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SUBJECT INDEX TO ARTICLES. VOLUME 17

This is a subject index to all the reading matter in the JOURNAL OF INDUSTRIAL HYGIENE, and one should, therefore, look for the subject word, with the following exception: "Book Notices" are indexed under this title on page 305. The name of the author follows the subject entry in parentheses.

For author index, see page 307.

tween the control and experimental groups.

The mean activity of the experimental group was, however, significantly greater than that of the control group after the animals were from 175 to 200 days old, and it appears that this difference in activity was associated with the exposure of the experimental group to an atmosphere containing a high concentration of light negative ions.

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THE MINERALOGY OF ASBESTOS DUST*

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AND

CHARLES R. WILLIAMS

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THE term asbestos has no definite mineralogical significance, but is applied to several minerals which, under certain circumstances, occur in fibrous form. The hydrous magnesium silicate "chrysotile" (or serpentine asbestos) is the most widely used of these asbestos minerals. According to recent figures of the U. S. Bureau of Mines (1) over 90 per cent of the asbestos fabricated in the United States comes from mines near Thetford, Quebec. These mines are the leading producers of chrysotile. Other forms of asbestos are "Crocidolite," soda-iron silicate; "amosite" and "anthophyllite," iron-magnesium silicates, but all are of minor importance from a quantitative point of view.

Dusts generated in the processing of asbestos are known to be harmful when inhaled in sufficient quantities, and the mineralogical composition of such dusts is an important factor in the problem of the effects on the respiratory system. During the past year the writers secured for petrographic analysis dusts from six asbestos plants in various parts of the country. Samples of rafter dust created by many of the different operations in both spinning and molding of asbestos were obtained. Microscopic examination of the dusts revealed a most startling condition, namely that asbestos fibers in respirable sizes make up only a very small percentage of the various dusts.

The generally accepted maximum size for dust particles which can penetrate into the lungs is about 10 microns. As a result of animal experimentation with asbestos dust, however, Gardner and Cummings (2) state: "The experiments demonstrate that fibrous structures at least as long as 200 microns can pass the protective mechanism of the upper respiratory tract and enter the lungs." This is confirmed by human lung sections of asbestosis victims which the writers have seen. Thus the percentages given in the following tables represent the *number* of particles less than 10 microns in maximum dimension for all minerals except asbestos. In the case of that mineral, fibers as long as 200 microns are included as respirable providing their maximum thickness does not exceed 5 microns. In none of the dusts examined was there present more than a trace of asbestos with the maximum dimension less than 10 microns.

The mineral particles which make

*Received for publication October 7, 1935.

up the bulk of the respirable portions of these dusts are the impurities found in raw asbestos. Figure 1 shows the paucity of asbestos fibers in the dust and the relative abundance of granular material. As the composition of dusts from similar operations in all plants was analogous, only two groups of data are necessary to illustrate the existing conditions. Moreover, all of the plants included in the investigation use chrysotile as the raw material.

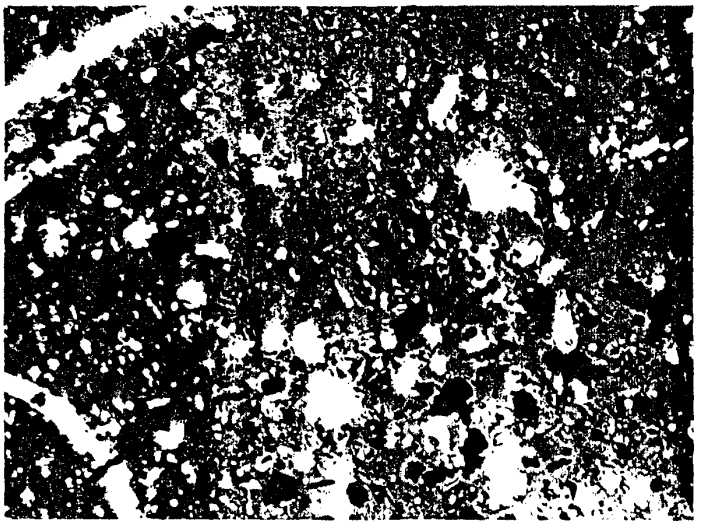

FIG. 1.—Photomicrograph of dust from preparation room. The black grains are magnetite, while the light ones are mostly carbonate and talc with some serpentine. A few fibers of asbestos can be seen. The large white fiber to the left of the picture is organic. (Crossed nicols 175 ×)

The dust produced by the preparation of the asbestos contained a higher percentage of respirable asbestos fibers than any of the other dusts examined. The carding dust consisted of some coarse (25 to 300 microns) asbestos fibers and abundant respirable grains of other minerals. Asbestos fibers dominated the dust from the spinning operation, but they were largely confined to the sizes above 200 microns. The amount of respirable material in this dust was smaller than in the other two, for most of it is apparently liberated in operations preceding the spinning.

Because cement is used in the manufacture of many molded asbestos products, calcite (calcium carbonate) is generally the chief constituent of the dusts from such operations. Thus, all of the samples examined from this type of work contained a large percentage of acid soluble (1:10 HCl) material by weight. The lowest was 64.8 per cent.

Asbestos in long fibers is an important constituent of the dusts from the mixing and pulverizing operations but is relatively unimportant in re-

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spirable sizes. Dust from the cutting room showed almost no asbestos. The small percentage of respirable asbestos is even more impressive when it is considered that 90 per cent of the total *number* of particles of all the dusts were respirable.

In most of the samples asbestos is present in sizes varying from 20 to

TABLE 1

DUST PRODUCED IN THE MANUFACTURE OF ASBESTOS TEXTILES

	PREPARATION	CARDING	SPINNING
	per cent	*per cent*	*per cent*
Talc	6	9	5
Carbonate	30	27	21
Magnetite	28	21	27
Serpentine	14	29	27
Asbestos	15	8	8
Others	7	6	12

TABLE 2

DUST PRODUCED IN MOLDING OPERATIONS IN THE MANUFACTURE OF ASBESTOS BUILDING BRICKS, ETC.

	CUTTING ROOM	MIXING ROOM	PULVERIZER
	per cent	*per cent*	*per cent*
Talc	4	trace	trace
Carbonate	75	70	70
Magnetite	trace	4	9
Serpentine	4	10	6
Asbestos	trace	3	trace
Others	17	13	15

500 microns in length and from $\frac{1}{2}$ to 50 microns in diameter. Practically all particles, however, are over 100 microns in their longest dimension. The reason for the scarcity of asbestos in shorter fibers is no doubt due to its physical nature. Asbestos is bounded parallel to its elongation by perfect planes of cleavage which permit it to break into almost infinitely slender fibers while still retaining its original length. The processing, therefore, splits the asbestos finer and finer with little tendency to shorten it. Moreover, inasmuch as the fibers tend to mat together they are less likely to be picked up by air currents. Granular particles, such as the foreign material present in these dusts, are easily dispersed.

The talc, serpentine, magnetitite, and carbonate so abundant in the dusts are all impurities in the asbestos as mined. Figure 2 shows the raw material with these minerals clinging to the long fibers of asbestos. In all cases where the Canadian raw material was examined microscopically, the mineral assemblage of impurities is essentially the same.

Talc is a mica-like hydrous magnesium silicate, and its platy character permits it to be dispersed easily and stay suspended in the atmosphere. Serpentine is chemically identical with asbestos (chrysotile); it is the material composing the rock in which asbestos veins are found. Unlike asbestos, however, it breaks into equidimensional grains that have no tendency to mat together. Magnetite is an iron oxide which also forms granular particles. Carbonate as listed in the analyses includes three carbonates—calcite ($CaCO_3$), dolomite [$(Ca, Mg)CO_3$], and magnesite ($MgCO_3$)—all having similar physical properties; and, like serpentine and magnetite, they break into roughly equidimensional particles. The physical nature, then, of all these impurities permits them to be liberated from the asbestos during processing operations and thus find their way into the plant atmosphere.

Gardner and Cummings of the Saranac Laboratory have for some time been carrying on experimental work in asbestosis (2). They subjected guinea pigs, white rats, and rabbits 8 hours a day, for as long as $2\frac{1}{3}$ years, to air laden with asbestos dust. The material used for these experiments is called King's Floats, an asbestos dust obtained from the Thetford producers. A petrographic analysis of this material is given in Table 3.

TABLE 3

RESPIRABLE MATERIAL IN KING'S FLOATS

Serpentine....	40%	Carbonate....	18%
Magnetite....	12%	Talc.....	12%
Asbestos.....	14%	Others.....	4%

The material in King's Floats larger than 10 microns in maximum dimension was found to be essentially the same as that below 10 microns, with the addition of asbestos, the fibers of which vary in length from 50 to 300 microns and average about 15 microns in diameter.

FIG. 2.—Photomicrograph of raw asbestos used in spinning. A portion of a hair-like asbestos fiber is shown after it had been separated into many smaller fibers. Note the abundance of granular impurities that have been set free by crushing. (Crossed nicols 160 ×)

SUMMARY

Petrographic analyses of rafter dust from six asbestos processing plants, including molding and weaving of asbestos, disclosed that in the respirable sizes, asbestos is a relatively unimportant constituent. Talc, serpentine, carbonates and magnetite predominate in all of the dusts examined. The question arises as to the importance of the part played by these minerals in lung damage resulting from dust exposures in the asbestos industries.

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See also:

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The impression is gained from this study that foundries may be operated practically without undue hazard to the health of the workers or limitation of their working capacity.—*Theodore Hatch.*

SILICOSIS AND ASBESTOSIS: A MEMORANDUM. *Home Office, H. M. Stationery Office, London, 1935.*

The present position regarding compensation for pulmonary fibrosis is usefully summarized in this brochure. During the three years 1932-4 there were certified 435 deaths from silicosis and 1,444 instances of disablement, and 5 deaths with 60 cases of disablement due to asbestosis. A short description is given of the origin and development of silicosis; and then are stated the industries and processes in which silicosis occurs. Means of prevention are grouped under (i) suppression of dust, generally by the use of water, (ii) ventilation so applied at the point of origin of the dust as to prevent its access to the air of workplaces, iii) other preventive measures such as furnishing each worker with a separate supply of dust-free air to breathe or wearing efficient respirators, and (iv) initial and periodic medical examinations, under which workers with defective respiratory physique are excluded from the industry and anyone found to have pulmonary tuberculosis is suspended from further employment. The medical arrangements for examinations and for certifying cases are described. All these medical matters are carried out by a Board of experts from whom there is no appeal. The compensation schemes differ in minor details for various industries; they cover the getting of ganister and other highly siliceous materials, the getting and manipulation of sandstone, the grinding of metals on sandstone wheels, a long list of processes entailing risk of inhaling silica dust in such industries as the manufacture of pottery, settling of steel castings and sand-blasting, and the asbestos industry.—*E. L. Collis.*

SILICOSIS—AN INTERPRETIVE REVIEW OF ACCUMULATED EXPERIENCE. *C. O. Sappington. Indust. Med., Apr., 1935, vol. 6, pp. 173-177.*

A brief discussion has been given covering information on what silicosis is; how it is contracted; how it is detected; compensation experiences and laws; how industry can protect itself and its employees from future cases of silicosis; and an outline for the preparation of the defense of claims.—*From the author's summary.*

PATHOLOGY OF DUST. III. THE ORIGIN OF IRON IN ANTHRACOSIS (EXPERIMENTAL DATA). *I. M. Peissakowitsch and P. G. Kostenko. Virchow's Arch., 1935, vol. 294, pp. 643-647.*

The extent of the carbon pigmentation in the tracheal and bronchial lymph nodes of research animals (dogs) showed marked variation. Paralleling these changes was the extent of the blood pigmentation. It is thereby made clear that dust infiltration deranges the normal lymph and blood streams with resultant reduction in erythrocytes and subsequent formation of blood pigments.—*L. Teleky.*

PATHOLOGY OF DUST. IV. DUST SECRETION FROM THE LYMPH CIRCULATION. *I. M. Peissakowitsch and M. M. Scheinin. Virchow's Arch., 1935, vol. 294, pp. 648-652.*

The authors produced a unilateral artificial pneumothorax in dogs or produced a paresis of the thorax muscle on one side by alcoholizing the intercostal nerve. The dogs were then given extensive dust exposure for several months. In the treated half of the lung were heavy dust deposits and absence of self-cleaning; there was no evidence of movement of the dust towards the pleura.—*L. Teleky.*

OCCUPATIONAL DISEASES OF THE MOUTH. *W. Weinberger. Ztschr. f. Stomatol., 1935, vol. 33, pp. 449-544.*

A dust gingivitis is described and the cause ascribed to various kinds of dusts. Generally the differentiation between disability from dust and the ordinary gingivitis is made with difficulty. The distinction between lead line and gingivitis is not always sharp. The author has presented a very comprehensive review.—*L. Teleky.*

DUST, SMOKE, FUMES, AND VAPORS: THEIR DETERMINATION AND ELIMINATION

MINE AIR FILTRATION. *E. P. Cowles and R. A. H. Flugge-de-Smidt. Discussion by H. S. Patterson and H. L. Green. Jour. Chem. Met. and Min. Soc. So. Africa, Apr., 1935, vol. 35, p. 318.*

Patterson and Green give here their discussion of the paper by Cowles and Flugge-de-Smidt which appeared in September, 1934 (see these Abstracts, 1935, *17*, 41).

Mr. Patterson shows photomicrographs of the dust collected in the filters showing particles ranging from 30 μ down to 0.25 μ and consisting of irregularly shaped chips and in many cases aggregates. The needle shaped particles are absent. The differences in size frequency of the dust in the slides and in the air approaching the filter are noted and attributed to aggregation on the filter and the method of preparation of the slides.

Mr. Green stresses proper technic in taking impinger samples and the probable inefficiency of the impinger with respect to particles of the order of 0.5 μ in diameter with the sampling rate employed. Filtration theories are discussed with special emphasis on the increase of efficiency with operation. The importance of sericite is questioned and attention is called to the ease with which this mineral can be revealed and identified under the petrological microscope while other fine particles, not so readily identified or even revealed, may be entirely overlooked when samples are examined solely by this method. Examination of dry-mounted samples under a high-power microscope should also be undertaken.—*Richard Page.*

STUDY OF METHODS FOR THE DETERMINATION OF DUST IN GASES. *B. F. Bal'son. Abstr. as follows from Trans. Thermo-Tech. Inst. (Moscow), 1934, No. 6, pp. 19-23, in Chem. Abstr., May 20, 1935, vol. 29, p. 3262.*

Many methods are described. It is concluded that it is best to pass the gases through a hydraulic seal, although the use of a blower in addition to the hydraulic seal is recommended when dealing with highly

trace of albumen, acetone and calcium oxalate crystals in the urine. He recovered.

THE PATHOLOGY OF CHROMIC ACID AND ITS DERIVATIVES. *L. Barbera. Rass. di Med. Appl. al Lav. Indust., June, 1935, vol. 6, pp. 211–239.*

The author has studied cases of acute, sub-acute and chronic poisoning induced in rabbits by subcutaneous injection of chromic acid of various dilutions. Similar studies were made with intravenous injection of solutions of potassium dichromate. In addition guinea pigs were poisoned by exposure to chromic acid vapor. Skin absorption of chromic acid is confirmed. Absorption by the respiratory system results in inflammation, atrophy and pulmonary hyperemia. The existence of lesions of the glomeruli as well as similar lesions in the renal tubules is pointed out in the various forms of poisoning. A transitory increase in blood calcium was followed by a diminution in the sub-acute cases, while there was a progressive increase in the cases of chronic intoxication. Blood sugar increased markedly during the last days of life of the animals.—*Lawrence T. Fairhall.*

INDUSTRIAL CHROMISM IN WORKERS ENGAGED IN THE MANUFACTURE OF POTASSIUM DICHROMATE. *L. Barbera. Med. del Lav., June 30, 1935, vol. 13, pp. 209–233.*

The author describes 24 cases of individuals affected by exposure to hexavalent chromium and suggests prophylactic measures for the reduction of this hazard.—*Lawrence T. Fairhall.*

PERMISSIBLE CONCENTRATIONS OF CHROMIUM TRIOXIDE IN AIR. *S. Ginsburg, A. Iljinskaja, and R. Leites. Gigiena truda i teknika bezopasnosti, 1935, no. 3, pp. 80–85.*

The authors investigated in different plants five chroming vats equipped with local exhaust hoods. The determinations were made with an improved colorimetric method using the Mullin reagent (sensitivity to 0.000173 mg. chromium). Most of the tests gave negative results or insignificant amounts (0.0034 mg. per cu.m. of air). There was established a certain correspondence between concentration in the air, in the naso-pharynx of the workers, and in the condition of their upper respiratory passages.

Low concentrations of chromium trioxide (0.1 mg. per cu. m.) produced definite injuries in the upper air passages: hyperemia of the mucous membrane, atrophic and hypertrophic rhinitis, and pharyngitis, etc. Properly designed and installed exhaust systems can eliminate dangerous concentrations—*From the authors' German summary.*

AMOUNT OF POISONOUS IMPURITIES IN THE HYDROGEN GIVEN OFF IN STEEL ETCHING. *W. G. Gurevitsch, M. M. Javnel, and B. A. Raschkovan. Gigiena truda i teknika bezopasnosti, 1935, no. 3, pp. 60–64.*

The authors made experiments on steel etching with sulfuric acid (sp. g. 1.83, arsenic content 0.000332%) diluted 10–20 times, and have determined the amounts of impurities formed under various conditions. It was ascertained that in etching a mixture of phosphine and arsine is given off—in the cases noted there was more phosphine. The least amount of arsine (0.01–0.2 mg. per L. of hydrogen) is liberated at a higher melting point; lowering the melting point 25° increases the quantity of arsine about 6 or 7 times (to 0.09–0.15 mg.). The maximum liberation of arsine occurs at the beginning of the fusion. A reduction in the acid concentration increases the arsine liberation.

In contrast to the arsine, the maximum amount of phosphine (0.7 mg. per L. of hydrogen) is liberated at a higher temperature (80°). It is difficult to establish any relationship at all between conditions of steel etching and hydrogen sulfide given off.—*From the authors' German summary.*

DUST HAZARDS AND THEIR EFFECTS

PULMONARY ASBESTOSIS. *T. Oliver. Bull. Mém. de la Soc. méd. des Hôpitaux de Paris, June 28, 1935, No. 23.*

Pulmonary asbestosis is an occupational dust disease of slow development during the progress of which the spongy portions of the lung becomes gradually replaced by unyielding fibro-connective tissue, and like

treal. The authors urge the adoption of adequate, standardized regulations applying to the fumigation of buildings. The use of a warning gas, such as cyanogen chloride, with hydrocyanic fumigants prevents unsuspecting persons from entering lethal atmospheres. No substance is at present known having the same physical properties as hydrogen cyanide, and consequently no warning mixture is infallible.

The authors quote opinions of a number of authorities on the advisability of using hydrocyanic-cyanogen chloride mixtures.

In the discussion, Williams emphasizes the need for standardization of fumigating regulations. Pratt quotes three fatalities resulting from hydrocyanic gas poisoning in fumigating where cyanogen chloride was used as a warning agent, and states that the use of any but the non-existent perfect warning gas creates a false sense of security and should be avoided.—*R. T. Pring.*

DUST HAZARDS AND THEIR EFFECTS

Pulmonary Asbestosis. III. Carcinoma of Lung in Asbesto-Silicosis. *K. M. Lynch and W. A. Smith. Am. Jour. Cancer, May, 1935, vol. 24, pp. 56-64.*

This man had suffered long occupational exposure to dust, some 43 years all told, about 22 in a cotton mill, about 21 in an asbestos factory, with resulting fibrosis of extensive grade in the lungs and pleura, the apparent consequences being pulmonary circulatory and respiratory disability, with emphysema, bronchiectasis, and cardiac embarrassment.

As has been observed by us in other cases of asbestosis, one of which has been previously reported [see these Abstracts, 1931, vol. 13, p. 241], the fibrosis of the lungs here bears the accepted characteristic mark of silicosis, that is, in addition to diffused fibrosis, there occurred the formation of hyaline fibrous nodules.

The pulmonary carcinoma appeared to originate from one of the branches of the bronchus to the right lower lobe, where squamous metaplasia of lining epithelium was observed.

The duration of the carcinoma cannot be specified. It was apparently of considerable time but certainly did not antedate fibrosis of the lung. A conception of its origin by reason of chronic bronchial irritation is compatible with the current view of the etiology of such tumors.—*Authors' summary.*

Silicosis and Malignant Disease. *W. S. Handley. Lancet, (Correspondence) Nov. 17, 1934, vol. 227, p. 1128.*

Dr. Handley agrees with Prof. Dible's paper in the Lancet of November 3, 1934, in which the latter reports one case of leukemia and three of carcinoma in 14 autopsies on patients who died of silicosis in East Lancashire during 1930.

It is worth while paying some attention to those who agree with such a diagnosis.—*H. K. Pancoast.*

Silicosis (Discussion). *A. J. Orenstein. Jour. Chem. Met. and Min. Soc. So. Africa, Feb., 1935, vol. 35, p. 269.*

This is a continuation of the discussion of Jones' paper which appeared in the above Journal in September and October, 1933 (see *This Jour.*, Abstract Section, 1934, vol. 16, pp. 30 and 84).

In commenting on Dr. Jones' theory that sericite, and not silica, is the dominant cause of silicosis, the following points are brought forward:

(1) Inferences drawn from alleged absence of silicosis under certain conditions of exposure to certain dusts have proved fallacious and the greatest caution must be exercised in giving credence to reports that no silicosis occurs where siliceous dust in heavy concentrations is present.

(2) Sericite may cause silicosis, but undoubtedly pure silica does also. Workers in the Banting Institute of Canada have shown that in laboratory animals, silica did cause silicosis when sericite did not.

(3) It is at least extremely doubtful whether it is possible to distinguish under the petrological microscope very fine particles of silica from very fine particles of sericite. It is most probably quite impossible.

(4) The mere presence of a certain foreign substance in dead silicotic lungs is no proof

that this particular substance or even dominant, cause of process.

(5) Facts as a result of inten mental work are required.—*Ric*

Reaction to Inhalation of K Dust on the Lungs of R *Beintker. Virchows Arch., 19 pp. 546-569.*

The author caused rabbits kieselgühr of the usual diatomac and with low sericite content. of 5 minutes were extended afte 1 hour (the dust concentration is Some of the animals died afte inhalation, while the longer-liv 18, and 24 months after inhala begun. Intermissions of a week to animals having the longest The resulting formation of gian ascribed by the author to the which is characteristically caused gühr. The migration of diatom about the lung tissue is a mecha closely related to the respiratory of the lungs. The reaction of tissue results in proliferation; h cells of the lymphatic tissue, th enter in great numbers.

Under pressure of the diatomes imbedded extensively between t (of the lymphatic tissue) the nu lymphocytes appear elongated. are replaced by connective ti Evidence of decomposition of th was not found, nor was clearin alveoli observed later.

The results apply only to rabbi conclusions referable to dusted man are to be made only with res (See These Abstracts, 1933, 1 *Teleky.*

Silicosis. *Wm. D. McNally a Bergman. Indust. Med., Feb., 1 pp. 61-65.*

The entire subject is discussed cally, the signs and symptoms, prognosis, pathology, and metho lecting dust. In summarizing th say:

1. Silicosis is not a new disease been brought into prominence by t of unemployment.

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IR EFFECTS

isease of slow development during gress of which the spongy portions ung becomes gradually replaced by ing fibro-connective tissue, and like silicosis, its pathology has been variously interpreted.

In 1900 Dr. Montague Murray of Charing Cross Hospital reported the autopsy of an asbestos worker who died after 14 years' exposure to asbestos dust. The lungs showed pulmonary fibrosis without evidence of pulmonary tuberculosis. Six years later Marchand and Riesal found similar conditions in the lungs of an asbestos worker and in the same year the French Bulletin de l'Inspection de Travail called attention to the high mortality of workers in an asbestos factory. A few years later Professor J. M. Beattie of Liverpool demonstrated by animal experiment that asbestos dust was capable of causing pulmonary fibrosis. The physical signs of a typical case of asbestosis personally examined were as follows: the patient was a woman of 48 years, emaciated and weak. She had been obliged to stop work because of cough and dyspnea. There was no sputum, and the respiratory capacity was 1 inch. The chest showed increasing dulness on percussion from apex to base and the expiration was prolonged. At right base a small dry friction rub was heard. The heart apex was slightly displaced up and to the left. The pulmonary second sound was accentuated. The patient died a year after the examination.

Symptoms of Asbestosis. After a period of 10 or more years spent in an asbestos factory the worker who has hitherto shown a marked susceptibility to colds on the chest is observed to have become thinner and to be short of breath on exertion, cough is frequent and without expectoration. There is complaint of progressive weakness, loss of appetite and pain over lower lungs. The heart is usually normal. Chest expansion is curtailed. Percussion elicits dulness at the bases, auscultation reveals diminished breath sounds with occasional râles.

X-ray examination shows indications of infiltration of the lung below a line joining the ninth rib posteriorly with the fourth rib anteriorly. The field presents an amorphous flocculent appearance with here and there evidences of small cavitation.

Autopsy reveals asbestosis bodies in the lungs, and a fibrosis of the lower lobes. Opinions vary as to whether these bodies are characteristic of asbestosis and do not appear in any other condition. In a recent paper, E. Williams details several instances of similar foreign bodies in the lungs of coal miners with no history of asbestos exposure and S. R. Gloyne reports a similar experience. The foreign bodies were also found in cases of coal miners treated at the Royal Infirmary at Cardiff.—*W. I. Clark.*

SAND BLASTING. ITS TECHNOLOGY, CLINICAL CLASSIFICATION, HYGIENE, AND PROPHYLAXIS. *G. Pancheri. Rass. di Med App. al Lav. Indust., June, 1935, vol. 6, pp. 179–210.*

Sand blasting with particular reference to its use in cleaning foundry castings is described in detail. Numerous cases of silicosis in the industry are discussed and attention is drawn to means of industrial control tending to minimize this hazard.—*Lawrence T. Fairhall.*

SILICOSIS AND CARCINOMA OF THE LUNG. *L. Maxwell. Abstr. as follows from Med. J. Australia, 1934, vol. 2, pp. 168–169, in Am. J. Cancer, Aug., 1935, vol. 24, p. 896.*

A man of fifty-nine had spent 10 years of his earlier life as a driller in a gold mine. About 2 years before hospital admission he began to suffer from dyspnea on exertion, dry cough, and increasing weakness. X-rays showed a dense shadow in the apical lobe to the right lung. Lipiodol gave normal filling of the lower lobe, but did not enter the dense area of the upper lobe. Bronchoscopy revealed an ulcer in the mouth of the right lobe bronchus, and biopsy of this showed thickening of the surface epithelium and some downgrowth, giving rise to a suspicion of carcinoma. The later history is not given.

SILICOSIS AND SILICO-TUBERCULOSIS CENSUS. *D. M. Brumfiel and L. U. Gardner. Am. Rev. Tuberc., Aug., 1935, vol. 32, pp. 208–210.*

"Actuated by a desire to get a fair idea of the distribution of silicosis and silicotuberculosis in the United States, and also of the behavior of such patients when subjected to the treatment that prevails for uncomplicated tuberculosis, a preliminary survey has been carried on by mail during the past several months."

PULMONARY HEART DISEASE IN PNEUMOCONIOSIS. *J. M. Dyson. Am. Heart Jour., Aug., 1934, vol. 9, pp. 764-770.*

1. Pulmonary heart disease is described, together with its diagnosis by roentgenography and electrocardiography.

2. A series of 18 cases of its occurrence in pneumoconiosis is presented to illustrate incidence and symptomatology.

3. The disability and incidence indicate that pulmonary heart disease is not a rarity in anthracite coal miners, and must not be neglected.

4. It is urged that pneumoconiosis, because of its great economic and industrial importance, be more generally considered an important cause of pulmonary heart disease.

5. No attempt is made to explain why pulmonary heart disease occurs in some cases of marked pneumoconiosis, but not in others equally marked.—*Author's summary.*

INJURIOUS FACTORS IN ASBESTOSIS AND SILICOSIS. *P. I. Beger. Med. Klin., Sept. 14, 1934, pp. 1922-1927, and 1258-1261.*

The author attacks the question from a mineralogical point of view. He points out that a key to the reactions can be found in the asbestosis and begins with a discussion of the crystal structure of chrysotile asbestos, describes its progressive decomposition in the body, and the destruction of its silica lattice. It is not mechanical irritation but silica set free through solution which produces fibrosis, the formation of which does not cease when the inhalation of asbestos stops, but continues as long as the asbestos bodies already present remain in sufficient numbers. All such cases would appear quite hopeless. However the reason that it has not affected everyone may be explained possibly by the fact that there is a different concentration limit for different people, below which the silica content is too small to produce fibrosis. The concentration can also remain below the limit, when the number of asbestosis bodies present is relatively small or only slightly susceptible to decomposition. This latter will be the case only when the body fluid is weakly acid or intensely alkaline.

The formation of the bodies depends upon the pH of the blood; it can also hinder the development of the asbestosis bodies. It is possible for the asbestos needles to be discharged, without entering into the structure of the bodies.

There follows the solution of the silica through surface attack, and this free silica produces fibrosis. Thus it follows that asbestos dust caused the silicosis. Dissolved silica is always the cause, whether originally in quartz or in a silicate. The harmfulness of a mineral depends upon its silica content and its solubility. Quartz has a large silica content and extraordinarily slight solubility; chalcedony is more easily soluble, and the most soluble are opal, diatomaceous earth, and tripoli. The solubility of flint lies between those of diatomaceous earth and tripoli. Feldspar, occurring in eruptive rocks is rich in silica, and through their decomposition are formed sericite (a type of mica) and kaolin. Both of these minerals are very resistant to natural weathering processes; in the lung, however, because of the minute size of the dust particles with their relatively large surface area, and the large excess of solvent, they do dissolve. However, these "secondary" minerals are approximately in equilibrium in the lungs and dissolve only very slowly. These stable types thus remain in the lungs for a long time. This explains Jones' results on the question of sericite. While feldspar, quartz, etc. break down in the lungs to dangerous poisons, sericite remains in large quantities and produces the false impression that it alone had caused the damage. However, it should not be stated that sericite causes no damage.

The cause of the disease, nevertheless, is *only the dissolved silica* in the cases of asbestosis and silicosis.—*L. Teleky.*

MORE ON ASBESTOSIS BODIES. *P. I. Beger. Virchows Arch., 1934, vol. 293, pp. 630-639.*

The mechanical irritation of the lung through breathing asbestos dust does not seem to be important, for the symptoms of the disease appear after the irritating effect has diminished or completely stopped. The harm in the case of asbestosis as in ordinary silicosis is caused by the solution of the silica lattice of the asbestos fibres. From

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ASBESTOSIS BODIES. *E. Beintker. Virchows Arch., 1934, vol. 293, pp. 627-629.*

In disagreeing with Beger, Beintker takes the view that asbestosis bodies are of inorganic nature. He sees in them (also in opposition to Beger) not the cause of asbestosis, but in their origin a protective reaction of the organism.—*L. Teleky.*

PULMONARY ASBESTOSIS. *W. B. Wood and S. R. Gloyne. Lancet, Dec. 22, 1934, pp. 1383-1385.*

The authors now add to their previous studies by giving a review of 100 cases, all of whom had been exposed industrially to asbestos dust, most of them at the same factory; 67 were women and 33 men.; 53 were without tuberculosis; 21 with active tuberculosis; 9 with obsolescent tuberculosis; and 17 were doubtful cases. Carcinoma of the lung was present in 2 cases. Dyspnea is the first and last symptom of which the patient complains; indeed, the distress occasioned by constant breathlessness is so great that the disease might be described as monosymptomatic. In advanced cases the "earthy" character of the complexion and a violet tinge in cheeks or lips are noteworthy. Cessation of exposure to asbestos dust does not usually check the progress of the disease; nevertheless, patients have been seen wherein the condition appeared to remain stationary after stopping work at the factory. Septic bronchitis, bronchopneumonia, and pulmonary tuberculosis are the commonest terminal complications of the disease. The shortest exposure to dust was 6 months (2 cases) and the longest 15 years. Fibrosis is best seen in the lower lobes; adherent pleura is common; no silicotic nodules have been encountered. The condition is characterised by a cellular reaction of mononuclear phagocytes and asbestosis giant cells followed by the formation of a reticular fibrosis. Although active tuberculosis was present in 21 cases, this risk seems less than that associated with silicosis.—*E. L. Collis.*

EFFECTS OF THE INHALATION OF ASBESTOS DUST ON THE LUNGS OF ASBESTOS WORKERS. A PRELIMINARY STUDY. *A. J. Lanza, Wm. J. McConnell, and J. W. Fehnel. U. S. Pub. Health Repts., Jan. 4, 1935, vol. 50, pp. 1-12.*

A preliminary report on the health hazards in asbestos mines and fabricating plants is given. The study included a dust survey in asbestos mines and mills in Canada and in five fabricating plants in the United States, physical and x-ray examinations of 126 representative workers having more than 3 years' experience, and finally a special study of exhaust systems designed to eliminate asbestos dust. In addition, the death and permanent disability claims listed as due to pulmonary tuberculosis were investigated in one plant. The findings of this study are well summarized by the authors' conclusions and recommendations:

"1. Prolonged exposure to asbestos dust caused a pulmonary fibrosis of a type different from silicosis and demonstrable on x-ray films. Clinically, from this study, it appears to be of a type milder than silicosis.

"2. Cases of definite cardiac enlargement were frequently found to be associated with asbestosis.

"3. A predisposition to tuberculosis due to asbestos dust was not indicated in this study.

"4. Asbestosis as observed in this series of cases had not resulted in marked disability in any case.

"5. It is not known how much asbestosis may add to the mortality of pneumonia and acute nontuberculous pulmonary infections.

"6. It is not practicable as yet to establish standards for the asbestos dust content of air.

"7. The amount of dust in the air in the

asbestos plants studies can be substantially reduced.

"It is recommended—

"1. That the industry seriously face the problem of dust control in asbestos plants.

"2. That new employees be examined physically, including x-ray examination of the chest, and rejected for employment if they show tuberculosis or pneumoconiosis.

"3. That employees be examined physically, preferably every year, but at least every 2 years, this examination to include an x-ray examination of the chest.

"4. That the industry sponsor studies on known cases of asbestosis, as well as studies on effects of asbestosis on the heart and circulation."—*Theodore Hatch.*

ASTHMA IN THE TEXTILE INDUSTRY. *E. Beintker. Arbeitsschutz (Reichsarbeitsblatt III), 1934, pp. 235–237.*

Respiratory disturbances were reported in a cotton spinning plant. The author himself, after making the survey, suffered an increase in temperature, exhaustion, and irritating cough. The cotton was very dusty, was yellow, and contained various impurities. A survey of the whole industry showed only a few cases of asthma and of those, only isolated cases could be traced directly to the work, since the attacks appeared especially after Sundays and holidays. Also the trouble in the aforementioned plant disappeared after the poisonous cotton stock was used up.—*L. Teleky.*

DUST, SMOKE, FUMES, AND VAPORS: THEIR DETERMINATION AND ELIMINATION

DETERMINATION OF BENZENE IN TOXICOLOGY. I. PRELIMINARY STUDY OF THE COLORIMETRIC DETERMINATION OF M-DINITROBENZENE. II. DETERMINATION IN THE BLOOD. III. DETERMINATION IN THE ORGANS. *M. Péronnet. Abstr. from pharm. chim., 1934, vol. 20, pp. 145–149; 195–206; 244–248, in Chem. Abstr., Nov. 20, 1934, vol. 28, p. 7287.*

THE EXAMINATION OF COTTON, COIR, AND ESPARTO-GRASS DUST FOR HISTAMINE. *A. D. Macdonald and H. B. Maitland. J. Hyg., Oct., 1934, pp. 317–321.*

The asthma which occurs as an occupational trouble among operatives after years of exposure to the dust of card-rooms in cotton mills has been ascribed to the possible presence in the dust of histamine. The investigation reported was to ascertain how far histamine may be present in such dusts. It was found in most samples of dust from card-rooms and especially in the finer particles which would most readily reach the lungs. While histamine was a fairly constant constituent of card-room dust, the histamine content of the various samples differed. On the other hand samples of coir dust and esparto-grass dust were practically free from histamine; workers exposed to considerable amounts of these dusts do not suffer from asthma.—*E. L. Collis.*

RECENT DEVELOPMENTS IN METHODS OF SAMPLING DUST. *H. L. Green. Paper given at the Institution of Mining and Metallurgy. (London). Nov. 15, 1934.*

From a critical study of the three dust sampling instruments in common use today —konimeter, jet dust counter, and impinger—the author concludes that none of these instruments gives accurate data concerning either the number or size of industrial dusts. Compared with an "absolute" instrument such as the direct counting ultra microscope or the author's settlement chamber (see THIS JOUR., 1934, *16*, 29) their efficiencies were 50% and less.

As a universal instrument, sampling with perfect efficiency over a size range from 0.2 to 20μ, the author proposes a thermal precipitator which deposits the dust sample on two cover glasses in a condition suitable for immediate microscopic enumeration and measurement. The efficiency is reported to be 100% compared with the ultramicroscope. The sampling rate is 7 cc. a minute; this is obtained by water displacement from a reservoir to which the instrument is connected.—*Theodore Hatch.*

CONTROL OF DUST IN SANDBLAST APPARATUS. *E. A. Vigdortschik, N. F. Stoshkowa, and M. A. Goloschtschokina. Gigiena truda i tekhnika bezopasnosti, 1934, no. 5, pp. 40–46.*

Investigation was made of the dust content of the room air in the operation of the principal types of sandblast apparatus; (1) their equipment (type of apparatus, venti-

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Investigation was made of the dust content of the room air in the operation of the principal types of sandblast apparatus; (1) their equipment (type of apparatus, ventilation, room control, etc.), (2) air pressure in the nozzle, (3) type and grain size of the abrasive.

The determination of the dust was made at the same time gravimetrically and with the Owens' apparatus. The effect of ventilation and of the dust helmet were also tested.

The hygienic improvement of the working conditions were summarized in the following manner; (1) apparatus with stationary nozzles permitted the best dust removal, apparatus with movable nozzles and without individual protection are not to be permitted. (2) The dust helmet with an air inlet which introduces not less than 170 L./m. is to be available. The air for this line is not to have an unpleasant odor. A spherical air distributor can be applied. (3) There must be more investigation in regard to substitution of quartz sand in the sandblast apparatus with a metallic abrasive.—*From the authors' German summary.*

HYGIENE OF SPRAYING OPERATIONS. *M. F. Stoshkowa and M. A. Goloschtschokina. Gigiena truda i tekhnika bezopasnosti, 1934, no. 5, pp. 46–50.*

Spraying operations (according to examination of the process in the Leningrad works) are described in which lacquer, pigments and mixtures of them are applied. Special attention is given to nitrocellulose lacquers. The results are presented of an investigation of workroom atmospheres where different lacquer pigments are sprayed under various fixed conditions. All air samples were taken during the spraying process at the breathing zone of the worker. The determination of the solid particles was made gravimetrically and by means of the Owens' counter. The testing for the content of volatile substances was made by the combustion method for determination of the general content of organic materials, while the determination of the benzol content was made by the nitration method. On the basis of the analytical data the following industrial hygiene measures are suggested: (1) Conducting the painting in closed isolated rooms in which the worker is not present; (2) distinct directions for conducting the spraying operations; (3) immediate removal of the painted objects from the workroom; (4) installation in the working zone of ventilation for exhausting the contaminated air, in doing which the greatest possible air change and a high air velocity in the spraying area are to be attained; (5) working out definite regulations for the installation of the ventilation equipment on account of the hazard from explosive mixtures and the discharge of static electricity in the exhaust ducts.—*From the authors' German summary.*

THE SCHOOP METHOD ("METALLIZING"), ITS HAZARDS, AND THEIR CONTROL. *N. F. Stoshkowa, E. A. Vigdortschik and M. A. Goloschtschokina. Gigiena truda i tekhnika bezopasnosti, 1934, no. 5, pp. 59–62.*

The so-called Schoop method ("metallizing") consists generally in placing a thin, fused layer of a non-corroding metal (zinc, lead, aluminum, etc.) by means of a special spraying apparatus on the surfaces of the metal to be protected (for example, iron). The investigation of this process in a group of Leningrad plants has shown that 30 to 70% of the covering metal is dispersed into the air. In the application of zinc and lead by the "metallizing" process, a large number of highly dispersed solid particles were found at the breathing level of the worker. These consisted of 90 to 95% of the covering metal. With the pressure of exhaust ventilation equipment, the dust concentration is appreciably less. The dust content in the air passages of the worker is not very great (from 3 to 10%) and the fraction from 1 to 5 microns in size is retained. But even this small percent of dust retained comprises a large absolute amount, namely 5,728 to 14,200 particles per cu. cm.

In spite of the fact that zinc is principally appiled, fever was not in evidence among the workers. The chemical and microchemical analyses of dust for zinc oxide gave, however, negative results. Apparently the conditions under which the zinc is melted and the following rapid cooling are not favorable to oxidation of zinc in the air. The danger of the lead dust is substantiated by symptoms of lead poisoning among the workers.

Local exhaust ventilation serves as the principal means of protection. This, as the investigation has shown, is highly effective for dust and gases.

Of importance also is individual protec-

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Sappington. Paper. Pp.
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Bruxelles-Méd., Jan. 6 and
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while the amounts of dust and the size of the particles are considered to present a definite dust hazard. Then a medical investigation was conducted at 19 factories during which 915 workers were clinically examined, in some cases with x-rays. On the whole no clear signs of any prevalent silicosis were detected. Nor would it appear that "potters' rot" is expected to occur in these factories as in the English potteries. However, powdered flint does not seem to be used which is the principal cause of trouble for potters; on the contrary, coarse sand is mentioned as being employed to separate the ware in the saggers. Possibly the absence of flint accounts for the absence of prevalent silicosis.—*E. L. Collis.*

THE FUNCTION OF THE STATE DEPARTMENT OF PUBLIC HEALTH IN THE CONTROL OF PNEUMOCONIOSIS. *Frank J. Jirka. Illinois Med. Jour., Nov., 1934, vol. 66, pp. 414–417.*

LABORATORY METHODS FOR THE DETERMINATION OF ATMOSPHERIC POLLUTION CAUSING PNEUMOCONIOSIS. *C. O. Sappington. Ibid., pp. 417–421.*

THE HEALTH OF WORKERS IN DUSTY TRADES. *R. R. Sayers and J. J. Bloomfield. Ibid., pp. 421–427.*

THE CLINICAL DIAGNOSIS OF SILICOSIS. *J. R. Head. Ibid., pp. 428–431.*

THE PATHOLOGY OF PNEUMOCONIOSIS. *R. H. Jaffe. Ibid., pp. 431–437.*

RADIOGRAPHIC VISUALIZATION OF FIBROSIS PRODUCED BY DUST INHALATION. *F. Flinn. Ibid., pp. 437–440.*

A STUDY OF THE SPUTUM IN PULMONARY ASBESTOSIS. *R. C. Page. Am. Jour. Med. Sci., 1935, vol. 189, pp. 44–55.*

A brief résumé of pulmonary asbestosis is presented, with particular emphasis on the rôle played by asbestosis bodies and clumps. The technic for the demonstration of asbestosis bodies and elastic tissue in the sputum is described in detail, together with microscopic sections.

A series of 38 cases of asbestos workers have been studied and kept under observation for a period of at least 5 years. In the 11 cases that died, the diagnosis of asbestosis was verified by autopsy findings. Asbestosis bodies were found in every case but one. The "weathered" type of body was found in those exposed over a long period and those exposed for a short interval showed small, thin bodies which emphasizes the point that the number of bodies merely indicates the exposure to dust and that the type of body found is of pathological significance.

The presence of asbestosis clumps in the sputum is diagnostic of lung destruction but a negative finding does not rule it out. This has been confirmed by clinical and x-ray evidence. The presence of elastic tissue in the sputum signifies lung deterioration and may be present in pulmonary asbestosis both with and without clumps or in asbestosis associated with tuberculosis. The incidence of tuberculosis in this series of cases was 21% which is in accord with other workers. The author suggests routine examination of the sputum in suspected cases of asbestosis.—*L. M. Morse.*

PULMONARY ASBESTOSIS. *D. S. Egbert. Amer. Rev. Tb., 1935, vol. 31, pp. 25–34.*

Necropsy findings on a case of asbestosis with 13 years exposure in the carding room of an asbestos factory. A clinical diagnosis of this case was reported by Soper (these Absts., 1931, vol. 13, p. 49). Death occurred suddenly from heart failure 4 years after the onset of symptoms and 3½ years after discontinuing work. No evidence of infection was detected. Pleural cavities were obliterated by fibrous adhesions. Lungs retained their shape, were firm and noncrepitant. The interlobar fissures were obliterated. On section entire right upper lobe and apex of left upper lobe were dry, firm and mottled black and grey. The remainder of the lungs were abnormally firm, mottled red and grey. Smears of the cut surfaces showed large numbers of asbestosis bodies. On microscopic examination pigmented hyalinized fibrous connective tissue deposits were observed around the bronchioles and bronchi. Sections from the right upper lobe revealed a diffuse obliterating dense fibrosis with only an occasional recognizable air space. Asbestosis bodies, described in some detail, were numerous throughout the areas of fibrosis. The tracheobronchial lymph nodes showed some proliferation of the

reticulum, pigmentation and rare asbestosis bodies. The heart, weight 375 gms., showed ventricular hypertrophy and dilatation of the right side. The discussion of this case report contains a table summarizing the anatomical findings from 28 cases of asbestosis collected from the literature.—*L. U. Gardner.*

ASBESTOSIS AND TUBERCULOSIS OF THE LUNGS. *L. Martz. Ztschr. f. Tbc., 1935, vol. 72, pp. 11–15.*

A woman was employed in an asbestos factory from 1920 to 1925 and again from November, 1931 to September, 1932. In November, 1932, she showed the first signs of illness, and in 1934 was shown to have asbestosis and tuberculous cavities in the lungs.—*L. Teleky.*

CALCIUM CONTENT OF THE BLOOD OF WORKERS IN THE CEMENT INDUSTRY. *I. D. Michenine and E. I. Sweinek. Méd. du Trav., Nov., 1934, vol. 6, pp. 311–325.*

The calcium content of the blood of workmen employed in the dustiest parts of cement plants is increased and sometimes reaches 18.8 mg. per 100 cc. The potassium and sodium content is about normal; there is an increase of magnesium in some workmen.

Determination of the blood calcium may serve as an aid in estimating the quantity of dust in the lungs of workmen.

The presence of calcium in the blood makes indispensable a thorough study of the problem of cement from several aspects, especially with regard to the other constituents.—*Authors' summary.*

PROTECTIVE ACTION OF BERYLLIUM AGAINST CERTAIN INDUSTRIAL DUSTS. *S. M. Fabroni. Med. del Lav., Dec. 31, 1934, vol. 25, pp. 441–444.*

Experiments with animals (rabbits) poisoned with lead acetate and with arsenious acid lead the author to the conclusion that beryllium hydroxide has some protective action.—*L. T. Fairhall.*

CHRONIC MANGANESE POISONING IN INDUSTRY. *J. Dantin-Gallego. Abstr. as follows from Rev. San. e. Hig. Pública, 1934, vol. 9, pp. 270–278, in Bull. Hyg., Jan., 1935, vol. 10, p. 16.*

The author reviews the condition of manganese poisoning for the past century and gives a general account of its symptomatology. He then describes the case of a man of 27 years whose work entailed the mixing of pyrolusite ($MnO \cdot OH$), graphite and other substances. This man and two colleagues dealt with "30–50 quintals" of pyrolusite daily (1½–2½ tons). Early in the second year after he started this employment he experienced a sense of fatigue and somnolence and of insecurity on walking, especially if he moved backwards. Once he fell as he was getting on his cycle to go to work. At the hospital, examination showed red blood cells 5,350,000 per cmm., and blood pressure 115/80; Wassermann negative. His face had the Parkinsonian mask-like expression; no alteration of sensation. A few days later he had attacks of marked muscular rigidity and retraction of the head lasting about 10 minutes and ending in tremor. Urinary examination yielded no manganese, but there were 7.5 mg. in 100 gm. feces.

Other authors have shown that manganese tends to accumulate in the lungs, liver, intestines, and kidneys. Some have recorded lesions in the corpus striatum and the caudate nucleus.

Prevention consists in the use of masks and the avoidance of dust in the mixing rooms. Treatment is said to be purely expectant.

THE EFFECTS OF EXPOSURE TO DUST IN TALC MILLS AND MINES. *W. C. Dreessen and J. M. DallaValle. U. S. Pub. Health Repts., Feb. 1, 1935, vol. 50, pp. 131–143.*

Two talc mills and mines in Northern Georgia were studied to determine the connection, if any, between talc dust exposure and tuberculosis mortality. The talc, containing 10% tremolite and traces of free silica, is used in the manufacture of steel marking pencils. Milling is incidental in order to salvage waste. Sixty-six persons were given physical and roentgenological examinations. Of these thirty-six were employed and the others had been previously exposed. Dust samples collected by impinger and the U. S. Public Health Service technic of counting showed exposures ranging from 1672 million to 17.1 million particles per cubic foot. A median particle

The author reviews the condition of man-nese poisoning for the past century and ives a general account of its symptomatol-gy. He then describes the case of a man f 27 years whose work entailed the mixing pyrolusite (MnO·OH), graphite and her substances. This man and two olleagues dealt with "30–50 quintals" of rolusite daily (1½–2½ tons). Early in the cond year after he started this employ-ent he experienced a sense of fatigue and mnolence and of insecurity on walking, pecially if he moved backwards. Once e fell as he was getting on his cycle to go work. At the hospital, examination owed red blood cells 5,350,000 per cmm., d blood pressure 115/80; Wassermann gative. His face had the Parkinsonian sk-like expression; no alteration of sen-tion. A few days later he had attacks of arked muscular rigidity and retraction of e head lasting about 10 minutes and end-g in tremor. Urinary examination yielded manganese, but there were 7.5 mg. in 10 g. feces.

Other authors have shown that manga-se tends to accumulate in the lungs, liver, estines, and kidneys. Some have re-ded lesions in the corpus striatum and caudate nucleus.

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In the group exposed to the highest dust concentrations, comprising 33 men, 16 were found to have pneumoconiosis and five of these also showed tuberculosis. No tuberculosis was found uncomplicated by pneumoconiosis, and no pneumoconiosis was found in the group exposed to low concentrations of dust. The high tuberculosis mortality rate in the county could not be attributed to the talc industry, but this study appears to show that Georgia talc is more injurious than tremolite talc, i.e., talc containing 40% or more of tremolite, as reported in a previous study.—*R. Page.*

IS THERE A PNEUMOCONIOSIS OF SLATE WORKERS? FINDINGS FROM AN INVESTIGATION AT SLATE QUARRIES. *A. Feil. Bull. Acad. Méd., Jan. 22, 1935, pp. 105–109.*

An inquiry was carried out in Mayenne and Anjou in which 251 workers were examined; 70 worked in the quarries, and 181 on the surface dressing slates. The quarrymen had far the greater exposure to dust. Notwithstanding careful clinical examination with x-ray films, no definite signs of any pneumoconiosis were detected. Respiratory manifestations were not more numerous among the quarrymen than among the others; nor, indeed, than among the general population. Of the quarrymen 38%, and of the others 46% were free from any lung trouble; they coughed not, neither did they spit, nor could any signs be found in their lungs. The slate only contained from 6 to 7% free silica; the rest consisted of complex silicates, but sericite was plentiful. This last point is of interest as being against the idea that sericite is particularly harmful in dust.—*E. L. Collis.*

CHROMIUM AND ITS COMPOUNDS IN INDUSTRIAL HYGIENE. *M. Déribéré. Ann. d'Hyg. Pub., Indust. et Sociale, Jan., 1935, pp. 7–16.*

A summary of the metallurgy and increasing uses in industry of chrome and its compounds. The toxic effects of these substances is reviewed. The article contains nothing new.—*E. L. Collis.*

CANCER OF SKIN AND INCREASE IN INCIDENCE OF PRIMARY TUMOURS OF LUNG IN MICE EXPOSED TO DUST OBTAINED FROM TARRED ROADS. *J. A. Campbell. Abstr. from Brit. Jour. Exper. Path., 1934, vol. 15, pp. 287–294, in Am. Jour. Cancer, Feb., 1935, vol. 23, p. 360.*

DUST, SMOKE, FUMES, AND VAPORS: THEIR DETERMINATION AND ELIMINATION

DUST CONTROL—PRESENT AND FUTURE DESIGN CONSIDERATIONS. *T. Hatch. Mech. Engr., Mar., 1935, vol. 57, pp. 154–156.*

The need of revision and clarification of the legal aspects of the dust problem is discussed; and it is stated that the hygienic and economic aspects of the problem can be settled only through permanent elimination of dust from industry. Most past design has been based on empirical formulas, unsubstantiated by a systematic correlation of actual results with the details of design, coupled with an understanding of the physical properties of dust and the laws governing its dispersion and behavior in air. The value of a dust control system should not be measured in terms of the percent efficiency of the system but in terms of the concentration of dust at the breathing zone of workmen and in the air discharged from the equipment.

The author discusses the physical properties of dusts, their motion through gases, the forces causing this motion, and the means of dispersion of dusts into the atmosphere. He shows that in dust control, the problem is the removal of dust laden air from the source of dust generation, not the removal of dust from the air. Consequently it is desirable to keep the dust in the least possible volume of polluted air. The area of throat, size and shape of hood, and volume of air exhausted are more important than the "static suction" at the throat of the hood in determining the hood's effectiveness in capturing dust.—*R. Page.*

osphine were detected, but
re so small that acute poi-
sphorus smoke is scarcely
nburned phosphorus vapor
d.

EW OF THE RECENT LITERA-
Sturgis, R. Isaacs, S. M.
H. Bethell, and G. E. Farrar.
Med., June, 1935, vol. 55,
.
of this review deals with
Metals, Drugs, and Radia-
7–1039), and covers lead, ar-
gold, other metals and poi-
ation.—*H. N. Lawson.*

ECTS

osis of the perilobular tissue
later changes to silicotic nod-
ver becomes cirrhosed; one
r changes in the portal lymph
liver, the spleen, and in the
, all of which latter changes
ore slowly. In the lungs dur-
l of observation no distinctly
mation occurred. The author
t no mechanical action by the
akes place but that the quartz
l the resultant colloidal silicic
nsible for the tissue prolifera-
hypothesis was confirmed by
a colloidal silicic acid in the
queous silica-sol free of elec-
protein.—*L. Teleky.*

THE PATHOGENESIS OF TISSUE
IN SILICOSIS. II. THE QUARTZ
OF SILICOTIC TISSUE. *G. F.*
fer. Arch. f. Gewerbepath., 1935
18–37.
ie practice with Timm's method
ling abstract) one may deter-
ature of the dust deposits; thus,
detected by the Berlin-blue re-
earing red in the dark field, while
iron particles appear blue in the
Especially easy are the sections
Kockel's method (Virchow's
), 277, 856) with carbon tetra-
saturated with chlorine. The
lied also 3–5μ ashed paraffin sec-
which the carbon disappears on

ashing while the iron *imparts* a rosy red color. On further treatment with aqua regia the silica residue alone remains. The technical procedure used is given in detail.

The lungs of men who have been exposed to various kinds of quartz dusts were examined and quartz particles found in lung sections and in sections from the liver, spleen, and kidney which ordinarily would have been considered quartz-free. In the silicotic nodules were vast numbers of quartz particles generally less than 1 μ while the silicosis-free portions contained the larger particles, 3–5 μ. This fact indicates a specific corrosive process which is probably due either to direct solvent action of the body fluids on the dust particles or to colloidal silicic acid. Colloidal silicic acid is known to produce diffuse fibrosis (Gye & Kettle).

The nodule formation is due to mechanical blockage of the lymph circulation by the dust deposits. The tissue around the deposits has a higher silica concentration, and proliferation of the connective tissue results. The allegedly different effects of different kinds of rock dusts are thus explained, for example, clays may decompose with varying degrees of colloidal silicic acid formation. The author believes that neither Beger's nor Jones' methods (see these Abstracts, *Beger* (whose name mistakenly appears as *Berger*), 1934, *16*, 56; Jones, 1933, *15*, 129), let them see the finest quartz particles which can be seen by his method, and he disputes both Jones' and Beger's theories.—*L. Teleky.*

STUDIES ON THE PATHOGENESIS OF TISSUE CHANGES IN SILICOSIS. III. NEW STUDIES ON THE NATURE OF ASBESTOSIS BODIES. *G. F. Koppenhöfer, Arch. f. Gewerbepath., 1935, vol. 6, pp. 38–62.*

By Timm's procedure (cf. Parts I & II of this study) the author found vast numbers of very fine needles in asbestotic lungs far in excess of the number of asbestosis bodies. Their length was 2–3 μ and their width 0.006 μ–0.01 μ. Since the asbestosis bodies may be 10 μ in length they cannot possibly be formed from these tiny needles. By Kockel's method (cf. Parts I & II of this study) iron is found in all, including the young asbestosis bodies. By treatment with the chlorine-saturated carbon tetrachloride there is obtained finally the silicic acid shell and what Beger called the albuminous sheath (Eiweisshülle). (Cf. these Abstracts, author's name mistakenly given as *Berger*, 1934, *16*, 56). In spite of attempts with various strong reagents the author could not cause these sheaths to shrivel up. Ashing was attempted without success and the author finally concluded that the sheath of the asbestosis bodies is not albuminous. Beger's theory explaining the construction and destruction of these bodies is felt to be incorrect and in contradiction to the evidence the author has presented.—*L. Teleky.*

(The photomicrographs in these three papers are unusually good and the technics are given in considerable detail. We regret that space does not permit more detailed abstracting.—Ed.)

MODERN VIEWS ON SILICOSIS. *W. E. Cooke. Jour. Hyg., May, 1935, pp. 207–218.*

The author points out how silicosis is caused by silica dust gaining access to the lungs. Such particles are fairly readily soluble in alkaline fluids; and the finer the particles, the more quickly are they dissolved. Other dusts, although sharp and angular, do not set up a fibrotic reaction. There is no sound evidence that silicates produce silicosis. Sericite, which has been blamed, occurs generally in the dust of Lancashire mines; but no silicosis occurs among the miners, except those men employed in drilling through sand-stone rocks to get at the coal measures. Sericite particles are plentiful in the lungs of the coal-miners, but fibrosis is absent. Other dust particles found in coal may form the bases of "curious bodies," similar to those seen in the lungs of asbestos workers. Asbestos is unique among silicates in that it originates fibrosis; but possibly its bases are dissolved by the tissue fluids and eliminated, leaving behind a free silica fiber to be the true cause of the fibrosis.—*E. L. Collis.*

SOME ROENTGENOLOGICAL OBSERVATIONS REGARDING PULMONARY SILICOSIS IN PORCELAIN WORKERS. *G. Jönsson. Acta Radiol., 1935, vol. 16, pp. 431–438.*