

ST0850665

PLAINTIFF'S EXHIBIT

DOW-1633

ABSTRACT OF THE
LITERATURE
OF
INDUSTRIAL HYGIENE
SUPPLEMENTARY TO
THE JOURNAL OF INDUSTRIAL HYGIENE

EDITORS

DAVID L. EDSALL, M. D., S. D., United States
EDGAR L. COLLIS, M. D., M. R. C. S., Great Britain

VOLUME XIV
JANUARY, 1932—DECEMBER, 1932

PUBLISHED BY
HARVARD SCHOOL OF PUBLIC HEALTH
Boston, Mass.

ST0850666

EDITORS

United States

DAVID L. EDSALL, M.D., S.D.

Great Britain

E. L. COLLIS, M.D., M.R.C.S.

HONORARY CONSULTING EDITOR

SIR THOMAS M. LEGGE, M.D., D.P.H.

ASSOCIATE EDITORS

United States

W. IRVING CLARK, JR., M.D.

CECIL K. DRINKER, M.D.

EMERY R. HAYHURST,

A.M., Ph.D., M.D.

YANDELL HENDERSON, Ph.D.

JAMES P. LEAKE, M.D.

WALTER R. MILES, Ph.D.

HARRY E. MOCK, M.D.

C.-E. A. WINSLOW,

M.S., A.M., Dr.P.H.

WILLIAM P. YANT, B.S.

Great Britain

JOHN C. BRIDGE, F.R.C.S.(E.) D.P.H.

SIR KENNETH GOADBY,

K.B.E., M.R.C.S., D.P.H.

SIR LEONARD HILL, M.B., F.R.S.

T. LISTER LLEWELLYN,

B.S., M.D., M.I.M.E.

SIR THOMAS OLIVER, M.D.

R. PROSSER WHITE,

M.D., M.R.C.S.

H. M. VERNON, A.M., M.D.

D. A. COLES, M.D.

South Africa

E. H. CLUVER, A.M., M.D., B.Ch., D.P.H.

Canada

C. H. BEST, M.D.

Australia

CHARLES BADHAM, M.B., B.Sc., D.P.H.

MANAGING EDITORS

ALICE HAMILTON, A.M., M.D.

PHILIP DRINKER, B.S., Ch.E.

DUST HAZARDS AND THEIR EFFECTS

DUST IN ULTRAVIOLET LIGHT. Pfaff. *Schweiz. med. Wchnschr.*, Dec. 13, 1930, p. 1174.

The author made dust counts on air samples (300 c.c.) collected under a quartz lamp before it was lighted and on samples collected three or four minutes after the lamp had been lighted, at a distance of 50 cm. from it. Counts are given from two experiments, both of which showed a 59 per cent. increase in flocculation of dust particles after the lighting of the lamp. The author gives as explanation of this that the air becomes ionized in the vicinity of the ultraviolet light and removes the electric charge from the dust particles, thus allowing them to settle in greater numbers.—M. C. S.

THE NATURE OF THE DUST IN THE AIR OF COTTON-CARD ROOMS. R. H. Pickard. *Abstr. as follows from Jour. Textile Indust.*, 1930, vol. 21, pp. 595-604T, in *Chem. Abstr.*, Aug. 10, 1931, vol. 25, p. 4132.

This is a report of an investigation of the dust produced during carding in seventeen card rooms covering the widest possible range of conditions in regard to the type of cotton, the dimensions and layout of the room, the efficiency of the ventilation, and the method of stripping. The dust is shown to consist mainly of minute almost invisible particles, less than 0.01 mm., and of a few large particles, chiefly fragments of fiber, which are, in general, numerically unimportant. The sampling of the air by Owens' jet extension apparatus, the computation of the minute particles, and the

expression of the results are described. The composition of the dust from a chemical and biologic standpoint is discussed. The ratio of the number of organisms of all kinds to the total number of dust particles in the atmosphere did not vary greatly in the tests. The mildew organisms belonging to the *Aspergillus niger* group were invariably strongly represented. Of the total number of fungus spores present, they rarely formed less than 50 per cent., and at times exceeded 90 per cent. Chemical analysis of the dust (ten samples) indicated that it was composed of about 90 per cent. organic matter, and about 10 per cent. inorganic matter. The organic matter consisted of cotton hair fragments, seed coat particles, and fungus spores. Approximately 60 per cent. of the inorganic matter was silica, and the remainder was chiefly iron.

A COMPARATIVE STUDY OF DUST FILTERS. T. M. Kozlyayev. *Arb. wiss. Forsch.-Sekt. Leningrad., Abt. Arbeitsschutzes*, 1927, vol. 1, part 2, pp. 263-277.

TUBERCULOSIS AND PULMONARY ANTHRACOSIS. M. Stassen. *Abstr. from Rev. belge de la tuberc.*, July-Aug., 1929, vol. 20, p. 147, in *Am. Rev. Tuberc.*, May, 1931, vol. 23, pp. 103-104.

This is a review and discussion of tuberculosis and anthracosis in coal miners, presented under the following headings: (1) route of passage of dust; (2) nature and properties of coal dust; (3) physiologic factors affecting health of coal miners; (4) action of coal dust

on sensitized human respiratory mechanism; and (5) search for tubercle bacilli in sputum. Interested readers are referred to the abstract in the *American Review of Tuberculosis*.—E. O.

METHODS FOR SUPPRESSING DUST IN ASBESTOS TEXTILE FACTORIES. HOME OFFICE REPORT. H. M. Stationery Office, 1931.

Embodied in this report are a series of agreements between employers and inspectors as to danger points and methods of dust suppression in textile asbestos factories. The report is well illustrated throughout by diagrams and also by photographs of actual plants. The danger from asbestos dust has raised new and difficult problems in ventilation for dust suppression. These problems can, however, be surmounted by the use of modern appliances; but time must elapse before the dust danger in this industry can be brought under control. The interest in this report is the demonstration it gives of the advances which have taken place in recent years in the technic of locally applied exhaust ventilation for suppressing any dust hazard.—E. L. C.

SILICOSIS IN SOUTH AFRICA. A SYMPOSIUM ON THE HISTO-PATHOLOGY, PATHOLOGICAL ANATOMY AND RADIOLOGY OF THE DISEASE. F. W. Simson, A. S. Strachan, and L. G. Irvine. *Proc. Transvaal Mine Medical Officers' Assn., Special Supplement, 1931, vol. 10, no. 118, pp. 44.*

Three papers are presented here in order to set out plainly the conclusions arrived at by South African experts relative to the pathologic types which

are associated with different combinations of silicosis and tuberculosis. Simple silicosis starts in lymphoid tissue, which occurs anatomically along the air passages rather than the blood vessels; it is instigated by the arrival in this tissue of phagocytes carrying silica particles. A silicotic islet forms enlarging into a nodule on a whorled plan. Such nodules may coalesce with neighboring ones, and form a fibroid mass; they are generally distributed fairly evenly throughout both lungs.

Should tuberculous infection occur simultaneously with the dust inhalation, the fibrous formation is usually more rapid and more massive; further, it shows a tendency for the center of the nodule to become necrotic. This pathologic condition is called infective silicosis; but it may progress slowly over years, during which the patient appears in fair health and experiences no toxic symptoms. Finally such a case becomes one of overt tuberculosis. Should the tuberculous infection be present before the dust is inhaled, the tendency is for similar infective nodules to occur; but their distribution is isolated and not symmetrical, depending upon the sites of original infection. When, however, the tuberculous infection is superimposed upon simple silicosis, caseous tuberculosis may be found surrounding the fibrous nodules, which in themselves show little sign of necrosis; this condition is usually one of overt tuberculosis from the commencement of infection.

An opportunity arose for correlating pathologic findings with clinical symptoms and X-ray shadows from 400 cases in which a clinical examination and radiograph had been taken within six

J. I. H.
Jan., 1932

months of death. An explanation is given of the classification used in judging radiographs. First comes general arborization, then slight mottling which gradually becomes coarse; all these are shown by simple silicosis. The presence of active tuberculous infection is indicated by cloudy shadows, usually localized.—E. L. C.

SILICOSIS. E. L. Collis. *Bull. Hyg., April, 1931, vol. 6, pp. 305-312.*

This is a good general review of the subject, short and to the point. There are no references in the text, but an excellent bibliography is appended.—P. D.

FIBROSIS OF THE LUNGS IN SOUTH COAST COAL MINERS, NEW SOUTH WALES. K. R. Moore and C. Badham. *Health, Commonwealth of Australia, 1931, vol. 9, pp. 33-40.*

The results are reported of examining 471 coal miners with not less than ten years' experience below ground. The inquiry was made to ascertain the influence on the lungs of mine dust before stone dusting was put into practice. Fibrosis was found in 25.9 per cent.; it increased with length of exposure, attaining 40.8 per cent. for men with over thirty years' industrial history. The fibrosis among these South Coast coal miners in radiographs shows as a fine-grained type diffused generally over the lungs; occasionally it is coarser where an infective element is present. It resembles the findings of asbestosis rather than silicosis; and is in accord with other findings among coal miners (see *THIS JOUR.*, 1931, vol. 13, p. 19). Estimations of disability among such miners with fibrosis must depend more upon clinical exami-

nations than upon radiographic findings. The onset of the condition is slower and any disability caused is less definite than fibrosis among the metalliferous miners; no tendency to succumb to tuberculosis was apparent. More knowledge as to pathology and histology is desired.—E. L. C.

PNEUMONOKONIOSIS, TUBERCULOSIS, AND SOCIAL CONDITIONS IN IRON FOUNDRY WORKERS IN VIENNA. B. Komissarnik. *Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 2, no. 1.*

This is a report on the results of examining a group of forty workers in an iron foundry clinically and by X-rays, and also of questioning them as to their family history and conditions of living. There were altogether 153 persons employed at the foundry. None who had less than ten years' work at the foundry were examined. A description is given of the process of casting and the cleaning of castings, and the various materials used are enumerated. The most important injurious factor is sand dust, and according to Collis the sand used in molding contains almost 79 per cent. of silica (SiO_2).

The men worked for nine and three-fourths hours on five days a week and did no work on Saturdays. Of the forty examined half were from 51 to over 60 years of age; thirteen had worked from thirty-one to forty years, five from forty-one to fifty years, and two over fifty years. About 95 per cent. had been employed continuously on dusty work. In twelve cases the fathers of the men examined had also worked at the foundry and had lived from 75 to 84 years; none had died of tuberculosis. According to the statements of the workers there were only

nine cases in which a member of the family had died of tuberculosis.

Of the forty examined, four were definite cases of pneumonokoniosis, five were suspected cases, and three were borderland cases.

By X-ray examination twenty-three were found to have signs of old inactive pulmonary tuberculosis but no tubercle bacilli were found in the sputa.

The investigations show the necessity of improving the hygienic conditions of work by dust estimation and air analyses in the places of work, and by careful attention to the ventilation system and the working of the exhausts. —A. J. C.

EXPERIMENTS TO DETERMINE THE MINIMUM AMOUNT OF COAL-DUST REQUIRED FOR PROPAGATION OF A MINE EXPLOSION. *G. S. Rice and H. P. Greenwald. U. S. Bur. Mines,*

Rep. Investigations, Serial No. 3132, Aug., 1931, pp. 3 (multigraphed).

Tests in the Experimental Mine have shown that the lower limit of inflammability of through 200-mesh Pittsburgh coal dust lies between 0.032 and 0.08 ounce per cubic foot under the conditions there obtaining. It appears that the limit will be not far from 0.05 ounce per cubic foot. This is a very small amount and is equivalent to 3 ounces per linear foot in an entry of 60 square feet in cross section. Such an amount distributed over all the surfaces could be detected only by careful examination. It is evident that no coal mine can be so clean that propagation of coal dust explosion is impossible, a conclusion voiced by the Bureau's engineers many years ago, and one which points to the need of efficient rock dusting to prevent coal dust explosions.—*Authors' Conclusions.*

OCCUPATIONAL INFECTIOUS DISEASES: OCCURRENCE, TREATMENT, AND PREVENTION

INFECTIOUS AGENTS IN INDUSTRY. *F. Schoofs. Rev. d'hyg., Jan., 1931, vol. 53, pp. 32-37.*

The author discusses the occurrence in Belgium of ankylostomiasis, anthrax, syphilis, and smallpox, and refers to the legislative measures which have been adopted for their control.

ORGANIZATION OF A CAMPAIGN AGAINST ANKYLOSTOMIASIS IN A MINING CAMP. *C. Garin, J. Roussel, and B. Gonthier. Abstr. as follows from Méd. du travail, March, 1931, vol. 3, pp. 37-48, in Bull. Hyg., July, 1931, vol. 6, p. 539.*

The first need is a complete examination of the stools of everyone work-

ing below ground. An accurate list must be obtained and the co-operation of the workers insured. Special sanitary conveniences must be erected, where a bucket is used for defecation and then passed to an attendant who takes a sample for transmission to the laboratory. Telemann's method for the microscopic counting of the eggs present is employed, wherein an aqueous emulsion, after being shaken up with hydrochloric acid and ether, is centrifuged; a drop of the deposit is then placed under a cover slip and examined. Particular attention is directed to the organization of the work so that from 150 to 200 samples can be dealt with daily, and to strict cleanli-

J. I. H.
Jan., 1932

differential diagnosis, and finally various minor forms of poisoning. With respect to adults, the diagnosis of mild and severe forms of plumbism and late manifestations are discussed in detail. A short bibliography is included.—L. T. F.

THE PREVENTION AND CONTROL OF LEAD POISONING IN INDUSTRY. J. S. Mark. *New Jersey Med. Soc. Jour.*, Oct., 1931, vol. 28, p. 773.

A CASE OF MERCURIAL POISONING. A. Langelez. *Rev. du travail*, 1931, vol. 28, pp. 1253-1259.

Following the occurrence of a slight case of mercury poisoning, an investigation was carried out at a factory where hair is treated with nitrate of mercury for use in the manufacture of hats. The man concerned was employed in moving bags of treated hair while packing them for dispatch. He was not employed in treating the hair; this process was carried out in an entirely separate place. Chemical analysis of the atmosphere in which he was working indicated the presence of traces of mercury. Further tests were then carried out by placing sacks of treated hair in a closed chamber in which test papers were exposed. When

the hair had been prepared during the preceding four weeks, the test papers became gray after four hours, and were black after twenty-four hours. When the hair had been prepared for a year, no reaction could be detected for seven hours, and after twenty-four the black tint was not so deep. When the hair had been prepared two years, the black tint was still less intense after twenty-four hours. This investigation indicates that an uncombined salt of mercury is present on hair treated with nitrate of mercury, and that vapors containing mercury may arise at ordinary temperatures. In the present instance, such vapors traversed strong paper bags.—E. L. C.

DETERMINATION OF SMALL AMOUNTS OF ZINC IN THE PRESENCE OF LEAD. M. E. Stas. *Abstr. as follows from Pharm. Weekbl.*, 1930, pp. 93-97, in *Ber. u. d. ges. Physiol. u. exper. Pharmacol.*, July 1, 1931, vol. 60, p. 178.

In the absence of the sulphide or ferrocyanide nephelometric methods of zinc determination (which require the removal of lead in any case in order to give correct results), the o-oxyquinoline method gives good results even in the presence of lead.—L. T. F.

DUST HAZARDS AND THEIR EFFECTS

ON THE QUESTION OF OBTAINING A CONSTANT DUST CONCENTRATION IN A DUST CABINET. H. Abeshaus. *Arch. f. Hyg.*, April-May, 1931, vol. 106, pp. 102-111. Translation of Author's Summary, p. 110.

1. By means of a suitable simple apparatus, it was possible through the method of dispersing eddies to obtain a

constant dust concentration some time after starting the fan, with variations 3 to 8 per cent. in extent.

2. An ordinary fan used for stirring up the dust, whether above or below, did not give a uniform dust concentration in the chamber.

3. Only the combination of two fans, turning in opposite directions

with suitable selected rotative speeds, gave a uniform dust concentration in a particular zone with a fluctuation of 4 per cent.

4. The dust concentration in the central zone was greater than the concentrations at exterior points; such nonuniform vertical distribution was an advantageous condition in those cases where we wished to have different constant dust concentrations.—T. H.

PNEUMONOKONIOSIS IN ITS CLINICAL ASPECTS AND ITS SIGNIFICANCE AS AN INDUSTRIAL DISEASE. W. Brednow. *Abstr.* July 19, 1931. *Rev. Tuberc.* 112.

This is a review of the literature which has appeared since the last issue of the *Journal*. It is a very interesting and useful abstract in the *Journal of Tuberculosis*.—

ASBESTOS LIKE BODIES FROM THE LUNGS OF A COAL-MINER WHO HAD NEVER WORKED IN ASBESTOS. F. E. Tylecole and J. S. Dunn. *Lancet*, Sept. 19, 1931, vol. 2, pp. 632-633.

Asbestosis bodies are composed of a colloidal covering upon a slender filament of asbestos fiber, upon which the covering is adsorbed. The nuclei of the bodies consist of spicules of biotite. The author ascribes to the iron present in asbestos the reaction which occurs, and maintains that some soluble fraction of asbestos leads to the formation of the asbestosis bodies, and that this chemical action plays its part in the production of pulmonary fibrosis.—E. L. C.

CASE OF ASBESTOS-LIKE BODIES IN THE LUNGS OF A COAL-MINER WHO HAD NEVER WORKED IN ASBESTOS. F. E. Tylecole and J. S. Dunn. *Lancet*, Sept. 19, 1931, vol. 2, pp. 632-633.

Details are given of the pathologic condition found in a fatal case of chronic fibroid tuberculosis of the lungs in a man who had worked as a coal miner. He had never been exposed to asbestos dust; nevertheless, bodies were found in the lungs resembling those which originate from inhaling asbestos dust. They simulated them in size and in general shape, but they were smaller and had rounded swellings at their ends; and they were more numerous and more abundant. But they were smaller and less regular in shape, and possessed a more homogeneous material. The fact that these bodies consist of minute fragments of silicate mineral, which are found in the lungs, and undergo change under the influence of fluids; hence the occurrence of a peripheral zone of a peripheral zone of the iron containing bodies. The occurrence of these bodies apart from exposure to asbestos.—E. L. C.

PULMONARY ASBESTOSIS COMPLICATED BY PULMONARY TUBERCULOSIS. W. B. Wood and S. R. Gloyne. *Lancet*, Oct. 31, 1931, vol. 2, pp. 954-956.

The point under discussion is whether asbestosis predisposes to pulmonary tuberculosis in the same way that does silicosis. Information is given concerning a total of fifty-seven cases of asbestosis, twelve of which showed evidence of tuberculosis. The information gathered is not held to

J. I. H.
March, 1932

three embedded docs
on this page

be conclusive as to whether either condition prepares the way for the other; nor does it negative either suggestion. But it does definitely indicate that both diseases can be present simultaneously. The article is of value in presenting concisely the symptoms and physical signs of uncomplicated asbestosis, as follows: "Irritable cough, scanty expectoration, shortness of breath, progressing to a distressing dyspnoea on the slightest exertion, pains in the chest and decline in weight, often followed by extreme emaciation. The complexion is 'earthy.' Cyanosis is usually but not invariably present. Clubbing, if present, is of slight degree. On auscultation, fine dry crackles are usually heard over the lung bases posteriorly, and in the axillary regions. Fine pleural friction is often heard. Percussion may reveal some impairment of resonance at the lung bases. Negative points are the absence of haemoptysis—except perhaps an occasional trace of colour in the sputum—and the slight degree of expectoration. Sputum examination reveals the characteristic asbestosis bodies. X-ray examination shows a diffuse fine fibrosis affecting chiefly the lung bases while sparing the lung apices and infraclavicular regions." These characteristics sharply differentiate the condition from those commonly associated with tuberculosis.—E. L. C.

DANGER TO HEALTH FROM GRINDSTONE DUST WITH SPECIAL REFERENCE TO ARTIFICIAL STONES AND SILICOSIS.
Menslage. Abstr. as follows from Zentralbl. f. Gewerbehyg., May, 1931, N. S. vol. 8, pp. 123-125, in Bull. Hyg., Oct., 1931, vol. 6, p. 745.

The value of this article, written by an engineer, lies in the analysis he gives of artificial grindstones. Such chemical analyses are difficult and expensive. The three he cites were made by a German-American firm.

No. 1. Binding material: ceramic.
Grinding material: artificial carborundum.
Analysis of the fired wheel:

	%
Al ₂ O ₃	83.29
SiO ₂	11.14
Fe ₂ O ₃	0.83
MgO.....	0.48
CaO.....	0.62
Na ₂ O.....	0.25
K ₂ O.....	0.70
TiO ₂	2.69
Total.....	100.00

Laboratory remarks: Free silica can be practically excluded in a normal, i.e., highly fired stone.

No. 2. Binding material: ceramic.
Grinding material: silicon carbide.
Analysis of the fired wheel:

	%
SiC.....	81.50
SiO ₂	12.67
Si.....	0.85
Al ₂ O ₃	2.89
Fe ₂ O ₃	0.54
MgO.....	0.18
CaO.....	0.27
Na ₂ O.....	0.29
K ₂ O.....	0.83
TiO ₂	0.07
Total.....	100.09

Laboratory remarks: The binding material contains feldspar and quartz; some part of the total silica contained in the feldspar is free silica. The heat reactions during firing dissolve some, but not all, of the free silica so that in the finished stone the free silica amounts to about 3.55 per cent.

A third analysis (in essentials not differing widely from those detailed)

is given in which the binding material was a silicate and the grinding material artificial carborundum. The laboratory remark shows it to contain practically no free silica.

The author states that in grinding with artificial stone the "wear" proportion of the article ground to the stone is as 1:45 (in parts by weight) as compared with the much greater 1:5 to 1:10 with natural stone.

His view is that from purely physical considerations any dust in inordinate amount is harmful, but that silicosis, generally speaking, can only arise from natural sandstones.—T. M. L.

SOME GEOGRAPHICAL AND ANTHROPOLOGICAL FACTORS IN THE STUDY OF INDUSTRIAL DISEASES. *E. G. Bowen. Abstr. as follows from Jour. State Med., Nov., 1930, vol. 38, pp. 666-671, in Med. Jour. Australia, Sept. 12, 1931, vol. 2, p. 337.*

Bowen has attempted to show how geographic and racial factors affect the course of miners' phthisis. An anthropologic survey of two adjacent valley regions in Cardiganshire has revealed the existence of two separate types of inhabitant, one type inhabiting each of the areas surveyed. The two valleys present different geographic features, one, inhabited by dark, long-headed folk of slender build, being narrow and gorge-like; the other valley is wider and peopled by a larger, fair-haired type of individual. Lead and zinc mining has been carried out in these valleys for many centuries and has now declined, leaving the inhabitants to take up farming. Sheep farming is practicable only in the narrow valley, but crops are grown in the more fertile one. Examination

of the death registers in the area from 1879 to 1926 shows the incidence of miners' phthisis to be high. The mines were badly ventilated and very wet, and complication of silicosis by tuberculosis was almost universal. It was found that in the narrow region 37 per cent. of the deaths took place between the ages of 57 and 62, and only 8 per cent. between the ages of 65 and 70, as against 22 per cent. and 20 per cent., respectively, in the wider, more fertile area. Most deaths from miners' phthisis took place when the mining activities were declining. The incidence of simple pulmonary tuberculosis follows the same variations in the period under review as miners' phthisis. The better class of living, more sunshine, and other social and economic factors in the second valley have resulted in increased resistance to pulmonary tuberculosis in the older mining population as well as in the present agricultural population.

SILICOSIS. *Internat. Labour Office, Studies and Rep., Series F (Indust. Hyg.) No. 13, 1930, pp. 24.*

This issue consists of the resolutions adopted by the conference held at Johannesburg in August, 1930; although only just published, it is a supplement to the larger volume which recorded the proceedings of the conference and should be filed with it (see THIS JOUR., 1931, vol. 13, p. 183). It is a useful summary for reference purposes. The part dealing with the medical aspects, including etiology, pathology, and diagnosis, is particularly concise and accurate. There are three appendixes, one of which is concerned with radiology and sets a standard of technic; a second deals

J. I. H.
March, 1932

with preventive measures as practised in mining; the third discusses prognosis, after care, and compensation.—E. L. C.

SILICA IN THE BRONCHIAL GLANDS IN PULMONARY SILICOSIS. A. Leulier and A. Policard. *Abstr. as follows from Compt. rend. Soc. de biol., 1931, vol. 106, pp. 1034-1036, in Physiol. Abstr., Sept.-Oct., 1931, vol. 16, p. 391.*

The portion of the ash of the bronchial glands which is insoluble in hydrochloric acid is taken as a crude measure of the amount of silica contained in them. Scarcely a trace of silica is indicated by this method as existing in the glands. Evidently there is a difference in mobility between the elements in the lung which fix the silica and those fixing carbon in anthracosis. The latter migrate freely to the glands.

SILICOSIS AND TUBERCULOSIS. W. Mascher. *Abstr. as follows from Beitr. Klin. d. Tuberk., 1930, vol. 73, p. 388, in Am. Rev. Tuberc., Nov., 1931, vol. 24, pp. 114-115.*

The author examined thirty-two workers in the quartz industry, the workers being subjected to an intense concentration of dust containing 99 per cent. of silicic acid. Roentgeno-

logically eleven of the workers revealed silicosis in stage 1, three in stage 2, and seven in stage 3, while six were free from silicosis and five were questionable. The latent period of the disease averaged about one year, and a definite disposition was discernible. Workers with deformities of the thorax or the spinal column showed a severe silicosis after a relatively short time. In none of the cases were tubercle bacilli found in the sputum, but one of them was a case of spontaneous pneumothorax and two postmortems disclosed silicosis without tuberculosis. The workers were without exception strong, athletic types of men between 20 and 40 years of age. In twelve cases, in which there were found roentgenologically old and fresh tuberculous foci, there could be noted no influence of the silicosis or of the tuberculosis upon each other.

EFFECTS OF COLLOIDAL SILICA UPON THE GROWTH OF TUBERCLE BACILLI IN BLOOD. S. L. Cummins and C. Weatherall. *Brit. Jour. Exper. Path., Aug., 1931, vol. 12, p. 245.*

The authors' experiments *in vitro* lead them to the conclusion that "silica sol does not in any way further the pullulation of tubercle bacilli in human blood outside the body."

OCCUPATIONAL INFECTIOUS DISEASES: OCCURRENCE, TREATMENT, AND PREVENTION

COMMON COLDS. W. G. Smillie. *Personnel Jour., April, 1931, vol. 9, pp. 470-474.*

We do not know the cause of colds. There is strong evidence that the disease is due to an infectious organism,

probably a filterable virus. We believe that this infection is spread by direct contact, from person to person. Some people are entirely immune, but most people contract the infection once or twice a year. We have strong

above this a fan had been installed a short time before illness showed itself. The sticky material called "Resistin" was said to contain alcohol 6 parts, benzene 4, tetrachlorethane 14, and acetate of cellulose 3. None of the cases was correctly diagnosed by the medical attendant.

The author reviews the many cases of poisoning which have been described since the introduction of tetrachlorethane in 1903 as a solvent for fats and resins, claiming its noninflammability and slight solubility in water as an advantage over other solvents. In addition to numerous cases from doping of airplane wings (leading ultimately in 1917 to its exclusion from the dope), he cites fatal cases from the manufacture of artificial pearls and from its presence in zapon lacquers. He describes its increasing use as a solvent, as a cleaning agent, as a head wash, as a parasiticide, in the artificial silk and the boot and shoe industries, and as an ingredient in all manner of cleaning agents sold in tubes under trade names. —T. M. L.

EXPERIMENTAL CONTRIBUTION TO POISONING BY TETRACHLORETHANE. L. Müller. *Abstr. as follows from Arch. f. Gewerbepath. u. Gewerbehyg.*, 1931, vol. 2, pp. 328-329, in *Bull. Hyg.*, Dec., 1931, vol. 6, p. 868.

In experiments on white mice, guinea-pigs, and rabbits by inhalation, subcutaneous and intravenous injection, the author was able to note only

fatty degeneration of the lobes of the liver, but not acute atrophy or the regenerative processes observed in man. This may be due, he thinks, to the same causes as have prevented, hitherto, experimental production of cirrhosis of the liver in animals.—T. M. L.

INVESTIGATION OF INJURIES FROM HARMFUL EFFECTS OF XYLENE IN BERLIN LITHOGRAPHIC PROCESSES. L. Nelken. *Abstr. as follows from Zentralbl. f. Gewerbehyg.*, July, 1931, N.S. vol. 8, pp. 182-184, in *Bull. Hyg.*, Dec., 1931, vol. 6, p. 863.

As a result of observations as to the harmful effects of xylene published by Dr. Stocké in the *Zentralblatt für Gewerbehygiene und Unfallverhütung* of December, 1929, the laboratory of the Sickness Insurance Society for Letter Press Printing issued a questionnaire and carried out determinations of the hemoglobin and the number of leukocytes in 220 persons.

The number of leukocytes was less than 5,800 in 13.64 per cent., under 5,500 in 8.18 per cent., and under 5,000 in 3.63 per cent. The hemoglobin was below 80 per cent. in 16.35 per cent. of those tested.

The general conclusion is that xylene poisoning (with possible toluene and benzene admixture) is caused in the processes where it is used in spite of the almost invariable application of local exhaust ventilation, and the changes can be shown in the blood picture.—T. M. L.

DUST HAZARDS AND THEIR EFFECTS

INDUSTRIAL DUST AND PULMONARY TUBERCULOSIS. K. W. Jöllen. *Forsch. u. Fortschr.*, Nov. 20, 1931.

During the last eight years the author

has studied the effects of industrial dusts on rabbits which had been previously infected with tuberculosis from a human source, and he has been able

to show the different effects individual dusts have on the lung tissues. The rabbits were placed in a special inhalation chamber, into which the dust was introduced from below. The dust was thoroughly mixed with air by passing an intermittent air current through a series of three glass cylinders, the dust being put in the first. The dust concentration was generally from 60 to 80 mg. per cubic meter of air. Inhalations lasting from one-half to one hour a day were continued for three and one-half to five months; then the animals were killed and the lungs examined both macroscopically and microscopically. The results are arranged in three series: (1) the effects of dust from steel grinding, and from porcelain, coal, chalk, and soot; (2) the effects from cement, tobacco, and schist dusts; and (3) the effects from limestone, quartz, basic slag, white lead, and cotton textile dusts.

The greatest development of pulmonary tuberculosis was caused by the dust from grinding steel, and the next from porcelain and schist dusts, all of which contain much free silica. In spite of its high content of silica, quartz was found essentially harmless. Basic slag, coal, soot, and limestone were only slightly injurious. Cement, textile, and tobacco dusts were almost noninjurious, and the same may be said for white lead dust and chalk dust ($\text{Ca}(\text{OH})_2$), the latter of which might almost be regarded as a therapeutic agent. These results agree generally with statistics of diseases, and where variations occur they can be explained by special circumstances, such as careful vocational selection, the employment of many juveniles, and home work under bad housing conditions. A high rate of pulmonary tuberculosis had

been expected from the quartz dust, owing to the high content of free silica and therefore its harmlessness came as a surprise. It seems, however, that Smith and Collis have previously shown that this harmlessness may be due to a considerable admixture with aluminium oxide, and Heffernan has shown the same among quartz workers in Derbyshire. The failure of white lead dust to produce pulmonary tuberculosis was due to the great solubility of this dust in the lung tissues.—A. J. C.

PULMONARY ASBESTOSIS. *E. Beintker. Abstr. as follows from Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 2, pp. 345-358, in Bull. Hyg., Dec., 1931, vol. 6, pp. 862-863.*

The author records two cases, with postmortem 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 to 1922, and from 1922, when symptoms first appeared, until his death in 1929 as a porter. On X-ray examination the heart shadow was increased in diameter and the lung roots showed enlargement. The lung fields showed diffuse shadowing with small nodules about the size of a millet seed. These appearances were on the whole most marked in the left lower lobe. The patient died of heart failure. Histologic examination of the lung showed increase in connective tissue and extensive inflammation of the lung, together with asbestosis bodies.

The exposure in the second case began in 1900. There was a long period of dyspnea 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 fiber *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 fibers 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 silica remains, which stimulates the formation of connective tissue.

In conclusion, the author notes that asbestosis of the lung differs from silicosis in its radiologic picture as well as in anatomic 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 fibers in the lung tissue, and it is assumed that the asbestos fibers 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 on its distribution in the lung. Diffuse distribution does not give the same intensity of shadow to the radiologic 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 fibers into silica.—S. R. G.

OCCUPATIONAL INFECTIOUS DISEASES: OCCURRENCE, TREATMENT, AND PREVENTION

DISCUSSION ON THE PRESENT-DAY POSITION OF PNEUMONIA ON THE MINES. A. Smith, F. Daubenton, P. A. Peall, L. I. Coleman, and H. Q. F. Thompson. *Abstr. as follows from Jour. Med. Assn. So. Africa, 1931, vol. 5, pp. 389-396, in Bull. Hyg., Nov., 1931, vol. 6, p. 807.*

This is a report of a meeting held at Johannesburg in May, 1931. Dr. A. Smith, who read the first paper, said that since 1923 pneumonia had steadily increased despite the use of Lister's pneumonia vaccine. Since 1928 the prophylactic vaccination of new recruits had been given up at most of the mines, as it was considered that a new type of pneumococcus had developed, and its discontinuance did not seem to have

any ill effect. In 1930 the number of cases increased owing, it was believed, to the increase in the new laborers taken on that year, and to the occurrence of influenza in overcrowded quarters. While the mortality from other causes had decreased of recent years, mortality from pneumonia had increased.

Dr. Daubenton called attention to the incidence rate of 3 per cent. for the Rand and 1 per cent. in other countries, and the case mortality of 11 per cent. on the Rand compared with over 20 per cent. in Britain and between 30 and 40 per cent. in the United States. There were a number of cases resembling lobar pneumonia which cleared up in from two to three days. These he

two could any histologic evidence of infiltration be discovered.

CHANGES IN THE LIVER IN RABBITS WITH TAR CANCER. A. Babes. *Abstr. as follows from Bull. Assn. franç. pour l'étude du cancer, 1931, vol. 20, p. 420, in Am. Jour. Cancer, Jan., 1932, vol. 16, p. 7.*

The author has already described degeneration and necrosis of the parenchyma in the liver of rabbits which die during the first ten days of tarring, and proliferation of the hepatic cells in those that live more than ten days (*Bull. Assn. franç. pour l'étude du cancer, 1929, vol. 18, p. 328*). These lesions are constant and very pronounced.

In the present paper he records the changes found in this organ among thirteen rabbits that survived tar painting long enough for seven of them to develop carcinoma. These were,

in brief, very active proliferation of the parenchymal cells and a hypertrophy affecting particularly their nuclei, the two processes being generally more intense in rabbits with cancer and increasing in proportion to the development of the tumor.

The author regards this alteration as equivalent to that proliferative process in the tarred skin which precedes the appearance of cancer, and is inclined to attribute both to one common cause. Together with somewhat similar occurrences in the spleen these proliferative changes are an expression of some still unknown stimulus which tar in appropriate doses exerts upon the cells of the organism, and especially upon those of the epidermis.

The development of tar cancer in particular, and of cancer in general, may thus be considered, in part, as an outcome of some constitutional condition.

DUST HAZARDS AND THEIR EFFECTS

THE IMPINGER DUST SAMPLING APPARATUS AS USED BY THE UNITED STATES PUBLIC HEALTH SERVICE. L. Greenburg and J. J. Bloomfield. *U. S. Pub. Health Rep., March 18, 1932, vol. 47, pp. 654-675.*

The object of the present contribution has been to describe the design and construction of an apparatus for the sampling of atmospheric particulate matter. This device, known as the impinger apparatus, possesses the advantage of high dust catching efficiency when sampling air over the full range of dustiness (from relatively pure outdoor air to that found in very dusty coal mining operations) at the rela-

tively rapid rate of 28.3 liters (1 cubic foot) per minute. The dust is caught in a liquid medium in which it may then be counted and analyzed microscopically, gravimetrically, and chemically. Three forms of the instrument are described: the electrically driven, the compressed air driven, and a hand actuated form. Photographs and drawings of the apparatus have been provided.

The results of the sampling of various dusts, as well as of chromic acid mists and lead fumes, are cited in order to show the range over which this instrument may be used.—*Authors' Summary.*

J. I. H.
June, 1932

SAFETY CODES FOR THE PREVENTION OF DUST EXPLOSIONS. *U. S. Dept. Labor, Bur. Labor Statistics, Bull. No. 562, Dec., 1931, pp. 87.*

The safety codes for the prevention of industrial dust explosions included in this bulletin are the work of a committee sponsored by the National Fire Protection Association and the United States Department of Agriculture. They have been adopted by the National Board of Fire Underwriters and chosen by the American Standards Association as "American Standards." This publication is an enlarged edition of the earlier work which was published in Bulletin No. 433 of the United States Bureau of Labor Statistics. Safety codes are given for the following industries: starch factories, flour and feed mills, terminal grain elevators, pulverizing systems for sugar and cocoa, spice grinding plants, wood flour manufacturing, pulverized fuel systems, and coal pneumatic cleaning plants.

Methods of prevention are treated under the general headings: location, building construction, electric power and lighting, control and removal of suspended dust, prevention of ignition, mechanical precautions, and housekeeping. The use of inert gas for fire and explosion prevention is treated in a separate section, and includes details concerning the amount of gas required, design of gas supply equipment, and operation.—T. H.

THE FIXATION OF MINERAL DUSTS IN THE HUMAN LUNG. *A. Policard. Bull. hist. appl. à la physiol. et à la path., Dec., 1930, vol. 7, pp. 337-353.*

Special treatment of lung tissue by hydrochloric acid and by micro-inciner-

ation discloses that adult lungs, apart from any pneumokoniosis, contain many particles of soot and a large amount of ash. They represent particulate matter inhaled during life. The lungs of adults, but not of infants, are chemically rich in ash, particularly in silica ash. Mineral and silica particles are not peculiar to the lungs of miners; and pulmonary sclerosis due to silica is not entirely confined to certain occupations. It is a question of degree. The air of modern towns contains dust which is inhaled, and the particles which accumulate in the lungs are not always innocuous.—E. L. C.

PNEUMONOCOONIOSIS: PARTIAL REVIEW OF LITERATURE. *W. L. Cooke. West Virginia Med. Jour., Jan., 1932, vol. 28, p. 19.*

ASBESTOSIS: TWO CASES. *H. L. Stewart, C. J. Bucher, and E. H. Coleman. Abstr. as follows from Arch. Path., Dec., 1931, vol. 12, p. 909, in Jour. Am. Med. Assn., March 5, 1932, vol. 98, p. 848.*

Stewart and his associates report two cases of pulmonary asbestosis. In the first case the symptoms were relatively unimportant. In the second case the disease was concomitant with tuberculosis and, with it, was the cause of death. The similarity between some of the features of tuberculosis in childhood and tuberculosis complicated by asbestosis is suggested. In asbestosis the lung is not the only organ invaded by asbestosis bodies. The authors show that the spleen and lymph nodes may harbor large asbestosis bodies. They believe that from the histories of the cases they report there appears to be a fur-

ther need for study along the lines of prevention of this disease.—C. K. D.

PULMONARY ASBESTOSIS. *E. Krüger, Rostoski, and Saupe. Abstr. from Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 2, pp. 558-590, in Bull. Hyg., Dec., 1931, vol. 6, pp. 861-862.*

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 Fahr to the Medical Society of Hamburg in 1914 of specimens and photomicrographs of a case of pneumokoniosis in an asbestos worker. Fahr 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 Marchand and Riesel in 1906, who had speculated as to whether they were due to the inhalation of asbestos dust or were a hemoglobin derivative. In 1931 Büttner-Wobst and Trillitzsch 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 dyspnea. Cough occurred in 43 cases. Night sweats were recorded in 12 cases. Abdominal complaints were rare but loss of

weight in the late stages was found in 15 instances with rheumatic pains, headache, and general nervous symptoms. Among the 34 female cases abortions were recorded in 10. Conjunctivitis was found in 16. Pharyngeal symptoms were not infrequent. Enlargement of the thyroid was seen on 6 occasions, with definite Basedow symptoms in 5. There were 4 cases of kyphosis and 4 of scoliosis.

The pulmonary signs were as follows: The respiratory excursion was diminished. In 16 cases there were alterations in percussion note on auscultation at the apex, while 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 28, 12 showing asbestos fibers and 8 asbestosis bodies; there was no blood, and no tubercle bacilli or elastic fibers could be found. Cardiac enlargement was noted in 3 instances, 1 case displayed an aortic systolic bruit and 6 a mitral bruit, but they were apparently compensated lesions. The blood pressure was never below 100 and in 8 cases was between 150 and 170 mm. The hemoglobin in 2 cases fell to between 60 and 70 per cent., and in 14 others was between 70 and 80 per cent. Clubbing of the fingers was noted only once. The urine was frequently alkaline or neutral (20 instances); traces of albumin were noted in 18 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 1.5 m., 300 m.A., 45 KV, 0.05 to 0.08 seconds. Especial emphasis is laid on the importance of short exposure. Three stages in the development of the radiologic 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 midzone and lower lobe areas of the radiologic 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 silicosis 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 pneumokoniosis. 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 about 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 (*Zwirneri*) sections. A summary of fifteen cases classified into stages 1, 2, and 3 of the disease is given (see X-ray findings). Several radiograms are reproduced.—S. R. G.

THE NEED FOR DUST-PREVENTION MEASURES IN THE COAL INDUSTRY. *Proc. So. Wales Inst. Eng.*, 1932, vol. 47, no. 5, pp. 729-743.

Attention is drawn to the work recently done upon the pathologic condition of the lungs of coal miners, brought about by the inhalation of dust during their work. Undoubtedly a great development of fibrous tissue is found in the lungs. In certain cases coal dust is collected in the fibrotic tissue to such an extent as to justify the condition being called silico-anthracosis. Such lungs do not appear to succumb readily to tuberculous infection; possibly this is due to the fact that the adsorbing power of the coal dust renders inert the toxic principle of tuberculin. Where the silicotic condition is paramount, as in hard heading workers, the tendency to tuberculous infection is on all fours with that found among gold miners. Coal miners' lung is not normal; the miner suffers from breathlessness and dyspnea, with a high death rate in late life from bronchitis. The causation of such trouble is dust; and every possible precaution should be taken to minimize its presence in the air.—E. L. C.

HISTOCHEMICAL RESEARCH ON THE INITIAL LESIONS OF EXPERIMENTAL PULMONARY SILICOSIS. A. Policard. *Compt. rend. Acad. d. sc.*, July 20, 1931, pp. 197-199.

Cellular masses containing silica particles, called plaques, appear in animals exposed to the inhalation of silica dust; rats were used. These plaques are accumulations in alveoli of cells—dust cells—arising from the pulmonary stroma, loaded with mineral particles. The size of the plaques is limited by that of the alveoli from which they cannot escape. They have a high mineral content, due to silica in an organic combination which

kills and petrifies cytoplasm. Plaques so mummified cannot escape by the air passages, but remain and provoke fibrous reaction in the surrounding tissue. The degenerate cytoplasm, rich in silica, is an excellent medium for the growth of tubercle bacilli.—E. L. C.

EXPERIMENTAL PULMONARY SILICOSIS. A. Policard. *Abstr. as follows from Bull. hist. appl. d la physiol. et d la path.*, 1931, vol. 8, pp. 190-206, in *Physiol. Abstr.*, Jan., 1932, vol. 16, p. 584.

Experimental silicosis was produced in white rats by repeated inhalation of dust from silicious rocks. The cells seem to undergo a mineral impregnation accompanied by a resistance to staining, an enormous increase of ash as shown by micro-incineration, and a sort of mummifying of the protoplasm which resists all digestive autolysis. The plaques are formed by the accumulation within an alveolar cavity of cells with silicious particles.—C. K. D.

THE RETARDATION OF LYTIC PROCESSES BY COLLOIDAL SILICA SOLUTION. S. L. Cummins and C. Weatherall. *Abstr. as follows from Brit. Jour. Exper. Path.*, 1931, vol. 12, pp. 239-244, in *Physiol. Abstr.*, Feb., 1932, vol. 16, p. 724.

Preservation from lysis in human blood or serum by colloidal silica solution extends to other serum-soluble bacteria besides the typhoid bacillus. The solution also preserves type 1 pneumococci from lysis in ox bile and retards both tryptic and peptic digestion of albuminous substances. The addition of colloidal silica sol to a cellular exudate produced by intra-

peritoneal injection of dust particles leads to the agglutination of the leukocytes and dust cells and to their preservation intact for two months and upward. The bearing of these observations on pulmonary silicosis is discussed.

INDUSTRIAL HYGIENIC PROBLEM OF THE COPPER-MINING INDUSTRY. F. V. Meriweather. *Abstr. as follows from Arizona Pub. Health News*, 1931, vol. 64, pp. 26-36; *U. S. Pub. Health Eng. Abstr.*, Sept. 19, 1931, vol. 11, IHS, p. 12, in *Chem. Abstr.*, March 10, 1932, vol. 26, p. 1561.

Since many Arizona copper ores contain from 68 to 69 per cent. of silica, the problem of silicosis among workers in the mines is serious. The problem is discussed.—P. D.

PNEUMONOCOINOSIS WITH SPECIAL REFERENCE TO STONEMASONS. P. Heffernan. *Tubercle*, Feb., 1932, vol. 13, pp. 193-199.

The main interest in this article lies in the questions asked and the information given regarding the physical chemistry of silica containing compounds. The dust of free silica is accepted to be toxic, and the dust of combined silica to be nontoxic. But asbestos, always spoken of as magnesium silicate, is composed of magnesia contained in minute pores of a silica matrix, which forms the asbestos fiber; the magnesia can be dissolved, leaving a fiber of pure silica; this physical form may explain the toxic properties of asbestos. On the other hand, certain innocuous shales contain a fair proportion of quartz particles; but these particles are so protected by argillaceous mate-

rial as to prevent them from reacting with their environment. Medically the term "shale" is unfortunate, as some, which ought rather to be called "grits," are definitely harmful. The

author, after these interesting, rather theoretical discussions, closes by pointing out the clinical and pathologic differences which exist between simple and infective silicosis.—E. L. C.

OCCUPATIONAL AFFECTIONS OF THE SKIN AND SPECIAL SENSES

OCCUPATIONAL ECZEMA DUE TO CEMENT. HEMOCLASTIC CRISIS FOLLOWING CONTACT TEST. *Gougerot, R. Cohen, and Ganot. Abstr. as follows from Bull. Soc. franç. de dermat. et syph., July, 1931, vol. 38, p. 1135, in Arch. Dermat. and Syph., March, 1932, vol. 25, p. 543.*

A patient who had worked with cement for some time with impunity suddenly developed a sensitivity to it, as expressed in a dermatitis that cleared up on removal from contact with the substance but recurred on resumption of his work. A patch test with the cement gave a positive reaction in a few hours, which was accompanied by a hemoclastic crisis, as manifested by a fall in blood pressure and a rising leukocytosis.

THE ETIOLOGY OF "MILKERS' NODES." *A. P. Dolgov and M. A. Morozov. Abstr. as follows from Sovet. Vest. Dermat., April, 1931, vol. 9, p. 338, in Arch. Dermat. and Syph., Dec., 1931, vol. 24, p. 1093.*

Most authors believe that the eruption on the hands of milkers known as "milkers' nodes" is due to vaccinia infection from cows. The authors of this article have observed thirty cases in different regions of the Moscow district, eleven of which were examined thoroughly in the clinic. In each case the cows were examined and were found free from vaccinia. However,

the cows were affected with a peculiar zoonosis which produced these nodules in men. They resemble the eruption that Pirquet produced in association with typical vaccine efflorescences by inoculation of vaccine detritus, and which he called "paravaccinia" (vaccine rouge of the French). In all early cases of milkers' nodes the authors found in men as well as in animals the Strongyloplasmata, small round bodies believed by Lipschuetz to be the causative agent. The Strongyloplasmata-paravaccinia cannot be differentiated either morphologically or tinctorially from the causative agent of vaccinia (elementary bodies of Paschen), but in contradistinction to the latter, the paravaccine does not produce keratitis in rabbits (Paul's test). In six patients, histologic examination of nodes in different stages was made. In the corium inflammatory changes were found; in the older lesions the structure of granuloma was present, but in no case were epithelial changes of the type found in vaccinia seen. Inoculation into the skin and cornea of guinea-pigs and rabbits was negative. Auto-inoculation in nine patients gave a negative result, and only one patient responded positively; however, the culture revealed a staphylococcus in this case. When the affected milkers were inoculated with vaccine lymph, eight gave early reactions of different degree, and on revaccination three gave a

most varied applications in industry as a good fat solvent and cleanser, especially of metal parts. Parallel with this is its powerful narcotic action and action as a nerve poison, the latter showing itself in paralysis of the trigeminus and optic nerves, as well as in apoplectic seizures, the result of injuries to the blood vessels in the brain. Long-continued inhalation of small doses leads to chronic effects involving the whole organism and to addiction. The paper contains a table embracing 284 cases of poisoning of which 202 were acute and eighty-two chronic. Of the total, twenty-five were fatal. Local irritative action is slight. Under different physical and chemical conditions (even light alone) trichlorethylene undergoes decomposition with formation of hydrochloric acid, especially in the presence of aluminium dust which may lead to explosions in closed vessels. In the

presence of alkalies also it decomposes, forming, among other compounds, acetylene chloride which may give rise to fires. With naked flame it may decompose with formation of phosgene.

Open washing apparatus is recommended, while employment of young persons on machines containing the substance should be prohibited.

Appended is a summary of the 284 reported cases which the author has collected from many publications of factory inspectors and others. Fairly full details are given of the various types of attack—trigeminus paralysis, optic atrophy and neuritis, apoplexy (which she compares with a similar condition produced occasionally by carbon monoxide), and the inclination of trichlorethylene to induce addiction to its vapor.

[This is by far the most complete account of the effects of trichlorethylene that has so far appeared.]—T. M. L.

DUST HAZARDS AND THEIR EFFECTS

MEASUREMENT OF AVERAGE PARTICLE SIZE OF FINE PIGMENTS. S. D. Gehman and T. C. Morris. *Indust. and Engin. Chem., Analyt. Ed.*, April 15, 1932, vol. 4, pp. 157-162.

A method of calibrating a micro-turbidimeter of the extinction type against particle size of rubber pigments is described. Particle size measurements were made by the ultramicroscopic counting method, employing accurate concentrations of well-dispersed suspensions. Satisfactory calibration curves were obtained although it is pointed out that smooth curves were given because of the uniformity of size in the individual suspensions.—T. H.

REPORT OF THE DEPARTMENTAL COMMITTEE ON DUST IN CARD ROOMS IN THE COTTON INDUSTRY. H. M. Stationery Office, 1932, pp. 96.

This report has unusual medical interest, since it promises to throw considerable light on the causation of spasmodic asthma. This disease, as it affects those exposed to dust in the card rooms of cotton mills, is a characteristic occupational trouble. The dust at first irritates only slightly; but as years pass, the irritation becomes more intense, until an asthmatic condition is established. Finally the operative may be compelled to give up work entirely. Well-applied localized ventilation has, during the past

twenty years, greatly improved matters; but uncertainty exists as to whether all harmful dust is today removed. The most harmful appears undoubtedly to consist of the finest particles, of about 5 microns in size.

The Committee, notwithstanding laborious investigation of sickness records, found itself unable to determine whether any harm is today resulting from the atmosphere of the workplace. It turned its attention to localizing the factor in the dust which is at fault. Clinical and X-ray examinations failed to indicate the presence of any pathologic characteristic in the lungs of those affected; pathologic investigations gave the same reply. Hence the conclusion was drawn that the condition depended upon contraction of the involuntary muscles in the walls of the air passages brought about by sensitization to some substance present in the dust. The exact substance which sets up this allergic condition has not definitely been isolated. Histamine was found in the dust, and may be the factor in question; but the whole matter has been referred for further research. The sufferers from the asthma gave positive skin reactions to extracts made from the dust, thus establishing the contention that this occupational trouble is due to sensitization.

Without waiting for further scientific research, the Committee recommends that every step shall be taken, as far as possible, to clear all dust from the carding engines by localized exhaust drafts, and to apply general ventilation to the card rooms, preferably by means of a downward draft, in order

to keep all fine particles below the breathing level.—E. L. C.

PNEUMONOKONIOSIS AMONG THE MINERS OF REDJANG LEBONG (SUMATRA). P. J. van Gulik. *Abstr. as follows from Geneesk. Tijdschr. v. Nederl.-Indië, 1931, vol. 71, pp. 718-727, in Bull. Hyg., Jan., 1932, vol. 7, p. 21.*

According to Sleswijk pneumonokoniosis is common among workmen employed in mines where the ground is poor in calcium but contains an excessive percentage of silicates. In order to verify this theory, the author examined the ore of Redjang Lebong and found that it was very rich in silicates and contained very little calcium. He therefore expected to find many cases of pneumonokoniosis among the miners who had worked more than fifteen years underground. The results of the clinical and of the radiologic examination of the miners showed a relatively small incidence of pneumonokoniosis, and the author thinks that this may have been due to a high percentage of moisture in the air of the mines (almost 100 per cent.). —H. L.

PNEUMONOKONIOSIS. J. W. Gullikson. *Northwest Med., Feb., 1932, vol. 31, p. 84.*

PULMONARY FIBROSIS: EXPERIMENTS OF SHORT DURATION. W. S. Lemon and G. M. Higgins. *Abstr. as follows from Am. Jour. Med. Sc., Feb., 1932, vol. 183, p. 153, in Jour. Am. Med. Assn., April 23, 1932, vol. 98, p. 1501.*

Lemon and Higgins believe that the fibrosis of the lungs produced in

workers exposed to dusty atmospheres, especially those in which fine particles of silica make up the larger percentage of the dust, is an end product and represents a progressive defeat of the protective mechanisms of the body. It is never found until the lung fails to rid itself of dust carried out of the bronchi by ciliary action or of dust carried through the lung by way of the lymphatic channels. With the breakdown in the carrying mechanisms, the burden of protection is the phagocytic cell, which, with its load of engulfed material, passes to all parts of the lung and ultimately becomes immobilized in those portions of parenchyma in which lymphatic tissue is abundant. The cells concerned are polymorphonuclear leukocytes, which are the first to appear, to disintegrate, and to disappear, and clasmatocytes, which appear later, are extremely active, break up less rapidly, and may become transformed into fibroblasts. In association with the tissue fibroblasts the clasmatocytes form scar tissue. Finally, fibrosis is the result of the action of substances secreted by the cell on the foreign particles. If a tissue poison results from this chemical action, fibrosis is encouraged, and is progressive, lasting as long as the unaltered irritant remains in the lung.—C. K. D.

ASBESTOSIS OF THE LUNG. *Gerbis and Ucko. Deutsch. med. Wchnschr., Feb. 19, 1932, vol. 58, p. 285.*

ACUTE SILICOSIS. *E. M. Chapman. Jour. Am. Med. Assn., April 23, 1932, vol. 98, pp. 1439-1441.*

The appearance of respiratory symp-

toms after eight, twenty-one, and twenty-nine months of exposure to an alkaline dust of high silica content marks a more rapid and severe silicosis than is usual. Russell has seen the disease fully developed in a lens grinder who inhaled a pure quartz spray for eight months. In granite cutters the earliest case without symptoms was found by roentgenograms after two years of service. The rapidly fatal cases of MacDonald occurred in two young girls who had been employed for two and three-fourths and four and one-fourth years packing a similar type of soap. The

TABLE 1.—SILICA CONTENT OF TISSUES

	MG. OF SILICON DIOXIDE PER GM. OF DRIED TISSUE	
	Lung	Bone Marrow
Normal.....	1.4	0.3 0.7
In chronic silicosis (King)...	123.55	...
In Case 1: left upper lung...	12.0	1.0
In Case 1: left lower lung...	13.2	...

severity of respiratory embarrassment is attested by the marked decrease in the vital capacity, which was lower in the first case than that usually seen in uncomplicated cardiac failure.

The right ventricular hypertrophy, described in the pathologic examinations, is probably explained by the increased resistance and loss of elasticity in the pulmonary vascular bed. This finding aided in the recognition of the disease in the living patient, in whom the diagnosis could not be made by the roentgenogram alone.

No determination was made of the

silica content of the dust or soap to which these men were exposed, but estimates of the silica content of the tissues of the first case, done by the method of King, are given in Table 1. The data suggest that the reaction in the lungs is not a direct, quantitative one and very likely, as Heffernan believes, the rapid development of fibrosis results from the accelerated formation of a silica hydrosol in the presence of the alkaline soap dust. Ordinarily this reaction progresses

slowly in the faintly alkaline tissue fluids and may be so prolonged that symptoms do not appear until years after one has left a hazardous industry.

The three cases of acute silicosis that have been recorded are among the first such cases in American industry.

The rapidity of the process, in contrast to the usual chronic form, is probably due to the accelerated formation of silica hydrosol in the presence of an alkaline soap dust.—*Author's Comment and Summary.*

OCCUPATIONAL INFECTIOUS DISEASES: OCCURRENCE, TREATMENT, AND PREVENTION

ON THE FREQUENCY OF HUMAN ANTHRAX INFECTIONS. A. Schmitz and F. Wielsch. *Abstr. from Arch. f. Gewerbepath. u. Gewerbehyg.*, 1931, vol. 2, pp. 749-766, in *Bull. Hyg.*, April, 1932, vol. 7, pp. 232-233.

In an introductory section the author summarizes the regulations that are in force for the prevention of the introduction of diseased animals or products from diseased animals into Germany.

Statistics are available of the number of cases of anthrax occurring in human beings in Germany from the year 1910, and the author quotes these to show that imported raw materials of animal origin are responsible for the majority of cases.

In a second table are set out the figures showing the origin of the infective materials in those cases of anthrax which occurred among men in the hide and hair trades. During the same period there were 1,060 cases; in 74.5 per cent. of these the material was of foreign origin, in 4.6 per cent. it was home produced, while in the

remaining 20.9 per cent. its origin was not determined.

These 1,060 cases are again subdivided into three groups: namely, persons working in tanneries, transport workers dealing with hides, hair, etc., and manufacturers using hair of animal origin. The majority of cases (670) occurred among tanners; the other two groups were nearly equal in size, with 191 and 199 respectively. Materials of foreign origin are the source of the infection in from 60 to 80 per cent. of the cases. The author states that a considerable proportion of those due to infective material of undetermined origin should be classed as due to imported materials.

Tabulating the figures again to show the nature of the infection the author shows that in 95.4 per cent. of all the cases the infection involved the skin, with a fatality of 10.9 per cent. In 4.6 per cent. of cases the infection took place in the internal organs, and here the fatality was 94.5 per cent. During the twenty-nine years under review, 1,362 cases of anthrax occurred in

This is a brief summary of the investigation of the United States Public Health Service into the question of the hazards of luminous dial painting. The results will be published in extenso in the *Public Health Reports*.—L. T. F.

HYGIENIC CONDITIONS OF WORK IN CERTAIN OPERATIONS OF SPRAY PAINTING, WITH THE USE OF CELLULOSE VARNISHES. F. H. de Balsac and A. Feil. *Mouvement Sanitaire*, 1932, vol. 9, pp. 222-226, 229.

Some description is given of the use of the spray to apply cellulose varnishes in France. These varnishes contain from 75 to 85 per cent. fluids, and from 15 to 25 per cent. solids. The solids contain nitrocellulose resins and gums, together with pigments, among which lead salts may figure; but the amount of lead seldom reaches 2 per

cent. of the whole. Any risk arises from evaporation of solvents. Examination of men employed at a factory near Paris showed that there was some complaint of gastric troubles, of cough and difficulty in breathing, of vertigo and giddiness, as well as headache. Examination, however, failed to disclose any pathologic condition, while blood showed no abnormality, nor could signs of lead absorption be detected. Apparently the use of the spray for painting presents little risk under good conditions of ventilation. Any symptoms present disappear quickly in the open air. Nevertheless, if different materials be used, such as chlorine bodies, poisoning might result. Moreover, none of those examined had worked for more than a few years; possibly longer exposure may prove the work to be harmful.—E. L. C.

DUST HAZARDS AND THEIR EFFECTS

PULMONARY ASBESTOSIS. J. V. Sparks. *Radiology*, Dec., 1931, vol. 17, pp. 1249-1257.

THE ASBESTOSIS BODY. S. R. Gloyne. *Lancet*, June 25, 1932, vol. 1, pp. 1351-1356.

In this article the author brings together all the information he can collect with regard to the first recognition of what are now known as asbestosis bodies, and concerning their origin, both theoretically and experimentally considered. He has himself contributed much to the whole subject. A series of drawings presents various forms of asbestosis bodies; while information is given as to how these bodies react to acids and alkalies, as well as to ferments. The conclusion

seems definite that they are formed by the deposit upon fine asbestos fibrils of organic matter from the tissues, which contains iron. This organic coating can be dissolved, leaving bare the original fine fibril. This article brings up to date in a useful way the considerations relative to the asbestosis body, but curiously omits any reference to the presence of such bodies in lungs not exposed to asbestos dust, such as coal dust, as reported by W. E. Cooke (see following abstract).—E. L. C.

SILICO-ANTHRACOSIS PRESENTING CURIOUS BODIES SIMILAR TO THOSE IN ASBESTOSIS. W. E. Cooke. *Brit. Med. Jour.*, April 9, 1932, vol. 1, pp. 656-657.

The primary factor in the production

of coal miners' lung is silicosis, coal dust being retained in large amounts when the lymph drainage has been impaired by the action of silica; thus anthracosis is a special variety of silicosis, depending upon the accumulation of coal dust in a silica damaged lung. Most of the cases have been described among men getting anthracite coal, but the author cites a case in a miner who had worked on soft coal. Chemical analysis of the lung showed a silica figure of 40.2 per cent. in the ash, of which 15.6 was insoluble silica. An interesting point is that certain bodies similar in every way to the curious bodies seen in cases of asbestosis were found in the lungs. Apparently such bodies are not peculiar to asbestosis, and any spicule of insoluble material may have colloid deposited around it and become molded into a curious body. The appearance of such bodies is illustrated.—E. L. C.

SILICOSIS. *Lancet*, June 4, 1932, vol. 1, p. 1206.

A useful summary is here given of the experimental investigations which have been carried out into the development of pulmonary fibrosis following dust inhalation. Tests have shown

that there are two groups of dusts, one active and the other inert. The inactive dusts include carbon, coal, aluminium oxide, oxide of iron, marble, and carborundum; the active dusts in all cases contain silica in some form, as either quartz, shale, kaolin, or asbestos. Particular attention is drawn to the procedures followed by Professor Kettle, who studies the effects of dust by either subcutaneous experimental lesions or by intratracheal injection into the lungs.—E. L. C.

SILICOSIS AND THE INDUSTRIALIST. *H. Ballantyne. Jour. State Med.*, June, 1932, vol. 40, pp. 342-349.

The causation of silicosis as envisaged by an industrial managing director is set out. No threshold beyond which dustiness in the air becomes a hazard has been fixed medically, although some undefined degree of dustiness is acceptedly quite harmless. Today large industrial concerns must be prepared to install means for trapping or withdrawing from the working atmosphere as much dust as is practicable. It is safest to err on the side of excess when safeguarding the health of workers.—E. L. C.

CLIMATE

ATMOSPHERIC POLLUTION IN BORDEAUX. *P. Lamarque. Gaz. hebdomadaire de médecine et de chirurgie*, 1932, vol. 53, pp. 210-219.

An investigation extending over a period of eighteen months was carried out by the author into atmospheric pollution of the town of Bordeaux. Various reasons contribute to this pollution, such as the manufacture of sulphuric acid and hyperphosphates, the

combustion of organic waste, domestic fires, the exhaust fumes from the combustion of heavy oils and from motor cars; while nitrous fumes and fluosilicic acid emanate from certain industries. The author considers that all forms of pollution can be prevented, frequently with an advantage from the capture of valuable material now allowed to waste. The way in which such steps should be taken is outlined; and the

J. I. H.
Nov., 1932