

FILE NAME: AT&T and other Phone Companies (ATT)

DATE: 1937

DOC#: ATT028

DOCUMENT DESCRIPTION: Abstracts – American Ceramic Society



February 15, 1993

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CERAMIC ABSTRACTS

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Volume 16, 1937

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Editorial Office: 2525 North High Street, Columbus, Ohio.
Publication Office: 20th and Northampton Streets, Easton, Pa.

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Viscosity and plasticity of disperse systems: VI, Effect of temperature and electrolytes on the plastic properties of kaolin. M. P. WOLAROWITZ AND D. M. TOLSTOI. *Kolloid-Z.*, 73 [1] 82-86 (1935); see *Ceram. Abs.*, 16 [3] 101 (1937). VII, Plastic flow in an apparatus with cylinders displaceable lengthwise. D. M. TOLSTOI. *Kolloid-Z.*, 73 [1] 96-101 (1935).—A method for determining the flow resistance and shearing modulus of high concentration mineral suspensions is described. The apparatus was designed particularly to eliminate surface gliding of the cylinders. Results agreed well with those obtained by the rotating cylinder method of Wolarowitz. At very small

velocities, Bingham's equation for plastic flow does not hold for high concentration mineral suspensions. For Parts I-V see *Ceram. Abs.*, 15 [7] 222 (1936). F.P.P.

PATENTS

Alkali silicate. ANDERS E. A. CORNELIUS (Helsingfors Kemisk-Tekniska Fabriker A.-B.). Swed. 80,000, April 4, 1934. *Chem. Abs.*, 29, 6000 (1935).—Steam is blown into an electrically heated bath of alkali silicate formed by the reaction of alkali chloride and SiO_2 . During the process the bath is kept covered by a layer of the unmelted charge of alkali chloride and SiO_2 , with or without another substance, e.g., lime, for the formation of double silicates.

Method of manufacture of precipitated zinc oxide. G. ANTONOFF. Brit. 459,238, Jan. 20, 1937 (June 3, 1935).

Production of a calcium aluminate suitable for the manufacture of sodium aluminate by treatment with soda lye. AKTIEBOLAGET NORSK ALUMINIUM Co. Brit. 457,676, Dec. 16, 1936 (Aug. 30, 1934).

General

Animal silicosis. H. SIEGMUND. *Verhandl. Deut. Path. Ges.*, pp. 252-71 (1934); *Chem. Abs.*, 29, 8169 (1935).

Causation of pneumoconiosis. PHILIP DRINKER. *Jour. Ind. Hyg. & Toxicol.*, 18 [8] 324-38 (1936).—The various pneumoconioses and their causative agents are discussed. Silicosis and asbestosis are definite diseases; in anthracosis and various silicoses, modifications of normal lung conditions are seen. Effects of carbon or carbonates, gypsum, and iron oxides are also discussed. Methods of estimating dust exposures of a workman include the taking of dust samples from the work place and interpreting the results during the man's total period of exposure. Errors made from estimating the composition of dust from samples which have settled upon rafters instead of using samples taken from the air are emphasized. Permissible dust concentrations need not exceed 30 million particles per cu. ft. for dust with very low quartz content or 5 million for pure quartz. In defense of the use of standards of dustiness, the experience in S. Africa where dust standards have been applied successfully for many years is cited. E.J.V.

Charles N. Brady. *ANON. Bull. Amer. Ceram. Soc.*, 16 [2] 73-74 (1937).

Chemical considerations on some pneumoconiosis (anthracosis, silicosis): I, Nature of the problem. RENE FABRE. *Congr. Chim. Ind., 14th Congress, Paris*, 5 pp. (1934); *Chem. Abs.*, 29, 5774 (1935).

Clinical aspects, diagnosis, and treatment of pneumoconiosis. W. IAIN CLARK. *Jour. Ind. Hyg. & Toxicol.*, 18 [8] 537-49 (1936).—Pneumoconiosis is a disease resulting from the inhalation of inorganic dust. The two pneumoconioses which produce disability are silicosis and asbestosis. The pathology of silicosis is characterized by the presence of fibrotic nodules scattered through both lungs, and that of asbestosis is characterized by an interstitial fibrosis involving the lower half of both lungs. The symptoms of silicosis and asbestosis are similar, the most important being dyspnea. The most common complication is pulmonary tuberculosis which, in

silicosis, is a frequent cause of death. The diagnosis of both silicosis and asbestosis is made largely by a correlation of history and symptoms with the X-ray examination. The treatment of pneumoconiosis is preventive and symptomatic. The course of silicosis and of asbestosis is slow but eventually leads to incapacity due either to the disease itself or to a complication, frequently chronic pulmonary tuberculosis. The number of workers exposed to harmful mineral dusts in mining and in industry in the U.S. has been estimated as 500,000. E.J.V.

Clinical hematological studies for the differential diagnosis of industrial silicosis. C. SCHLONKA AND F. A. NOELT. *Klin. Wochschr.*, 14, 957-92 (1935).—The authors have experimented with the pathological-anatomical actions of the changes of the silicotic lungs in connection with the heart and the complete bloodstream. With the assistance of electrocardiograms, they have been able to investigate the condition of the lungs of silicotic patients. At the policlinic of Bonn University, Röntgen observations of the last 190 silicosis patients were taken, and these were analyzed according to "pure radiological points of view." Various tables showing the bloodcounts of several silicotic and tubercular patients were compiled. After certain peculiarities were established in the blood stream of the silicosis patients, it was found necessary to make further investigations of the connections between the studies of the blood and the clinical Röntgenological status. To obtain a most secure foundation, it was decided to separate those silicosis patients from the others who showed an important degree of tubercular complications. A characteristic blood status was shown in stone dust patients. This shows clearly excessive increase of white blood corpuscles with increased sinking at approximate normal counts of red corpuscles and distinct small counts of lymphocytes at relative transitional forms of leucocytes in a streak preparation. The same symptoms, even if less impressive, are shown in a second group from the total of silicosis patients as positive cases with tuberculosis complications.

W.F.F.

Colored ceramic aggregate for decorative concrete.

C. W. PLANT. *Jour. Amer. Ceram. Soc.*, 20 [3] 60-66 (1937).

Diagnosis of silicosis. EMERY R. HAYWARD. *Amer. Labor Leg. Rev.*, 26, 81-98 (1936); abstracted in *Jour. Ind. Hyg. & Toxicol.*, 18 [3] 131-32 (1938).—Factors necessary to diagnose chronic silicosis are: (1) exposure to silica dust in sufficient quantity for 5 to 20 years; (2) determination by intraperitoneal injection of the nodule-forming character of the dust; (3) nature of the work; (4) personal factors such as mouth breathing, previous respiratory diseases, etc.; (5) X-ray findings. Serial pictures should be taken over a period of time. The location of the nodules is characteristic, avoiding the periphery, symmetrical distribution, shape, and size. In this phase chronic silicosis is without disability. (6) Physical examination: no characteristic but some suggestive findings. (7) The patient's complaints: these are negligible in the first and second stages, but later cough, dyspnea, pains in chest, etc., may occur.

E.J.V.

Economizers and air preheaters. V. WALKER. *Elec. Rev.*, 119 [3082] 353 (1936).—W. discusses the conditions which govern the design of economizers and air preheaters for use with boilers.

J.L.G.

Epidemiological aspects of silicosis and tuberculosis. ALTON S. POPE AND DAVID ZACKS. *Amer. Rev. Tuberculosis*, 32, 229-42 (1935); *Chem. Abs.*, 29, 7534 (1935).—In representative groups of both granite and foundry workers in Massachusetts, the frequency of silicosis and of silicosis and tuberculosis was correlated with the duration of exposure to dusts containing free silica and to the concentration of such dusts in the occupational environment. Among granite workers silicosis was found in 15.3% and with tuberculosis in 7.6%. Tuberculosis is the cause of death in over one-third of all granite workers, a proportionate mortality 3 times that in foundry workers and 4 times that in all males of 20 years and over. Among the employees of 10 Mass. foundries, silicosis was found in 8.8% and with tuberculosis in 2.6%, a total frequency of one-half that in granite workers. The silicosis in foundrymen was not only less frequent but also less advanced in degree than in the granite workers. Pneumonia, causing one-fourth of all the deaths of foundrymen, is the greatest occupational hazard in the industry.

Industrial health hazards and employer responsibility. W. J. MCCORMELL. *Trans. Amer. Foundrymen's Assn.*, 7 [1] 161-65 (1936).—The importance of greater attention to the problem of overcoming industrial health hazards for foundry employees is recognized. Medical aspects are discussed, foundry hazards are outlined, and suggestions for a control program are given. D. E. CHAMBERS. *Ibid.*, pp. 166-79.—With the invention of the machine, dust became an industrial hazard. C. discusses the action of dust in the lungs and points out that all dusts are not dangerous. Silica dust is one of the dangerous dusts but only when present in certain concentrations of certain particle sizes. The silicosis problem is complicated by the fact that in many cases there is also decided evidence of the presence of tuberculosis. In foundries many men with normal lungs work for years and do not contract silicosis although there may be evidence of fibrosis. C. explains the action of dust particles inhaled on previous pulmonary injuries and states that workmen who are disabled by oc-

cupational fibrosis contracted in the foundry generally are those who exhibit evidence of concurrent pulmonary infection or injury. It is the executive's responsibility to inform himself on dust hazards, conduct surveys of his plant, and inaugurate a program of control. Prospective employees are grouped into three general groups; those which are fair risks and those which should not be employed are indicated. C. recommends that an educational program similar to that used in "Safety First" campaigns be inaugurated to combat the dust hazard. Discussion. AVER *et al.* *Ibid.*, pp. 180-90.—The various ways of preventing illness are pointed out, and precautionary measures taken in the foundry are outlined.

H.E.S.

Industrial pulmonary disease due to inhalation of dust, with special reference to silicosis. E. L. MIDDLETON. *Milroy Lectures*, 1936. *Lancet*, pp. 1-9 (July 4); pp. 32-64 (July 11, 1936); abstracted in *Jour. Ind. Hyg. & Toxicol.*, 18 [3] 129-30 (1938).—The first lecture is devoted to silicosis, as being the most important of the pneumoconioses. Particular attention is directed to the occurrence of the disease according to occupation. During 1930-1934, at least 1521 deaths occurred in England and Wales, of these, 372 were caused in the sandstone industry, and 326 were ascribed to coal mining; the manufacture of pottery claimed 270, metal grinding 142, gold miners, returned from S. Africa, 104, and tin miners 91. The disease is always originated by the dust of fine particles of free silica; the way in which this risk is present in a number of industries is explained. Sandblasting and the manufacture of abrasive soaps receive special note, as in both the hazard is so intensive that the onset of the disease is unusually quick and its course rapid; thus only 3 or 4 years of employment may have preceded the onset, instead of 15 to 20 years as in most other occupations. The occurrence of cases in coal mining is unexpected, since coal itself is not a dangerous dust; apparently the disease is originated by dust arising from the rocks among which silica is found or from impurities in the coal. Out of 169 deaths in all coal fields in Great Britain, 147 came from S. Wales; this undue proportion has not yet been explained. The picture, both clinical and histological, becomes modified when silica is mixed with other forms of dust; when coal is associated in the dust, the condition is known as anthracosis; here the fibrous tissue entangles the coal dust and retains it to help in blocking up the lymphatics. In the second lecture the influence of the dust of silicates, *i.e.* of chemically combined silica, is considered. Of these asbestosis stands out as most toxic; the particles consist of fragments of fibers, some 3 microns long and $\frac{1}{2}$ micron diameter. They originate pulmonary fibrosis which is more generalized and less nodular than that of silicosis; the condition develops quicker than silicosis, but the tendency to succumb to superimposed tuberculosis is not so pronounced. Other dusts considered are those of sillimanite, china clay, talc, mica, and sericite; none of these approach asbestos and silica in their dangerous qualities. The harmful nature of any dust may be tested by noting the reactions which follow when it has been either injected subcutaneously or administered by the tracheal route suspended in fluid; injection into the peritoneal cavity may also be employed. The theory adopted is that dusts exert their harmful influence by reacting chemically with

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the tissues of the lungs, the life and structure of which are thereby modified. Each form of dust stimulates a special reaction of its own, while mixed dusts set up a mixed reaction. No evidence is put forward that dusts other than those of silica or silicates are harmful, or that any dust is capable of reducing the toxic influence of any other.

E.J.V.

Investigations on quartz and sericite analysis of industrial dusts. F. SARTORIUS AND K. W. JÖTTEN. *Arch. Hyg. & Bacteriol.*, 115, 135-51 (1935); abstracted in *Jour. Ind. Hyg. & Toxicol.*, 18 [4] 54 (1936).—The separation of various mineral constituents of dusts by the use of liquids having suitable specific gravities is discussed. The standard methods of mineralogical and chemical analysis of dusts are mentioned, with a description of the X-ray examination. Some of the common minerals are shown. Mention is made of the mineralogy of sericite. E.J.V.

Methods of dust control. J. D. LERRICH. *Trans. Amer. Foundrymen's Assn.*, 7 [1] 209-21 (1936).—The point to begin elimination of the dust hazard is at the source. Methods used for controlling the dust hazards originating at different types of sources are described. 1. discusses the general methods used in dust-suppression problems and the estimation of the hazard, contending that the efficiency of a dust-collection system is best determined by dust counts. Methods used for testing ventilating equipment and the selection of fans are presented. Dust collectors and respirators, such as helmets, filter-type respirators, and positive-pressure masks, are discussed. Maintenance of equipment is necessary to the successful operation of such equipment and to the efficiency of any installation. A discussion is included.

H.E.S.

Molding of clay after heating at various temperatures. R. MORATTE. *Corriere Ceram.*, 15, 221-23 (1934); *Chim. Zentr.*, 1934, II, 3298; *Brit. Chem. Abs.-B*, 54 [27] 591 (1935).—Heating at 100 to 300° before molding increases the apparent porosity of the product fired at 900° and decreases the resistance to breaking of a specimen dried at 150°.

Nomograph for ceramic calculations. A. A. GUSYNSKI. *Therapogy*, 3 [5] 374-76 (1935).—The nomograph facilitates the chemical analyses and the calculation of the amount of oxides in the fired product and of the raw material required for a given quantity of the latter.

P.B. & E.S.

Personnel management. J. E. WALTER. *Factory Management & Maintenance*, 94 [12] S333-44 (1936).—The topics considered are (1) personnel management costs, (2) selection of employees, (3) personnel maintenance, (4) training and education, (5) medical and health service, (6) safety and accident prevention, and (7) personnel service work. Figures, tables, and photographs are included.

J.L.G.

Significance of free crystalline silica in the etiology of silicosis and silicotuberculosis. K. W. JÖTTEN AND H. KÖRSTEN. *Med. Wch.*, 10, 545-50 (1936); abstracted in *Jour. Ind. Hyg. & Toxicol.*, 18 [8] 130-31 (1936).—The authors dusted rabbits over a period of four years, first 2, then 3, then 6 hr. daily, with porcelain dust having 30% free silica and 1 to 2% sericite. After this period the ani-

mals showed no typical silicosis although there could be seen sharp, pinpoint-sized, subpleural foci and a slight increase of fibrosis. During the dusting, tubercle bacilli were administered intravenously. These grew slowly, and with indurating processes, into a pulmonary tuberculosis while the controls showed no noteworthy disposition to contract tuberculosis. It is concluded that over a 3 to 4 year period of dusting with tubercle bacilli injected, it was possible to produce a tuberculosilicosis, although with the dust alone it was not possible to show silicosis, in spite of the presence of sericite. By dusting with pure quartz (without tuberculosis injection and without sericite) for 1 hr. daily for 2 years, typical silicotic nodules were produced.

E.J.V.

Silicate analysis in industrial dusts. F. SARTORIUS AND K. W. JÖTTEN. *Zentr. Gewerbetk. & Unfallverhüt.*, 21, 65-69 (1934).—Materials studied were from the Rhine Steel Works, the Thyssen, and the U. S. Steel Co. Tables show in detail the procedure and results, accompanied by ample comment and description of methods involved. If dusty occupations are to be graded on a danger scale over long or short periods, the sickness percentages and dust analyses must be carefully compared. These new research methods are concerned with the size of grains in dust raised and the accurate preparation of undissolved acid particles, thus serving the combined purposes of mechanical phase analysis and chemical analysis. Important insight into the structure of different kinds of dust has been gained, and this has been increased by using definite purity tests, e.g., the tetralin method.

K.R.

Silicosis: harmful dusts which cause it. W. R. JONES. *Trans. Ceram. Soc.*, 34, 303-43 (1935); see *Ceram. Abs.*, 14 [3] 84 (1935).

Silicosis in the porcelain industry from the standpoint of the physician. SCHULPFARNT. *Ber. Deut. Keram. Ges.*, 17 [6] 322-30 (1936).—It is pointed out that a silicotic lung rarely occurs by itself, being usually associated with tuberculosis. A description of a silicotic lung is given. S. outlines the two theories of silicosis, mechanical and chemical, and discusses the chemical aspect of the problem.

E.J.V.

Training your own instrument men. ALFRED G. MOON. *Instruments*, 10 [1] 15-18 (1937).—M. reviews basic considerations, qualifications of candidates, training of instrument men, division of time between various types of repair jobs, supplementary educational work, progress reports, and rating guide to be used in semiannual check-up.

R.W.R.

BOOKS AND BULLETINS

Determination and Control of Industrial Dust. J. J. BLOOMFIELD AND J. M. DALLAVALLE. *U. S. Pub. Health Bull.*, No. 217, 167 pp. (April, 1935).—This brief but comprehensive work presents "the methods and instruments used in conducting dust studies in industry, the interpretation of results thus obtained, and their practical application to industrial problems, especially those phases relating to control of the dust hazard." Preliminary procedure involves the sanitary and occupational survey of a plant; final emphasis is placed on personal respiratory protection of workers. Between these occurs the dust technique.

increasingly large verdicts. The Workmen's Compensation Act first applied only to accidental injuries. Occupational diseases should be compensated under an arrangement similar to workmen's compensation but separately, because there is so much difference between them. Partial disability should be compensated. It is difficult to obtain unbiased and expert medical diagnosis of silicosis and the degree of disability. There should be a special medical board in each state for such a diagnosis. Prevention is more important than compensation and much cheaper. W.D.F.

Mineral materials which produce silicosis. B. GOSNER. *Speeches*, 60 [41] 101-102; [42] 111-117 (1931).—Lung diseases occurring in the porcelain industry are not produced by sericite or other minerals containing mica, as it is not present in the dust and mica is not contained by the siliceous materials used. This fact shows that lung diseases are not connected with the presence of mica. The appearance of silicosis is chiefly due to the presence of free silica in the siliceous rocks used. M.V.C.

Protection of health of glass and ceramic workers. T. THOMAS. *Glassite*, 66 [49] 323-26 (1931).—Measures to be taken in the case of various injuries sustained by workmen are discussed. M.V.C.

Rating and performance of stationary steam boilers. W. S. PATTERSON. *Combustion*, 8 [2] 23-30 (1931).—The absurdity of the terms "boiler horse power" and "per cent of rating" as applied to modern steam generating units is discussed, and more rational expressions are suggested. The effect of variable entering gas temperature, operating pressure, and superheat on the boiler performance is analyzed and illustrated by curves and equations. Gas-temperature gradient and draft loss through boilers are also discussed. H.E.S.

Report of the Committee on Ceramic Education for 1936. HAROLD E. WHITE. *Bull. Amer. Ceram. Soc.*, 16 [3] 111-20 (1937).—This report includes tabular data compiled by E. E. Marbaker and E. H. Fritz.

Suggestions for starting and maintaining a foundry apprenticeship system. J. E. Goss. *Trans. Amer. Foundrymen's Assn.*, 7 [2] 323-30 (1938).—G. outlines points to be taken into consideration in apprentice training, such as methods of selection, testing prospects, age limits, rates of pay, piece-work, requirements of a program, necessity of centralized activities, trial apprenticeship periods, agreements, kind of instruction, related work, etc. A discussion is included. H.E.S.

BOOKS AND BULLETINS

Bureau of Mines activities in the field of building materials. D. M. BAYES. *U. S. Bur. Mines Information Circ.*, No. 6924, 51 pp. Free. B. collates all publications by members of the Bureau personnel on the subject of building materials and includes reports published by the Government Printing Office and mimeographed by the Bureau and articles in technical journals and cooperative reports. R. A. KERNOL.

Chemist's Year Book. Edited by E. Hors. Sherratt & Hughes, Manchester; Chemical Publishing Co., New York, 1936. 19th ed. Price \$4.00. 1257 pp. The hand-

book has complete information concerning the various chemical constants and characteristics and properties of most organic and inorganic elements and compounds. In addition, various qualitative and quantitative determination procedures are given both for organic and inorganic substances. M.C. SHAW

National Physical Laboratory Collected Researches: Vol. XXIV, 1935. H. M. Stationery Office, London. 432 pp. Price £1 3s. The volume contains twenty-three reports of researches devoted chiefly to the study of metallurgical problems. The reports cover studies of the various iron alloys, alloys of Au-Cu, Cd-Zn, Ag-Sn, and Ag-Hg, metallic cadmium, and the crystal structure of α - and β -manganese. One paper is devoted to special refractories for metallurgical research. A brief résumé is given of the properties and methods of producing refractory crucibles, muffles, and tubes from silica, alumina, magnesia, thoria, alumina-clay, and silicon carbide-clay. M.C. SHAW

Official Year-Book of the Scientific and Learned Societies of Great Britain and Ireland; Record of Publications Issued during the Session 1935-1936. Compiled from Official Sources. 33rd annual issue. Charles Griffin and Co., Ltd., London, 1936. vii + 170 pp. Price 6s net. Noted in *Nature*, 139 [3501] 51 (1937). J.L.G.

Third Ordinance Increasing Compensation of Occupational Diseases in Germany. M. BACKE. Reprint from *Reichsarbeitsblatt*, No. 38, Part IV (1938). 47 pp. Berlin, 1937. The new ordinance relating to occupational diseases in Germany went into effect April 1, 1938, superseding the Second Ordinance of Feb. 11, 1929. Several industries are added to the list of compensable diseases, including all the ceramic industries (previously only the porcelain industry was insured), sandblasting, and operations for cleaning castings and molds. Asbestosis in the asbestos trades and lung cancer in the chromium industries become compensable. Severe silicosis, compensable under the Second Ordinance, is still the only form of silicosis insured against, but what constitutes the disease for clinical, roentgenological, and judicial estimation is definitely specified, thus doing away with a hitherto vexatious miscellany of complications. Severe silicosis accompanied by pulmonary tuberculosis requires only the establishment of the severe silicosis in diagnosis. Among damage claims reported for occupational diseases since 1929, silicosis has stood at the peak; in 1934, of 1043 cases, 522 were for silicosis; in 1935, of 1161 cases, 627 were for silicosis, with 146 deaths in 1935 from this cause. K.R.

NEW JOURNAL

Staub (Dust). Edited by C. LAMMERT. Vol. 1, No. 1. April, 1938. Published quarterly by Wilhelm Knapp, Halle. Price 5 Rm. The Association of German Industrial Insurance Societies reports on the current status of the dust-control campaign and surveys the literature. Two or three original research papers comprise the first part of each issue, followed by reviews of pertinent literature arranged systematically under (1) dust research into properties, estimation, and measurement, (2) dust sources, (3) dust diseases, (4) other dust injuries, (5) preventive methods, and (6) laws and decisions. K.R.