of them ten workers who had been employed in it from 15 to 30 years were examined with special reference to deposits in the lungs. All the skiagrams were normal, and there were no complaints of symptoms. In 1949, one of these factories was again studied with reference to talc poisoning, and five workers with the longest time of employment (from 19 to 29 years) were examined. A worker who had been employed for 29 years showed diffuse radiographic changes in the lungs. The present publication gives a detailed account of five cases in which there were radiographic pulmonary changes after prolonged exposure to talc dust during the manufacture of rubber inner tubes. Three of these workers had shown no radiographic evidence of fibrosis after respectively 6, 15 and 15 years of exposure to the dust. But after a further period of 10 years there were marked radiographic changes. None of the five workers presented any symptoms of talc poisoning, but three of them showed a slight reduction of pulmonary function. The authors recommend measures for the reduction of talc dust in the industries concerned, and they suggest that when such pulmonary changes as

they found are demonstrable, it is advisable to move the worker to a less dusty employment.

Claude Lillingston

KÖHLER, G., LEOPOLD, G. & STEYER, W. Zur Frage der Talkumpneumokoniose. [On Pneumoconiosis due to Talcum] *Ztschr. f. ärztl. Fortbildung.* 1951, July 15, v. 45, Nos. 13/14, 375-82, 7 figs.

The existence of pneumoconiosis due to inhalation of talcum dust is taken as established. A survey was made in a factory in Leipzig making powder for cosmetic and medical purposes, where until 1944 talcum was the only mineral base used, although during the last few years minor amounts of colloidal silica and kaolin were used for a time. Among 28 workers one case was found of stage II pneumoconiosis and two of stage I, after 19, 25 and 30 years' exposure to dust. Clinical observations are given in detail; they show little or no disability for stage I, but emphysema, bronchitis, a reduced vital capacity and a shortened apnoeic pause for stage II. The radiological findings are described and discussed in detail and they are illustrated by rather poor reproductions. The pictures resemble asbestosis rather than silicosis.

Working conditions and materials used in manufacture are described, and size distributions of the raw materials and of dusts collected on test plates are given. The case of stage II arose in the mixing room which is well separated from the packing room in which the two cases of stage I were found. The air-borne dust in the mixing room collected at a height of 6 feet contained only 0.6 per cent. by weight of particles below 5 microns and the mixing room was far dustier than the packing room. Dust control was greatly improved in the plant in 1940 by modern exhaust ventilation. Nevertheless, initial and annual X-ray checks by full-size films are recommended for all workers exposed to talcum dust. The subject with stage II had been certified in 1940 and removed from further dust exposure. The two women with stage I do not qualify for compensation under the present law (Eastern zone of Germany) because no objective loss of function of the respiratory or circulatory system or association with tuberculosis can be demonstrated. Both are women of ages 43 and 46 years and their removal from further dust exposure is recommended.

G. Nagelschmidt

HULTGREN, G. V. Undersökning rörande hälsorisk vid hantering av talk. [Investigations of the Risk to Health on Handling Talc] *Svenska Läkartidningen.* 1951, Mar. 2, v. 48, No. 9, 540-42.

Before giving an account of investigations in Sweden, Hultgren draws attention to recent changes abroad in the attitude taken to talc as a possible cause of industrial diseases. Thus in his work on occupational diseases published in 1942, the American

JOHNSTONE stated that no evidence had been found indicative of changes in the lungs due to talc. But in his work "Occupational Medicine and Industrial Hygiene" published in 1948, he referred to several cases of pneumoconiosis shown on post-mortem examination to be due to talc. Speaking in Stockholm in 1949, the German expert in industrial hygiene Dr. E. W. BAADER admitted that talc may provoke changes in the lungs, but that to be severe there must be an exposure to talc for a score of years. A year earlier REDELL discussed the risks of talc poisoning in the organ of the Swedish Medical Association, *Svenska Läkartidningen*. In his opinion talc granuloma and other lesions would be found to complicate operation wounds comparatively often once attention was drawn to this possibility. He suggested that some better substitute for talc should be found for use with operation gloves, and he urged great caution in the handling of talc.

The table Hultgren publishes deals with an investigation carried out in a Swedish cable factory in which talc had entered into the preparation of rubber material for more than 25 years. Among 57 workers who had been in contact with talc there were ten who had been so for more than 15 years—two of them for 25 years. Some of them had complained of discomfort from talc dust. The radiological examination of the lungs in these ten cases showed a certain number of old tuberculous foci and slight emphysema, but not a single case of pneumoconiosis. Yet Hultgren urges caution in the handling of talc which, when there is much of it in the air, should call for the wearing of a mask. He adds that the talc risk is now kept in mind in the planning of factories in which talc is used.

Claude Lillingston

FRIEDMAN, P. S., BELL, M. A. & SOLIS-COHEN, L. Talc Pneumoconiosis. *J. Amer. Med. Ass.* 1952, Apr. 19, v. 148, No. 16, 1418-19, 2 figs.

Talc is a hydrous magnesium silicate; it is used freely as a smooth powder, especially for rubber articles. The claim has been made that its inhalation will originate pneumoconiosis. In support of this claim a case is reported of a man who for some 24 years had worked manipulating rubber ribbons heavily coated with talc powder in an atmosphere cloudy with talc dust. At age 65 he came under observation with a chronic cough of long standing. He had a thoracotomy scar over the lower posterior hemithorax. X-ray disclosed diffuse pulmonary fibrosis, pulmonary emphysema, pleural thickening, and a talc plaque in the right hemithorax. There were also foci of pulmonary calcification. The sputum was negative for tubercle bacilli. Other authors have claimed a minimal incidence of tuberculosis in a series of cases of pneumoconiosis due to talc. The patient improved under treatment. Attention is drawn to linear areas of pleural density due to talc plaques which are said to be present in over 6 per cent. of talc miners. The symptoms seen which are distinctive of talc fibrosis are dyspnoea,

chronic cough, chest pain and fatigue. Limited chest expansion is invariable. Some emphysema is usual with fibrosis of a fine linear and granular character. The plaques are ascribed to accumulations of talc in peripheral lymphatics with lymphatic dilatation and stasis, associated with calcium localization. Steps should clearly be taken in industry to minimize exposure to talc dust. E. L. Collis

JAKES, W. E. & BENIRSCHKE, K. Pulmonary Talcosis with Involvement of the Stomach and the Heart. Report of a Case. *Arch. Indust. Hyg. & Occupational Med.* Chicago. 1952, May, v. 5, No. 5, 451-63, 5 figs. [Refs. in footnotes.]

The case here reported as one of talcosis was in a man aged 42 who prior to 1942 had worked for 16 years in a shoe factory with much exposure during the last 6 years to powdered talc, used to prevent layers of leather from adhering. From 1942 onwards he worked as a carpenter with no further exposure to dusts. He first came under observation in 1943 with cough and dyspnoea on exertion. Silicosis was suspected, but not confirmed. The chest condition got steadily worse, until he was admitted to hospital for the fifth time in 1950, when he died 8 hours after admission. At no time had it been possible to make a certain diagnosis. The heart had shown "cor pulmonale" distinctive of progressive pulmonary fibrosis; and epigastric discomfort was present after exertion. Neither in life nor thereafter could any tuberculosis be detected. Unfortunately no sample of the talc could be obtained. Commercial talc differs tremendously; it may be pure calcium carbonate, or mixtures of talc, tremolite, carbonates and serpentine; it may contain some quartz. Seven commercial talcs contained crystals below 10 microns in length.

The predominating pathological features found in this case were extensive pulmonary fibrosis and granulomatosis, cor pulmonale, and granulomatosis of the myocardium and the gastric mucosa. There was no cavitation, caseation necrosis or lymphadenopathy. Much consideration is given to the findings and to those reported previously in other cases ascribed to talc dust. Certain talc crystals were definitely identified in the tissues; but the length of time between exposure and death, 7 years, must render such findings of doubtful significance. The cardiac and gastric lesions are looked upon as a direct reaction to the talc. Reasons are given for discarding fungus disease and sarcoidosis as possible diagnoses. E. L. Collis

SMITH, Adelaide R. Pleural Calcification resulting from Exposure to certain Dusts. *Amer. J. Roentgenol.* 1952, Mar., v. 67, No. 3, 375-82, 12 figs. [11 refs.]

"An increased incidence of pleural calcification is

and in workers exposed to the dust of tremolite and muscovite mica. It is suggested that this may be due to pleural irritation produced by these dusts plus the presence in them of calcium and magnesium which act to stimulate calcium deposition."

MOSE, B. & DEASY, J. B. Talc Pneumoconiosis in the Textile Industry. *Brit. Med. J.* 1954, Dec. 18, 1450-61, 1 fig. [16 refs.]

The case is reported of a man who for 39 years had been employed as a picker maker. He had to make leather thongs, or pickers, used for driving shuttles which carry the weft threads from side to side through the warp threads on the weaving loom. The hide from which the thong or picker is made, after being thoroughly damped, has to be dusted liberally on both sides with French chalk which is hydrated magnesium silicate or talc. During the operation of dusting the air is cloudy with fine talc dust. Talc consists of fibres from 4 to 10 microns in size, and if it is inhaled, talc plaques may be detected in the lungs radiologically. In the present case X-ray showed a lattice or matrix-work background on which nodular deposits were superimposed. Probably the case was complicated by apical pulmonary tuberculosis. Talc pneumoconiosis is considered to be a rather slowly developing fibrogenic disorder, somewhat similar to asbestosis. The man had begun to experience dyspnoea and a mild productive cough. Others have reported talc granuloma as occurring in abdominal surgery following the use of surgical talc powdered with talc.

E. L. Collis

ALIVISATOS, G. P., PONTIKAKIS, A. E. & TERZIS, B. Talcosis of Unusually Rapid Development. *Brit. J. Indust. Med.* 1955, Jan., v. 12, No. 1, 43-9, 6 figs. [36 refs.]

The cases of 8 men are reported who worked in a talc factory pulverizing pieces of soapstone and creating clouds of dust; 8-hour shifts were worked, and occasionally 16-hour shifts. The exposure to dust was undoubtedly excessive. All the patients exhibited pneumoconiosis, which developed after unusually short periods of exposure. The exposures in cases 1, 2, 4, 5, 6 and 8 varied between 16 and 24 months; it reached 49 to 60 months only for cases 3 and 7. The X-ray shadows showed scattered mottling of the lungs, becoming confluent and soon progressing to tumour-like appearances. Six X-rays are illustrated; the shadows are unusual, more like those seen in cases of asbestosis than in silicosis. In no case could superimposed tuberculosis be detected. The dust particles in the air were frequently too numerous to count; but in 12 samples counts per litre of air varied between 730,000 and 1,925,000 particles. Chemical analysis did not disclose the presence of any free silicic acid in the talc, but only of silicate salts.

The rapid progression of the disease was a clinical and radiological characteristic. X-ray shadows were seen month by month, changing from light shadows to nodules and then to the tumour-like type; at the same time the clinical state rapidly deteriorated. Dust control in the factories concerned is urgently needed.

E. L. Collis

HEIMANN, H., MOSKOWITZ, S., IYER, C. R. H., GUTTA, M. N. & MANKINER, N. S. Note on Mica Dust Inhalation. *Arch. Indust. Hyg. & Occupational Med.* Chicago. 1953, Dec., v. 8, No. 6, 531-2.

The authors, in India, examined 61 workers in factories, to which crude mica is brought for processing. The dust concentrations ranged from 2,000,000 to 3,000,000,000 particles per cubic foot, and only a few workers had been exposed for more than 5 years. The examination included X-ray, which showed "ground-glass 2 reading" in 27, and "ground-glass 1 reading" in 14, of the workers (together 67 per cent.). There was no dust effect beyond this.

The results indicate that the generally accepted maximum allowable atmospheric concentration (20,000,000 particles per cubic foot) is probably correct.

Charles Wilcocks

GATTNER, H. Die Bleicherde-Lunge. [Fullers'-Earth Lung] *Arch. f. Gewerbepath. u. Gewerbehyg.* 1955, v. 13, No. 5, 508-16, 2 figs.

The bleicherde referred to here comprised a number of natural clays composed chiefly of aluminium hydro-silicates, and including varying amounts of Mg, Ca and Fe as well as other bases; combined silica amounted to 50-60 per cent. The chief mineral was montmorillonite which has a lattice structure similar to that of the mica group. The clays are obtained from sedimentary deposits in various parts of Germany. In the factory where this study was made the material used at first was clay from Bavaria; later bentonite from Hungary and Rieder clay from Saxony were used. The amount of quartz in the clays varies widely and it may reach 20 per cent., or, as shown by examination of some consignments, it may be absent altogether. In this factory enquiry showed that up to 1940 quartzose sand had been added to the clay in various proportions up to 20 per cent. The manufacturing process consists in mixing the clay with water and hydrochloric acid, heating, pressing to remove liquid and drying in ovens; the material is then ground in a ball-mill and filled into containers.

Nine men employed in the factory were examined; the history and clinical and radiological findings of 2 of these men are recorded in detail. The first was a locksmith who had been employed in various processes in the working of metals, including dural, to the dust of which he was exposed for several years. He was employed at the fullers'-earth factory for 10

years grinding the dried material in the ball-mill and was there exposed to the dust from the filling process. When he left that work he was 44 years of age. When he was 58 a chest radiograph showed pneumoconiosis, grade II-III, with diffuse, finely granular shadows over both lung fields, more dense in the upper zones, and with uniform, cloudy opacity at both apices. There were no symptoms of ill-health; no tubercle bacilli were found in the sputum after concentration. The second man was aged 47; he was employed for 14 years milling the clay in the same factory. The radiograph showed increased lung markings at the right base and extending to the hilum; both lung fields showed veiled shadowing with finely granular opacities, slightly more marked on the right side; in radiographs taken 2 and 3 years later the changes appeared to be more marked. The diagnosis in this case was pneumoconiosis, grade I-II. There were no symptoms. Of 7 more men employed at the factory radiographs showed one with doubtful early signs, one with uncertain result, and the remaining 5 negative, in the author's opinion; diagnoses given at a radiological institute placed the first 2 of these and one of the negatives as grade I, and one as having commencing signs. In this series of radiological examinations the man with the longest period of employment, 15 years, had a negative radiograph. The periods of employment of the others were comparatively short.

The conclusion reached is that the dust of this material is injurious, although not capable of causing silicosis. This possibility has apparently not been recognized generally, and preventive measures have been neglected.

[Fullers'-earth, composed chiefly of montmorillonite, was known as a cause of pneumoconiosis. See MIDDLETON (1940), *Proc. Internat. Conf. Silicosis, I.L.O. Geneva. Studies and Reports, ser. F. (Industrial Hygiene) No. 17, p. 134.* A fatal case, with autopsy, was described by CAMPBELL and CLOYNE (this *Bulletin*, 1942, v. 17, 331. See also TONNING, *ibid.*, 1950, v. 25, 1259.)]

E. L. Middleton

ROFFER, W. & GÄRTNER, H. Über eine Pneumokoniose bei einem Feldspatarbeiter. [*Pneumoconiosis in a Feldspar Worker*] *Zent. f. Arbeitsmed. u. Arbeitsschutz*. 1954, Mar., v. 4, No. 2, 35-40, 8 figs.

The authors describe a fatal case of lung disease in a feldspar worker, which, though it was not typical of true silicosis, they regard as one of "modified silicosis", the variation being due to the mixed character of the dust inhaled.

The feldspar dust contained 27.1 per cent. of potassium feldspar ($KAlSi_3O_8$); 14.7 per cent. of sodium feldspar ($NaAlSi_3O_8$); 12.6 per cent. of quartz and other minerals, and 45.4 per cent. of quartz.

Post mortem examination showed, in addition to extensive chronic tuberculosis of both lungs, with

caseation and cavitation, diffuse dissemination of large-cell dust granulomata in both lungs.

These nodules, which surrounded the small arteries and extended into the alveolar walls, consisted of macrophages, 1-2 μ in size, containing brown or black amorphous dust. Confluent granulomata resembled silicotic nodules, but there was very little increase of reticular fibres, no hyaline formation and very little increase of collagenous tissue. The lymph nodes contained similar dust granulomata.

Microscopic and polarimetric examination of the dust particles obtained from the lung tissues by ashing and defatting showed that many were doubly refractive.

In discussing the reason why the lesions were not typical of silicosis in view of the quartz content of the feldspar, the authors suggest that the aluminium, potassium, sodium and calcium ions or oxides in the feldspar tend to inhibit or neutralize the silicotic effect of the crystalline quartz particles.

Ethel Browning

POLICARD, A. & COLLET, A. Recherches expérimentales sur la nocivité des poussières de feldspath. [*Experimental Research into the Harmful Nature of Feldspar Dusts*] *Arch. Malad. Professionnelles*. Paris. 1954, v. 15, No. 5, 343-50, 4 figs.

Feldspars occur in most igneous rocks and exposure to their dusts is frequent. There are 3 feldspars; the commonest is orthose, a silicate of aluminium and potassium; then comes pericline, a sodium aluminium silicate; and labrador, a combination of calcium aluminium silicate and sodium aluminium silicate. In order to investigate their possibly harmful properties 100 mgm. of each in fine particles less than 5μ in size were injected intraperitoneally into rats. After one month, and up to 4½ months, the consequent reactions were observed. They are shown in microscopic illustrations. A certain amount of fibrosis was found, increasing with time after the injections; it was most marked for labrador, and least for orthose.

With pericline the lesions were quicker to form and richer in collagen. Compared with that produced by feldspars, the fibrosis caused by silica is always more intense and the formation of collagen more abundant.

The feldspars are more harmful than kaolin and the micas, but less so than fluorspar or silica.

E. L. Collis

PANANA, A. Silicatosis por sepiolita (silicato de magnesio hidratado). [*Silicatosis caused by Sepiolite*] *Med. y Seguridad del Trabajo*. Madrid. 1954, Jan.-Mar., v. 2, No. 6, 11-14, 2 figs. on 2 pls. English summary (7 lines).

A case is described of silicatosis probably due to sepiolite (hydrated magnesium silicate, mouschayum), which has not hitherto been reported. Diagnosis was

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by radiography, and after considering the possibility that other fibrogenic dusts might be incorporated, the author concludes that the initial fibrosis is asbestotic.

F. M. Silicatosis of a Micronodular Type among Women employed in Glaze Spraying on Metal Objects. *Indust. Med. & Surgery*. Chicago. 1952, Feb., v. 21, No. 2, 47-9, 3 figs.

These are here reported of lung fibrosis, diagnosed by X-ray, among women employed for many years in the glazing of iron sheets. The process consists in spraying enamel on to iron sheets which are then dried, scraped and brushed, and thrust into electric ovens to melt the glaze. There is exposure to the dust of the enamel powder, but the maximum percentage of free silica in the powder is 1-2. The

enamel is made by mixing and roasting at 1,100° to 1,200°C. quartz 25 per cent., potassium felspar 30 per cent., natural cryolite 15 per cent., tin oxide 4 per cent., plastic clay 6 per cent., borax 15 per cent., and soda Solvay 5 per cent. In the final frit all the free silica is converted into silicate; the silica referred to above may be from siliceous pebbles in the powdering mill. Four instances are given of women employed from 5 to 12 years, X-rays of whose chests showed shadows of a reticular and micronodular type, attributed to fibrosis. The subjects were in good health and regular workers. No question arises here of any tendency to tuberculosis which is so distinctive of true silicosis. No estimations are given of the dust concentrations to which the women were exposed. If the X-ray shadows seen are due to pulmonary fibrosis caused by dust of silicates and are indicative of the existence of silicatosis, the resulting condition does not seem to be of any particular clinical importance. E. L. Collis

MARCH, 1947

INDUSTRIAL HYGIENE DIGEST

(Vol. 11, No. 3)

Literature Abstracts

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Industrial Health News



Issued Monthly By

INDUSTRIAL HYGIENE FOUNDATION

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327 Asbestos Dust. Anon. Safety Rev. (U.S. Navy), 4, 13 (Jan., 1947)

The brief article calls attention to the hazard of exposure to asbestos dust and the need of adequate localized ventilation. All working places with possible exposure should be checked for asbestos dust, and where mechanical exhaust ventilation must be supplemented by wearing of personal protective equipment, it should conform to Bureau of Mines specifications.

328 Air-Operated System Dumps Cyanide with Safety.
Anon. Compressed Air Mag., 52, 49 (Feb., 1947)

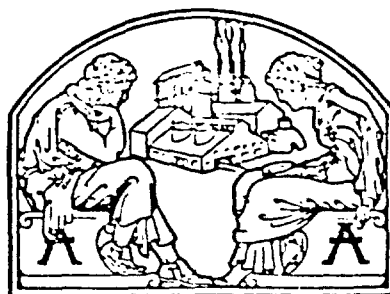
At the Kerr-Addison Mill in Virginiatown, Ontario, cans of cyanide to be used in the extraction of gold from ores, are handled mechanically by a system that is completely inclosed and controlled from the outside. Except for loading and unloading, the operation is automatic. After a can has been placed on the skip and the chamber has been closed, it is hoisted by an air cylinder. At the limit of its travel it is tripped and its contents are dumped into the hopper of a reagent feeder that discharges into conditioner tanks. Reversal of the piston stroke returns the skip to the starting position; but before the empty is replaced by a full container, the fumes and dust in the enclosure are exhausted to the atmosphere. Thus hand dumping with its attendant skin rashes are avoided. Diagrams are presented.

329 Dust Control Lessons from Fontana Dam. F.N. Chirico.
Occ. Hazards, 9, 24-25 (Feb., 1947)

Certain features of the dust control system introduced during the construction of Fontana Dam in North Carolina were not only unique but because of their extreme effectiveness in curtailing hazards have become a pattern for the industry. The most radical of those features was a mechanical water spray mounted on the frames of the electric shovels, continuously and thoroughly wetting the rock. This process reduced dust concentrations to averages of 1.4 to 2.7 M.P.C.F., and was much more efficient than intermittent hand wetting. It was also unnecessary to wet the rock during crushing—a point at which hand wetting has been found undesirable. Elimination of dust fog also increased night visibility. Other dust-reducing features included wet drilling, efficiently designed ventilation systems, total enclosure of indoor screens, with self-closing doors, top and skirt-board coverings at transfer and discharge points, dust-tight manholes, counterweighted hinged covers on chutes, discharge of the dust collector effluent through high stacks, and the installation of water sprays with conveniently located shut-off valves. Specially designed ejector ventilation systems were installed in the cement unloading plant, supplying clean air to the workers and removing the cement dust which was subsequently collected. An average of less than 10 M.P.C.F. was attained at that point, less than five in the concrete mixing plant, and less than four in the quarry and rock crushing plant.

330 Report on an Investigation into Dust and Ventilation Conditions in the Copper Mines and the Broken Hill Mine in Northern Rhodesia with Particular Reference to Silicosis. J. De V. Lambrechts. 42 pp. Lusaka: Govt. Printer. (1945)

The emphasis in this report is upon dust. It is recommended that dust sampling results form a basis for ventilation requirements. Depths



Industrial Hygiene Digest

INDUSTRIAL HEALTH NEWS

LITERATURE ABSTRACTS

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AUGUST, 1949

(Vol. 13, No. 8)

INDUSTRIAL HYGIENE FOUNDATION

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However, great care should be taken to exclude the tuberculous in selecting persons to receive aluminum therapy. (4) It is not believed that a scientifically controlled experiment in industry is feasible for the evaluation of aluminum for the prophylaxis of silicosis. This follows from the uncontrollable variables inherent in the industrial situation and other factors which have been discussed. For these reasons, it appears improbable that any research agency would consider it advisable to undertake such a project except under special conditions already discussed, and which may not be attainable. (5) The McIntyre Research Foundation, as presently organized, is not equipped to solve the aluminum prophylaxis problem in relation to silicosis. The steps considered necessary to accomplish this objective are outlined. (6) Research should be continued with laboratory animals with the object of finding a more adequate basis for application to man. Such study is now included in the program of the Saranac Laboratory of the Trudeau Foundation. -- Authors' Summary

- 866 Effects of Electricity on the Human Body. W.B. Kouwenhoven.
Ind. Med. 18, 269 (July, 1949).

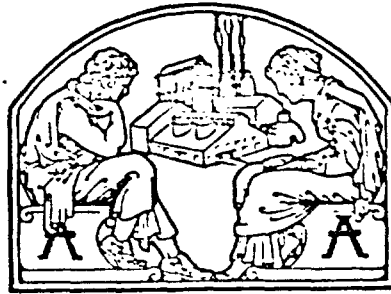
The author discusses briefly the various effects of electricity on the body, including variations with the amount of current. The current values of interest are: (1) threshold of feeling, about 1 milliamperere; (2) let-go current, above which it is difficult to let go of a wire, about 9 milliamperes for men, 6 for women; (3) current producing ventricular fibrillation, 0.1 ampere; (4) current producing a block in the nervous system, one ampere or more; and (5) the counter shock current. The last three result in death if prolonged; otherwise artificial respiration may save the victim. These effects refer to alternating current of commercial frequency. Direct current is much less harmful. The only effect of high-frequency currents is heating.

- 867 Asbestosis and Cancer of the Lung. Editorial.
J.A.M.A. 140, 1219-1220 (Aug. 13, 1949). ✓

Records of English, American and German physicians and The Annual Report of the Chief Inspector of Factories in England for 1947 show that the occurrence of cancer of the lung is related to pulmonary asbestosis. This relation is supported by the following observations: (1) The incidence rate of cancer of the lungs in asbestosis patients is 10 to 15 times as high as among the general population. (2) The male-female ratio is more nearly equal than it is for the general population, which indicates that an environmental and evidently occupational carcinogen tended to equalize the incidence rate of cancer of the lungs for both sexes. Recent experimental observations support this interpretation of clinical evidence.

- 868 Changes in the Lungs Produced by Natural Graphite. H.E. Harding and G.B. Oliver. Brit. J. Ind. Med. 6, 91-99 (April, 1949).

A brief description is given of the industrial uses of natural graphite, which is a crystalline carbon mixed with up to 10% of free silica and with other minerals. The greatest dust risk occurs in the grinding of natural graphite, for which evidence is presented to show that this can lead to



Industrial Hygiene Digest

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LITERATURE ABSTRACTS

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JANUARY, 1950

(Vol. 14, No. 1)

INDUSTRIAL HYGIENE FOUNDATION

4400 FIFTH AVENUE -- PITTSBURGH 13, PA.

- 35 Miniature Chest Roentgenograms in Schools and Industries in San Antonio, Texas. P.A. Pamplona and W.F. Hamilton. Am. Rev. Tuberc. 60, 501-513 (Oct. 1949).

A chest survey was made of 12,115 students and industrial workers in San Antonio. Both students and workers are classified in three groups. Group A is composed of Whites, excluding Mexican Nationals and those of Mexican descent. The excluded whites from Group A comprise Group B. Group C contains only negroes. The roentgenographic findings for 8,982 students showed evidence of reinfection tuberculosis in 43, or 0.4 per cent. The highest rate, 0.82 per cent, was found in Group B. The rate in Group A was slightly higher than in Group C. A total of 3,132 industrial workers showed evidence of reinfection tuberculosis in 73 persons, or 2.3 per cent. The comparative rates of incidence for the three groups were the same as for the student groups, though much higher. Emphasis was placed on the socioeconomic status and its relationship to the prevalence of tuberculosis among those in Group B. Other abnormalities of the chest were found in 0.32 per cent of the students, with bone involvement as the primary finding. Of the industrial workers examined, cardiovascular abnormalities prevailed among 0.95 per cent of the nontuberculous. -- Condensed from Authors' Summary

- 36 Asbestosis: VI Analysis of Forty Necropsied Cases. K.M. Lynch, and W.M. Cannon. Dis. Chest 14, p. 874 (1948).

The authors report an analysis of 40 cases in which asbestosis was found at necropsy. Cases are divided into minor, medium, and advanced grades, the advance of the disease and the prominence of asbestosis bodies showing a direct relation to the duration of exposure. In 4 of 14 cases of advanced grade, pulmonary tuberculosis was the primary cause of death. Only in cases of recent exposure was recent fibrosis found, this providing support for Gardner's belief that fibrosis does not progress indefinitely after cessation of exposure. Presence of asbestosis bodies is not invariable in experimentally produced asbestosis, but is more typical of human asbestosis. Lung damage occurs before the formation of asbestosis bodies, which may represent an attempt by the tissues to segregate the particles; they persist in the lung indefinitely. Pleural fibrosis is an outstanding, though not invariable, feature of asbestosis; the reason for this is not clear as the particles do not reach the pleura. The occurrence in asbestosis of nodular fibrosis of silicotic type, which King and others have produced experimentally, was confirmed in 8 cases. Carcinoma of the lung occurred in three out of 40 cases--an incidence of 7.5 per cent, which is seven times greater than general incidence--all in cases of medium--or advanced grade--asbestosis. This figure is in accordance with the experience of other workers, and calls for further study. Tuberculosis occurred in six cases, but it is suggested that this incidence is not significant; this is not quite convincing. Gardner stated that experimental asbestosis does not predispose to tuberculosis. (Unfortunately the occupational histories of these cases are not complete). -- Brit. J. Ind. Med.

- 37 Antihistamines in the Treatment of the Common Cold. A Preliminary Report. J.W. Middleton and J.A. Riber. Dis. of Chest 15, 679-684 (Dec. 1949).

(1) Sixty-three cases of the common cold were treated with antihistamines and 22 with placebo as a control. (2) There appeared to be a definite