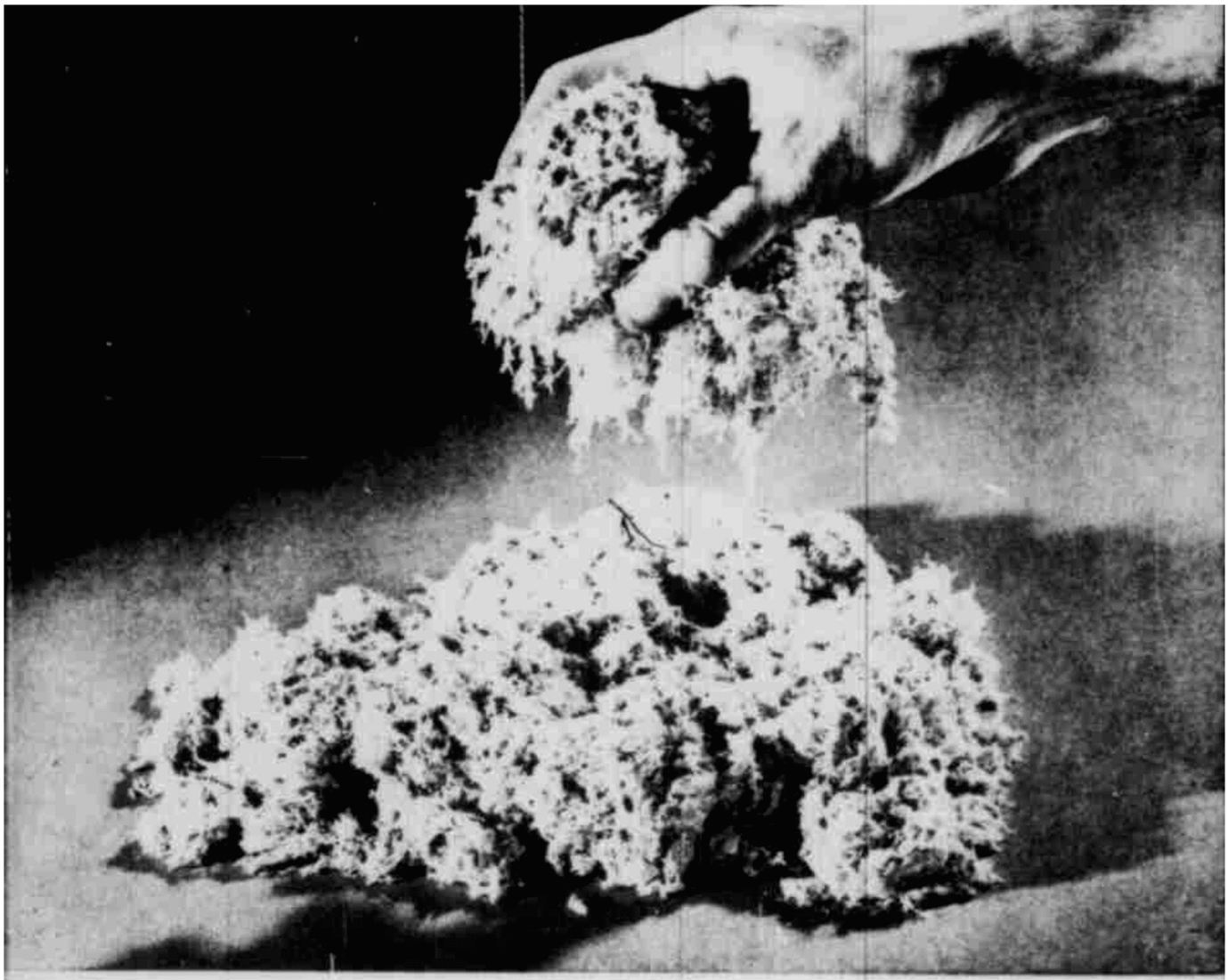


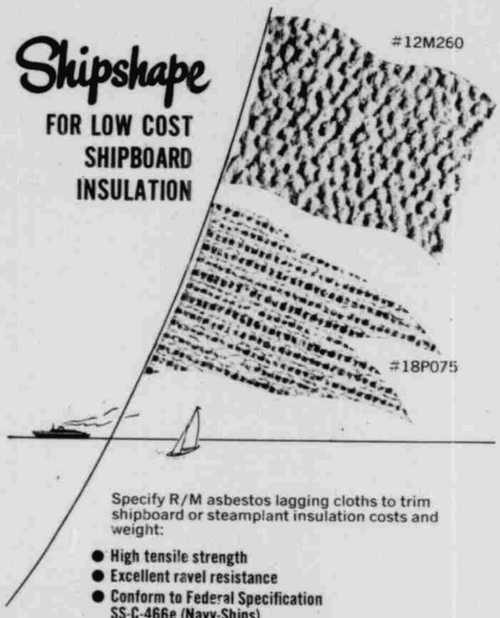
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THE SURFACE PROPERTIES OF ASBESTOS FIBRES

By: A. A. Hodgson B.Sc., Ph.D., F.R.I.C., Head of the Research Laboratory, Cape Asbestos Fibres Limited, London, England.

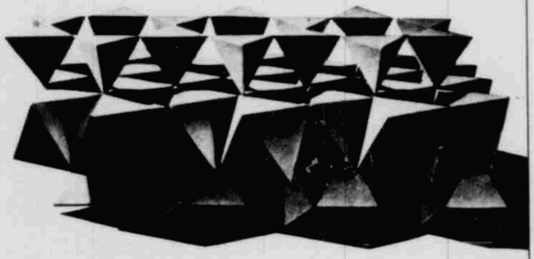
In the process of manufacture of asbestos cement products by conventional wet methods, we are concerned with a system which for simplicity reduces to three components, namely asbestos fibres, cement powder, and a somewhat complex solution in water of gypsum, lime, alkalis, with minute proportions of other substances. The biggest single factor controlling the efficiency of the process depends on the interfacial phenomena exhibited by this system. Put in other words, the production rate of a machine is primarily dependent on the drainage property of the raw materials slurry fed to that machine, while the drainage of the slurry is wholly dependent on the surface properties of its solid materials in relation to the solution in which they are suspended.

There are two other ways in which interfacial effects operate in this system. Firstly the bulk volume of asbestos fibres in suspension changes profoundly according to the type of asbestos considered. Secondly different types of asbestos fibres show all degrees of suspension in an asbestos cement slurry, from complete dispersion to dense flocculation. All these effects are brought into being because asbestos fibres have surface properties which are highly reactive to the surrounding medium, a fact which is important to recognize since a change say from alkaline to acid conditions can reverse the observed effects.

Turning to some practical evidence in support of these statements, we look first at the results of filtration tests on asbestos cement slurries containing different types of asbestos (Table I). In these tests everything has been done to simulate in the laboratory the conditions which apply in full scale manufacture. The slurry contains asbestos, cement and water in practical proportions; the asbestos has been fiberized to a degree consistent with what is used in practice; and the water is a filtered back-water fully saturated with ions dissolved out of the cement by partial hydration in previous tests of a similar nature.

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Schematic representation of structure of Amosite and Blue Asbestos



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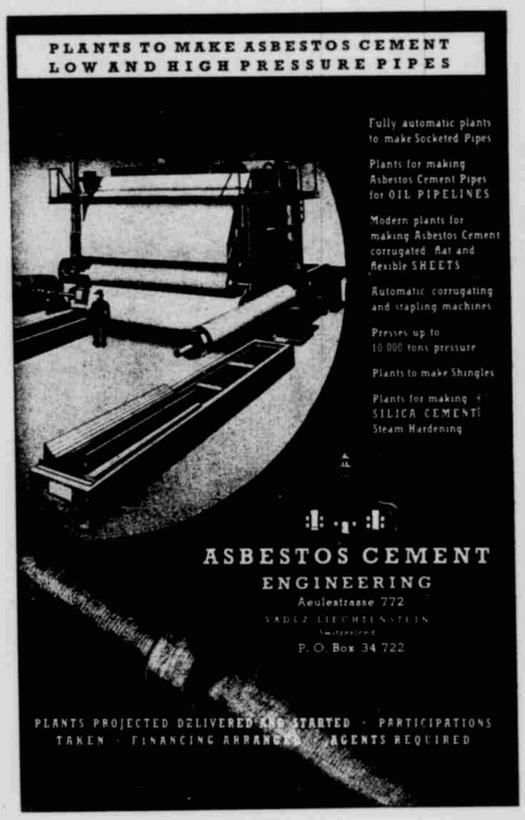
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TABLE I

Types of Asbestos	Standard Filtration Time (seconds)
Chrysotile, Quebec	709
Anthophyllite, Finland	306
Crocidolite, South Africa	227
Anthophyllite, Kenya	187
Actinolite, South Africa	183
Tremolite, Italy	167
Amosite, South Africa	162
Tremolite, India	149

For the purposes of this article it is not necessary to be concerned with fine distinctions in filtration properties between one grade of fibre and another. The results of Table I concern some specific samples which have been closely analyzed chemically and structurally and which therefore provide the necessary information required to explain their behavior. The general case is that all chrysotile fibres on the one hand, and all amphibole fibres on the other hand fall into two well defined groups in terms of filtration properties. Considering the major types only, chrysotiles possess filtration times 3 to 4 times those of crocidolite fibres and 4 to 6 times those of amosite fibres.

The wet bulk volume test on asbestos-cement slurries provides some further evidence of distinction between various types of fibres. Taking fibres of identical degrees of opening (i e. surface area) amosites and crocidolites give wet bulk volumes in the slurry test some 3 times greater than those of chrysotiles. Some ancilliary evidence from these tests is more important than actual test figures here. Detailed investigation has shown that while the wet bulk volume due to amosite and crocidolite fibres can be increased, as one would expect, with increasing surface area of the mass of fibres, chrysotile fibres respond only slightly in this respect. On the other hand the filtration times of amphibole fibres show little change as the surface areas of the fibres are increased within fairly wide limits, while the filtration times of chrysotiles may change sharply both in upward and downward directions over narrow limits of change in surface area. It is evident that the surface properties of the two major groups, chrysotiles and amphibole, must differ to an extreme degree to produce such widely separated characteristics.



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Fundamental studies on the physical chemistry of asbestos fibres have provided some useful though limited information. The influence of electrolytes on the surface charge of asbestos has been investigated in two ways. Pundsack (1956) used sedimentation methods to determine the iso-electric point of chrysotile, by increasing the alkalinity of suspensions of fine fibres until a floc formed and the suspension clarified. Martinez and Zucker (1958) used streaming potential methods to determine the surface charge or zeta potential of chrysotile fibre. In this method water is forced through a plug of fibre retained between two platinum disc electrodes in a glass cell. A voltage, the streaming potential, is developed between the electrodes and from considerations of the pressure drop of the solution across the cell, and the conductivity of the solution, the zeta potential of the chrysotile can be determined. Martinez and Zucker obtained values of about +100 mv. for the zeta potential of chrysotile in neutral solution. Independent studies on amphibole fibres have given values of about —10 mv. for crocidolite, and —20 mv. for amosite under similar conditions.

The streaming potential method provides fundamental confirmation that chrysotile fibres possess a relatively strong electropositive charge in an aqueous medium, while amphibole fibres possess a weak negative charge. As far as can be ascertained by the method of measurement, which is one of considerable technical difficulty, this property of the two major groups of asbestos fibres is maintained at the alkalinity and electrolyte concentration of aqueous slurries likely to be met in asbestos cement practice.

These findings are in accord with what might be expected on consideration of the structure of chrysotile and amphibole asbestos. Chrysotile has a predominant surface layer of hydroxyl sites, connected to an adjacent inner layer of magnesium sites. These alkaline sites would be expected to exert a strong surface activity, either by partial solution or by attraction of ions of opposite charge. In contrast amphibole asbestos has external layers of silica sites, which in chemical terms are recognized as being of a weakly acidic nature. Such sites, of highly insoluble nature, would be expected to exert a weak surface charge solely by attraction of suitable ions. Amphibole asbestos has in effect an almost neutral surface charge similar to

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that of pure silica (quartz), while chrysotile asbestos has distinct charge arising from its alkaline nature.

To relate the filtration and wet bulk volume properties of asbestos fibres to these fundamental physico-chemical observations consideration must be given to the sedimentation behavior of particles in suspension. Their behavior is paradoxical in that large sedimentation volumes occur where there is small repulsion of individual particles, while small volumes are due to the relatively large repulsion of particles. Sedimentation volume varies in a general sense inversely as the surface charge of particles. Where particles bear a relatively strong charge, mutual repulsion prevents their coalescence and provides a virtual lubricating effect whereby particles slide over one another. Gravitational force causes the particles to move over each other until all available holes and chinks in the volume occupied by them have been filled. The resulting sedimentation volume is small.

Particles possessing small surface charges and hence low repulsive forces will tend to coalesce, as the normal Van der Waals forces of attraction between molecules will be sufficient to overcome the repulsion due to small surface charges. Particles will then form a random latticework, like an untidy pile of bricks or pile of loose wool, its volume being determined by the compactness or otherwise of its whole structure.

We can therefore equate the low wet bulk volume of chysotile fibre in asbestos cement slurries to the relatively high surface charge on the fibre while the high volume of the amphiboles can be equated, to their relatively low surface charge. Since cement has a small sedimentation volume the inference holds that it possesses a high surface charge, a valid supposition in view of its strong chemical reaction to water. While both components of the chrysotile-cement system contribute to a low wet bulk volume, the interlace of amosite or blue asbestos fibres in their systems with cement and water is mechanically strong enough to provide a large wet bulk volume of both components, with the cement particles filling many of the voids in the latticework and also clinging to the fibres themselves.

For identical reasons the filtration properties of systems containing amphibole fibres and cement are good, because the structural network of fibre is maintained in

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the filter bed, thus preserving some degree of porosity. The effect should be considered in close relation to the contrary situation in the chrysotile-cement system, where surface charge criteria bring about close packing of the solids in the filter bed. The prime agent in filtration problems applicable to the asbestos-cement industry is of course cement itself. In its partially hydrated condition in slurries, it cannot provide a good filter bed, because gel compounds produced from the cement by the primary stages of hydration form bridges between particles barring the easy passage of water through its compacted mass. The inclusion of chrysotile aggravates this situation. Since the surfaces of chrysotile fibre comprise highly hydroxylated layers it is reasonable to expect these layers to form a contiguous phase with both the gel compounds of the cement and with the surrounding water. The solid part of such an asbestos cement system is in other words highly hydrophyllic and must be expected to possess poor filtration properties.

It cannot be said that amphibole fibres in general aggravate the cement filtration problem. They do not form contiguous phases with the cement and the water, and by virtue of the network effect break up the continuity of the cement gel phases. Fibres such as those of amosite and crocidolite will extend the mass of asbestos-cement and provide sufficient pore space to reduce the filtration time of corresponding slurries to one third or one quarter of those containing chrysotile. The effectiveness of amosite and tremolite fibres as filter aids could well be attributed to the relative stiffness of these types of fibres, which enable them to provide rigid networks. Tremolite does not however possess the stiffness of amosite, and it seems more likely that good filtration properties derive from the relative freedom from surface impurities of these fibres, together with certain other considerations of composition. In this context crocidolite is not as good a filter aid as amosite. Crocidolite may be oxidized more easily than amosite can be, and mild surface oxidation, accompanied by slight hydration seems to be a characteristic of all crocidolite once its surfaces are exposed by crushing and fiberization. The products of oxidation are poorly formed clay like materials based on iron hydroxides. Such materials in common with clay minerals have similar surface properties to chrysotile. We can therefore expect that the

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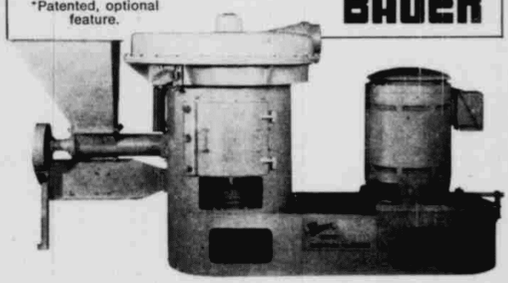
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potentially good filtration properties of crocidolite will be offset to some degree by the development of a weak hydrophyllic nature.

For the same reasons, but arising from a different cause, certain anthophyllites possess the poorest filtration properties in the amphibole group. It is known that the composition of anthophyllite includes an excess of hydroxyl sites, a fact which has been the subject of several mineralogical papers. Excess hydroxyls are probably attached at the silica layers of the structure, and in that event they will exert a similar, though much weaker, effect to the hydroxyl layer of chrysotile.

The foregoing arguments enable us to explain with reasonable certainty on grounds of surface properties why chrysotile fibres differ so markedly from amphibole fibres in their behavior in the asbestos-cement system. The amphibole fibres, particularly amosite and blue asbestos, possess distinct advantages in this system. Nevertheless it is impractical to manufacture asbestos-cement products from amphibole fibres alone, since their sole inclusion in fibre furnishes would lead to abnormally low densities owing to the high bulk volume of the fibre, and excessive drainage would leave an inadequate amount of moisture in the green product to allow for satisfactory curing of the cement. On the other hand while it remains abundantly practical to operate asbestos-cement processes with chrysotile asbestos alone, such processes are limited by the intrinsic poor filterability of chrysotile. Moreover the self-compacting nature of the chrysotile-cement system leads to difficulties in density control, asbestos-cement sheets made of chrysotile alone having, more often than not, densities above the recognized limit of 1.6 (100 pound/cubic foot).

Blends of amphibole and chrysotile fibres provide a compromise between their opposing characteristics as asbestos-cement furnishes. The amphibole fibres constitute the filter aid, and the means of controlling densities, while the chrysotile fibres supply the densifying effect and an adequate degree of water retention. We are now dealing with a four component system in which three solids with differing surface properties are dispersed in the fourth, aqueous, component. Obviously in such a system the compromise between the effects of the two different types of asbestos fibres could well lie within certain narrow limits,

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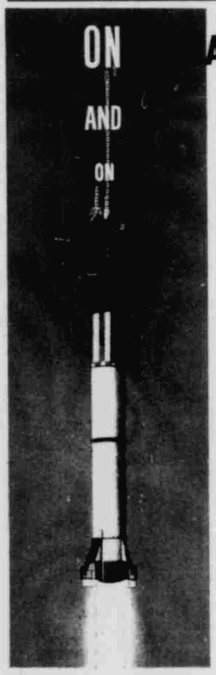
and it is at this point where current knowledge is lacking. While trial and error approach on both the laboratory and industrial scales indicates that the compromise for asbestos-cement sheets is reached satisfactorily with fibre furnishes containing 20% of amphibole fibre and 80% of chrysotile fibre, there is no certainty that this is the best, and, what is more important, that such assessment of the absestos-cement system as we can currently make manifests efficient employment of its components.

It does seem that a considerable amount of experimental work and theoretical reasoning is yet required to account for all the interfacial effects in the asbestos-cement and allied systems. Asbestos fibres have remarkable surface properties, and in our present limited knowledge of these it is unlikely that present manufacturing methods make full and efficient use of their potential. While we have an adequate knowledge of the physical, chemical and structural properties of asbestos fibres, this particular field of physico-chemical research is one which is still wide open. It is a recognizably difficult field to explore, but undoubtedly one which will yield rewards in both the academic and practical understanding of the behavior of asbestos fibres.

References:
F. L. Pundsack, J. Phys. Chem., 60, 361 (1956)
E. Martinez and G. L. Zucker, 1958, Private communication

AIA/PRODUCERS' COUNCIL—Two organizations deeply involved in the problem of creating the nation's physical environment reaffirmed their mutual goals and instituted new procedures to achieve them. The American Institute of Architects and The Producers' Council, Inc. signed a new agreement of affiliation which clarifies their current common objectives and updates affiliation agreements originally signed in 1923. They have been previously revised in 1939, 1947 and 1957. Because both groups work in the interest of the client, each is concerned with the goals and achievements of the other and seeks to protect the client, the AIA by fostering and preserving the highest degree of professionalism in architecture and the Producers' Council by guarding the quality and integrity of building products.

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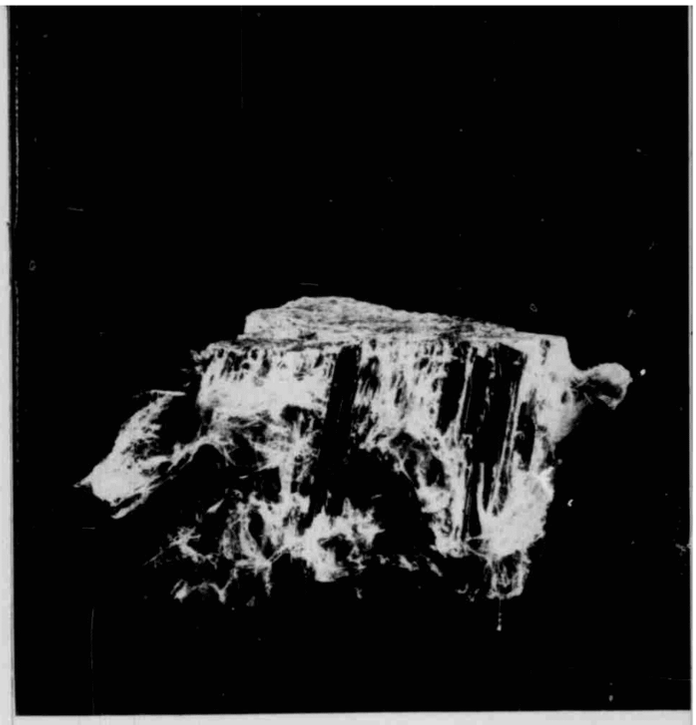
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ATI 21st Annual Meeting

The Asbestos Textile Institute held its twenty-first Annual Meeting on October 7th and 8th, 1965, at The INN, Buck Hill Falls, Pennsylvania.

The present officers were re-elected to serve the Institute during the coming year, namely: President—John A. Brown, Jr., Raybestos-Manhattan, Inc.; Vice President—J. L. Rainey, American Asbestos Textile Corporation; Treasurer—E. A. Schuman, Johns-Manville Sales Corporation; and, Executive Secretary—H. E. Sunbury.

The activities of the several working committees were reviewed by the respective chairmen, L. C. Williams, Wm. Maaskant, J. W. Christenbury and I. Barnett. President Brown thanked all of these men for their efforts during their two or more year terms as chairmen and the following new chairmen were appointed: W. C. Atkinson—Air Hygiene & Manufacturing Committee; J. D. McCluer—Technical Committee; W. S. Hough—Sales Promotion Committee; and, J. P. Wronski—Fiber Testing Committee.

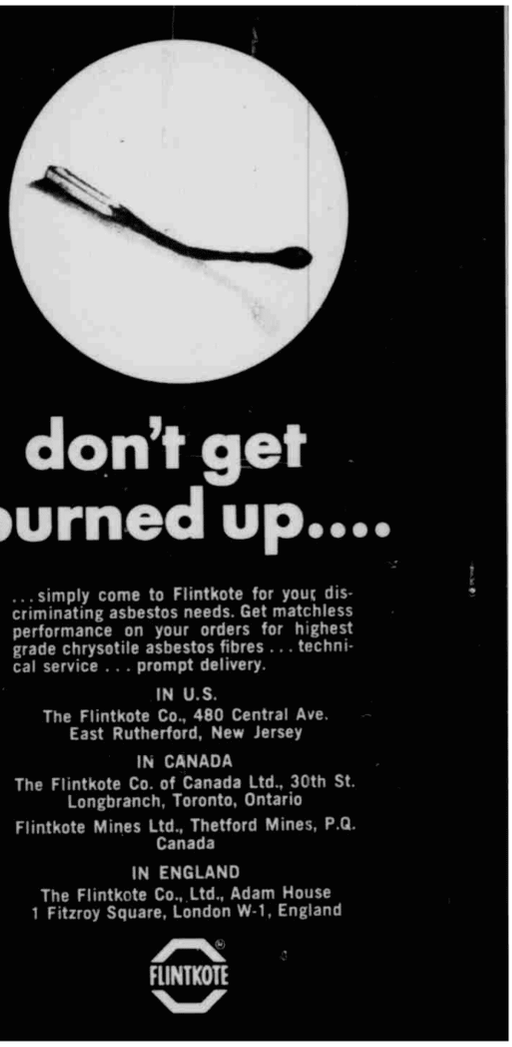
F. Parker Smith, Vice President of Bell Asbestos Mines Limited, presented an interesting review of conditions in respect to production of various grades of asbestos fibers, and current demand throughout the world for same.

Dr. J. W. Axelson, Research Chief for Asbestos Fiber Applications, Johns-Manville Corporation, presented a most excellent technical paper entitled "Testing of Asbestos Fibers—Discrete and Bulk Properties".

During the course of the meeting, President Brown exhibited a handsome Certificate of Appreciation to be presented to George F. Jenkins for his many years of loyal support of the Institute. Mr. Jenkins retired May 31st, 1965, as Senior Vice President of Asbestos Corporation Limited, Thetford Mines, P.Q., Canada.

President Brown announced that the next regular meeting of ATI would be held on February 10th and 11th, 1966, at the Barbizon-Plaza Hotel, New York City.

NAHB CONVENTION—The 22nd annual convention and exposition of the National Association of Home Builders will be held in McCormick Place, Chicago, Illinois, December 5th through 9th, 1965.



Automobile Sales

AUGUST 1965 motor vehicle factory sales from plants in the United States totaled 444,723 (passenger cars 332,990; trucks and buses 111,733). The total for August 1964 was 339,575. The figure for the first eight months of 1965 was 7,354,553 compared with 6,274,049 for the same period 1964. (Automobile Manufacturers Association)

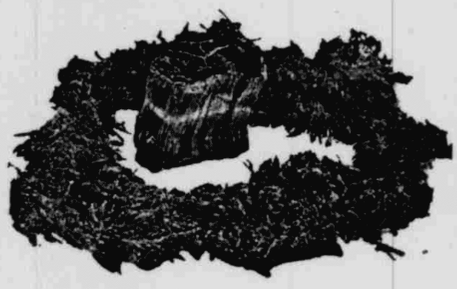
ASTM COMMITTEE C-17 (Asbestos-Cement Products)—Binders of asbestos-cement products were the subject of a talk presented to Committee C-17 at its Technical Committee meeting. The talk described a study of ten autoclaved and nine normally cured asbestos-cement products which included differential thermal analysis, X-ray diffraction and uncombined calcium chloride analyses.

In the subcommittee works are: advancement of cooperative program to evaluate the Canadian color stability test; study of chemical stability, water hardness and related test methods; formation of task group to consider freeze-thaw tests and exposure to sea water; subcommittee ballot of revisions in strength requirements in specification for asbestos-cement roofing (C 222); letter ballot of revisions in strength and moisture absorption requirements in specification for asbestos-cement siding (C 223); preparation of revised draft for a specification for asbestos-cement bulkhead siding; preparation of specification for insulating panels in which cores are other than fibreboard; review of specifications for linings for asbestos-cement pipe (C 541 T) following suggestions for revision from Committee C-3; and, preparation of proposed specification for asbestos-cement irrigation pipe.

ASTM has designated the annual $6500 free-grant doctoral fellowship as the ASTM Robert J. Painter Memorial Fellowship in memory of the late Robert J. Painter, ASTM executive secretary from 1952 to 1960. Through the years, Mr. Painter was one of the leading spirits behind the development of ASTM's fellowship and grants-in-aid program.

ASTM COMMITTEE WEEK—Shoreham and Sheraton Park Hotels, Washington, D.C., January 30th through February 4th, 1966.

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EL AMIANTO, MINERAL PARADOJICO, by S. de la Concha (Bulletin of the Instituto Geologico y Minero de Espana, T. LXXV, 1964)—This 110-page booklet, the first Spanish printed text of its kind, is composed of three chapters: I—Introduction & History; II—From the deposit to the market (varieties of asbestos, origin, mining, milling, classification, production, prices and other data); III—Evaluation of the fibers. It also contains four appendices: Spanish mining of asbestos; Petrographic studies; English-Spanish glossary; and, brief bibliography. With the text are included 24 photographs, 6 microphotographs and 14 figures. It deals with many interesting questions, one of which is fiberization. The problem of fiberization appears to be linked with the fiber's evaluation methods, in order to preserve the fiber's natural properties through the manipulations they have to endure until the final product is manufactured.

Spain is an important consumer of asbestos. In 1963 the country imported 40,137 metric tons of fiber valued at $8-million and in 1964 imported 51,509 tons valued at $10.5-million with an asbestos-cement products consumption of 425,000 tons valued at $30.85-million. For 1967, the Spanish "Development Plan" foresees about 540,000 tons consumption, valued at $39.2-million.

MARINITE LIMITED, manufacturers of monolithic incombustible asbestos sheet, have introduced a new sheet material, *Scotstone*, made from an inorganic mixture of synthetic calcium aluminum silicate binder and fillers reinforced with finely dispersed asbestos fibre. Scotstone is slate grey in color, homogeneous in texture and steam cured to give uniform strength and excellent dimensional stability. It is manufactured in sheet size 10′ x 4′ and in thicknesses ½″, ¾″ and 1″.

NATIONAL GYPSUM quarries and processes its asbestos fibre-bearing ore at its Thetford Mines, Quebec, Canada, plant, with reserves estimated at 45-million tons having 6 per cent usable fibre. Fibre is supplied to its three asbestos-cement plants located at St. Louis, Missouri, Millington, New Jersey, and New Orleans, Louisiana. Excess fibre is exported to foreign markets.

COMPARE THIS WITH OTHER COMPARISONS!

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Wet Coverage (equal ratio)	28 bd. ft.	
Dry Coverage	20 bd. ft.	

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Gold Bond ASBESTOS FIBRES

NGC NATIONAL GYPSUM COMPANY

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Building

SEPTEMBER 1965 contracts for future construction work advanced 10% over September 1964, according to F. W. Dodge Company, a division of McGraw-Hill, Inc. Total contract value amounted to $4,153,242,000, putting the seasonally-adjusted Dodge Index of total construction back up to 147 (1957-59=100).

Nonresidential building contract value topped last year's September value by 19%, providing most of the month's gain with a total of $1,463,879,000. Every major category of nonresidential building scored a substantial increase in September. The list includes commercial buildings up 20%, closely followed by schools and hospitals, ahead 18% and 15% respectively. Manufacturing buildings posted a 10% gain, while public, religious, recreational and miscellaneous nonresidential buildings did as well or better.

Residential building contracts were worth a total of $1,755,668,000 exceeding the year-ago value of 2%. Single family home building jumped ahead in the latest month, but the gain was largely offset by a decline in apartment construction.

With a September total of $933,695,000, nonbuilding construction erased the cumulative deficit which has been standing since spring. September's 14% advance was a broad one, as the huge street and highway category showed a 15% increase and the utilities and sewer and water projects scored even larger percentage gains.

The standings of the 3 broad construction markets through the third quarter clearly shows where the strength in total construction has been coming from in 1965. At the nine-month mark, nonresidential building value held an 11% cumulative lead over 1964; by contrast, Dodge residential building contracts were ahead by only 1%, and nonbuilding construction was barely even with last year's rate. The value of total construction for the first 9 months of 1965 was $37,694,363,000, 4% ahead of the same 1964 period.

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Samples and complete information on Carey-Canadian 7RF-9 floats may be obtained from the warehouse locations listed below or by writing to Carey-Canadian Mines, Ltd., P.O. Box 15095, Lockland, Cincinnati, Ohio 45215, or The Philip Carey Company, Ltd., Ville St. Laurent, Montreal 9, P. Q., Canada.

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Baltimore, Md.	A. B. Kohl Sales Company
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Chicago, Ill.	Chicago Firebrick Company
Cleveland, Ohio	Donald McKay Smith, Inc.
Dallas, Texas	Thompson-Hayward Chemical Company
Davenport, Iowa	Thompson-Hayward Chemical Company
Des Moines, Iowa	Thompson-Hayward Chemical Company
Detroit, Mich.	A. E. Fleming Company
Garwood, N.J.	Asbestos Corporation of America
Houston, Texas	Thompson-Hayward Chemical Company
Indianapolis, Ind.	Thompson-Hayward Chemical Company
Kansas City, Mo.	Thompson-Hayward Chemical Company
Knoxville, Tenn.	A. G. Heins Company
Little Rock, Ark.	Thompson-Hayward Chemical Company
Los Angeles, Calif.	E. S. Browning Company
Memphis, Tenn.	Thompson-Hayward Chemical Company
Milwaukee, Wisc.	Sprinkmann & Sons
Minneapolis, Minn.	Thompson-Hayward Chemical Company
New Orleans, La.	Thompson-Hayward Chemical Company
Oklahoma City, Okla.	Thompson-Hayward Chemical Company
Philadelphia, Pa.	George A. Rowley & Company, Inc.
Pittsburgh, Pa.	McCann-Shields Paint Company
St. Louis, Mo.	Thompson-Hayward Chemical Company
San Francisco, Calif.	E. S. Browning Company
Seattle, Wash.	Durkin Chemicals, Inc.
Trenton, N.J.	H. M. Royal, Inc.
Winchester, Mass.	W. D. Egleston Company, Inc.



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Next door, at our ultra-modern mill, it's a different story.

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If need be, J-M asbestos fiber specialists can go in another 90 directions. To solve your most demanding asbestos needs.

To get them started, talk with your J-M special representative. Or contact us directly.

Canadian Johns-Manville Co., Ltd., Box 1500, Asbestos, P.Q.

Johns-Manville Asbestos Fiber Sales, Research and Engineering Center, Manville, New Jersey, U.S.A.

JM

Johns-Manville

ASBESTOS — November 1965

GRAPHICAL TECHNIQUES FOR ENGINEERING COMPUTATIONS, by Walter Herbert Burrows, is a full and systematic presentation of the construction and application of scales, graph papers, graphs, and nomographs to engineering computations, from the mechanical design of scales through the theory of three-dimensional nomographs. All aspects of nomographs are presented in a clear and direct manner for self-instruction, classroom use, and general reference.

Mr. Burrows has taught chemistry and done research for many years at the Georgia Institute of Technology, and has served as a consultant to industry on problems of etching and corrosion of metals, surface chemistry, chemical equilibria, reaction kinetics, and instrumentation. He is the author of the hyperbolic coordinate system featured in this book, and also author of many published papers in professional and technical journals and of interesting demonstrations for educational television.

This 384-page, illustrated book is available from Chemical Publishing Company, Inc., 212 Fifth Avenue, New York, New York 10010 ($15.00).

UNITED STATES RUBBER COMPANY will invest approximately $5-million, including working capital, to triple production of Polycrest polypropylene fiber, double the size of its textile development laboratories and install a textile division data processing center. This expansion is expected to create more than 300 new jobs at Winnsboro, South Carolina, center of the company's textile division. Office space for an expanded sales force and commercial development staff will also be added to the administrative center.

UNITED STATES RUBBER COMPANY now has available the 1966 edition of its product directory. U. S. Rubber manufactures 33,000 different product lines and copies of the directory can be obtained from the company's advertising department.

U. S. RUBBER is one of America's largest textile producers, processing about 130-million pounds of textiles annually, including synthetic fibres for carpets and elastic apparel, tire cord and asbestos fabrics.

U.S. Rubber developed Asbeston® so you could use asbestos where you never could before.

Asbeston.

It does all the things regular asbestos does. Only it's lighter; and stronger for its weight. And because it's lighter and stronger, you can use it in more places in more ways. It's also a lot easier to work with. (Our engineering staff can make it easier still—they'll actually tailor any Asbeston fabric, yarn or tape or whatever to the specs of your operation.)

For more details on our full line of light and heavy Asbeston products, write:

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U.S. Rubber Co.,
350 Columbia Road,
Winnsboro, S. C. 29180

Textile Division
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U.S. RUBBER

®ASBESTON IS THE U.S. RUBBER REGISTERED TRADEMARK FOR ITS ASBESTOS YARNS AND FABRICS.

MARKET CONDITIONS

General Business.

General business continues to be good. Corporate earnings for the third quarter and for the first nine months of 1965 which, of course, reflect only what has already happened, are generally quite high and, in many cases, have set new records for many companies. The military action in Vietnam is having some effect on overall production but the demand for "commercial" goods of all types is exceptionally high and defense buying seems to be playing a minor role in general business activity. However, inventory build-up in durable goods seems to be slowing down and, since the steel industry labor settlement, inventories of that basic material are being decreased substantially. Investors seem confident of the future as indicated by a rise to historic highs in stock prices. Unemployment figures have dropped substantially and, in many areas, there is a definite shortage of skilled labor. This overall picture may change as advent of winter weather curtails outdoor construction projects in the Northern States.

In general, economists look for continued good business but the probability is that the growth rate will be considerably slower than that of the past few months or that activity will level off or even drop slightly from present exceptionally high levels.

Asbestos—Raw Material.

Quebec asbestos fibre shipments for the Industry during September 1965 totalled 117,470 tons, a reduction of 329 tons or less than one per cent from the same period last year. Year to date shipments at 836,223 tons remain approximately 4% or 33,844 tons lower than those of 1964.

Asbestos—Manufactured Goods.

Asbestos Textiles. The Asbestos Textile Industry continues to enjoy the strongest demand for its products it has experienced since the war years. This demand has en-



Is the combination of chrysotile properties you're looking for RIGHT HERE?

Best way to find out is to tell us what product you make and the properties of the reinforcing fibre most important to you . . . high reinforcing strength, superior wetting characteristics, greater surface area, low grit content. Your test evaluation may find the characteristics of Lake fibre ideally suited to fill your needs.

Lake's annual capacity of 100,000 tons of high grade chrysotile asbestos fibre is processed to meet the special requirements of its customers.

For test sample and catalog, write to Asarco International Corporation, 120 Broadway, New York, N. Y. 10005, distributors for Lake Asbestos of Quebec, Ltd.

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AUSTRALIA
Mt. Isa Mines. Ltd.
Sydney

AUSTRIA
Atlanta Bauer & Co.
Bremen, Germany

BELGIUM
Keyser & MacKay
Brussels

EGYPT
Textile Improvements Ltd.
Guildford, England

ENGLAND
Metal Traders, Ltd.
Asbestos Division
London

FRANCE
Dieppedalle & Seailles
Paris

GERMANY
Atlanta Bauer & Co.
Bremen

GREECE
Textile Improvements Ltd.
Guildford, England

HOLLAND
Keyser & MacKay
Amsterdam

INDIA
Metal Distributors, Ltd.
Calcutta

ITALY
Amianto Del Lago
Torino

JAPAN
C. Itoh Co., Ltd.
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NORWAY
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SOUTHEAST ASIA
Jardine Waugh, Ltd.
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SPAIN
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Textile Improvements Ltd.
Guildford, England

ASARCO INTERNATIONAL CORPORATION
A SUBSIDIARY OF AMERICAN SMELTING AND REFINING COMPANY ASARCO

LAKE ASBESTOS

abled manufacturers to increase prices to off-set higher costs and should result in some profit improvement for 1965 over 1964. There is every indication that sales will continue at the current high level for the balance of 1965.

High Pressure Insulation. The present market situation is very stable and this condition is expected to continue for the rest of the year.

Asbestos-Cement Pipes. Many large projects and new governmental regulations auger well for continued strong pipe markets. All types of pipe continue to exhibit strong demand, although water works construction exceeds that of sewers.

Asbestos Filter Fiber. The market for Arizona Filter Fiber remains steady at present. The amount of exports for this fiber indicates an increase in volume of sales for the balance of the year.

The above comments have been made by various informed executives in the industry. All comments are welcome.

STATISTICAL SUMMARY OF THE MINERAL INDUSTRY, 35th edition, annual, contains tables showing world production, exports and imports of all the economically important minerals for the years 1958 to 1963. Nonmetallic minerals, including asbestos, are fully covered. World trade in minerals and metals, including not only the crude materials but also semi-manufactured and refinery products, are tabulated in detail. This informative summary was prepared by the Mineral Resources Division of Overseas Geological Surveys, London, England.

MESSRS. J. M. VOITH A.G., St. Polten, Austria, were represented at this year's *International Pacific Fair* in Lima, Peru, by a stand in the Austrian pavilion from October 30th through November 14th, 1965. Those interested in information concerning the Austrian firm's production program are invited to contact the company's representative—Mr. Roger Gans, Domingo Casanova 158, Lima, Peru (telephone: 21899).

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Asia
Australia
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PRODUCTION

Australia—The Bureau of Mineral Resources has issued "The Australian Mineral Industry" containing the following production statistics on asbestos for the 4TH QUARTER 1964: Production totaled 3,299 short tons (Chrysotile—406 & Crocidolite—2,893).

Australia—The Bureau of Mineral Resources has issued "The Australian Mineral Industry" containing the following production statistics on asbestos for the YEAR 1964: Production totalled 13,808 short tons (Chrysotile—1,733 & Crocidolite—12,075).

Canada—According to the Dominion Bureau of Statistics, Ottawa, production of asbestos in Canada during JULY 1965 amounted to 109,466 tons compared to 119,020 in July 1964. Total for the first seven months of 1965 was 674,554 compared to 716,708 for the same period in 1964.

Rhodesia—The Ministry of Mines and Lands, Salisbury, has issued the following statistics on asbestos for AUGUST 1965: Production—15,941.38 short tons; valued at £779,193.01.05.

Aylmer Mines—With asbestos reserves in excess of 6,000,000 tons on its Coleraine Township, Canada, property, Aylmer Mines is negotiating with a firm having active mills in the area for further development or disposition of the property.

Noordhoek Mine—During the course of this year or early in 1966 a new Cape Blue Asbestos producer will commence operations in the Northern regions of the Cape Province, South Africa, namely Noordhoek Cape Blue Asbestos (Pty.) Limited, situated some 90 miles northwest of Kimberley. A modern milling plant will be erected and first production is expected before March 1966. The Noordhoek Mine will be directed by **R. T. Joyner,** who, for a considerable number of years was in charge of operations at the Wandrag Asbestos Mine near Kuruman.

Enquiries for fibre from the Noordhoek Mine should be addressed to:
HEERING INTERNATIONAL (PTY.) LIMITED
P. O. Box 86
Parklands, Johannesburg, South Africa
which company has been appointed the Sole Selling Agents

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IMPORTS & EXPORTS

Imports Into U.S.A.

(Figures by Bureau of the Census) — JUNE 1965

Unmanufactured Asbestos: — Short Tons

Amosite, Crude, Republic of South Africa	1,459
Crocidolite (Blue), Crude, Rep. of South Africa	1,765
Chrysotile, Crude, Canada	1
Republic of South Africa	317
Yugoslavia	1,042
Zambia, Southern Rhodesia & Malawi	345
Chrysotile Spinning Fibers, Canada	926
Zambia, Southern Rhodesia & Malawi	3
Chrysotile, Other, Canada	48,066
Zambia, Southern Rhodesia & Malawi	512
Asbestos, Other, Canada	3,356
Finland	275
United Kingdom	13
Other Countries	10
	58,090

Valued at $5,495,373

Manufactured Asbestos Goods:	Pounds	Value
A-C Pipes, Tubes & Fittings	8,044,035	$448,002
Asbestos-Cement Articles, Other	1,377,769	136,897
Asbestos Yarn, Sliver, Rope, etc. & other		207,180
		$792,079

(Published by Bureau of the Census) — JULY 1965

Unmanufactured Asbestos: — Short Tons

Amosite, Crude, Republic of South Africa	85
United Kingdom	204
Crocidolite (Blue), Crude, Australia	135
Republic of South Africa	535
Chrysotile, Crude, Republic of South Africa	348
Yugoslavia	694
Chrysotile Spinning Fibers, Canada	818
Zambia, Southern Rhodesia & Malawi	5
Chrysotile, Other, Canada	44,451
Other Countries	12
Asbestos, Other, Canada	1,845
Finland	198
India	23,368
United Kingdom	50
	72,748

Valued at $4,403,345

Manufactured Asbestos Goods:	Pounds	Value
A-C Pipes, Tubes & Fittings	7,599,282	$382,193
Asbestos-Cement Articles, Other	1,333,793	128,853
Asbestos Yarn, Sliver, Rope, etc. & Other		317,367
		$828,413

Exports From U.S.A.

(Figures by Bureau of the Census) — MAY 1965

Unmanufactured Asbestos: — Short Tons

Crude & Spinning		Non-Spinning Fibers		Waste & Refuse	
Canada	26	India	1,272	Belgium	33
Italy	59	Japan	112	Canada	50
Japan	13	Netherlands	31	India	202
Mexico	55	U. Kingdom	58	Japan	355
W. Germany	6	Viet-nam	220	Mexico	22
	159	Other Ctys.	7	Netherlands	91
			1,700	U. Kingdom	36
				W. Germany	23
				Other Ctys.	8
					820

Total Unmanufactured Asbestos—2,679 — Valued at—$354,548

Manufactured Asbestos Goods:	Net Qty	Value
A-C Shingles & Clapboard	Lb 2,180,075	$ 191,938
Other A-C or Fiber-Cement Items	Lb 486,349	98,262
Asbestos Gaskets & Packing	Lb 394,389	414,605
Asbestos Textiles & Yarns	Lb 153,022	77,851
Asb Mfrs. other than Friction Materials		337,004
Asb Clutch Facings incl. Linings	No 169,898	104,324
Asbestos Brake Linings	Lb 476,928	391,134
		$1,615,118

Australia—Imports of asbestos for the 4TH QUARTER 1964 amounted to 13,274 short tons (Amosite—2,478; Chrysotile—10,054; Other—742). Exports of asbestos for the same period for all types and grades amounted to 2,863 short tons. (Bureau of Mineral Resources)

Australia—Imports of asbestos for the YEAR 1964 amounted to 42,895 short tons (Amosite—7,373; Chrysotile—32,075; Other—3,447). Exports of asbestos for the same period for all types and grades amounted to 7,280 short tons. (Bureau of Mineral Resources)

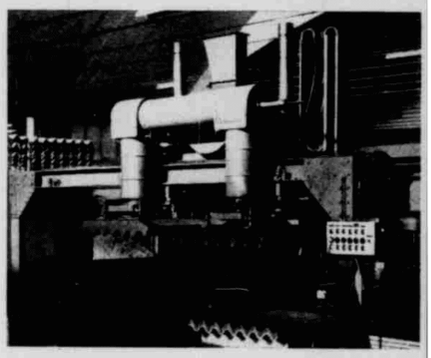
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INDUSTRY NEWS

HAPPY BIRTHDAY

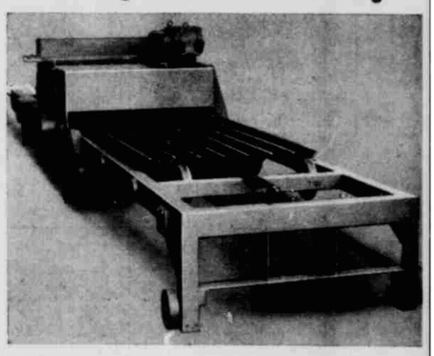
George F. Baccrich, President, Columbia Asbestos Company, Portland, Oregon, November 16.
J. J. Mangan, President & Managing Director, Hedman Mines Limited, Timmins, Ontario, Canada, November 16.
R. V. Hanslip, Vice President, Standco Industries, Inc., Houston, Texas, November 17.
Stanislaw Stachelski, Chairman, Valley Asbestos (Pty) Limited, Johannesburg, South Africa, November 19.
Donald E. Davis, Secretary, Universal Insulation Company, Philadelphia, Pennsylvania, November 20.
Thomas H. Dermody, Vice President—Finance & Director, The Ruberoid Co., New York City, November 21.
H. C. Papritz, Vice President & Treasurer, Nicolet Industries, Inc., Florham Park, New Jersey, November 21.
Marion E. Hansell, Treasurer, Philadelphia Asbestos Company, Philadelphia, Pennsylvania, November 22.
J. A. D. Marcotte, Special Assistant to the President, Asbestos Corporation Limited, Thetford Mines, Canada, November 22.
E. J. O'Leary, President & Chairman, The Ruberoid Co, New York City, November 24.
William H. Parker, General Manager, Canadian Asbestos Company, St. Laurent, Montreal, Canada, November 25.
Miles M. Wilson, Vice President, Trade Relations, Baldwin-Ehret-Hill, Inc., Trenton, New Jersey, November 28.
John G. (Jack) Ordway, Jr., President, MacArthur Company, St. Paul, Minnesota, November 29.
Frank G. Ruggles, President, Frank G. Ruggles Company, Inc., New York City, December 2.
Harvey D. Burgstresser, Vice President, Achenbach & Butler, Inc., Philadelphia, Pennsylvania, December 3.
Edmund F. Gorton, General Manager, Asbestos Corporation of America, Garwood, New Jersey, December 3.
K. Fred Netter, President, Supradur Manufacturing Corporation, Wind Gap, Pennsylvania, December 3.
P. M. Berry, President, Standard Asbestos Manufacturing Company of Cleveland, Cleveland, Ohio, December 8.
E. J. Fasold, Secretary & Assistant Treasurer, The Philip Carey Manufacturing Company, Cincinnati, Ohio, December 8.
Robert F. Orth, Vice President for Marketing & Pipe Division, Johns-Manville Corporation, New York City, December 8.
J. C. McKendry, President, Niagara Asbestos Company, Buffalo, New York, December 10.
Frank W. R. Douglas, Chairman, The Universal Asbestos Mfg. Co. Ltd., Tolpits, Watford, Herts., England, December 11.
Algerd F. Jerome, Vice President, North American Asbestos Corporation, Chicago, Illinois, December 13.

machines for removing asbestos - cement sheets from moulds



Fully automatic machines for removing asbestos-cement flat, straight corrugated and curved corrugated sheets from their moulds.
Oleodinamyc working with fast and exact displacements.
Suckers provided with jointed anchorage for a sure drawing of the sheet.
Possibility of installation combined with the cleaning and lubricating unit.

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Fully automatic machines for cleaning, lubricating and storing on the proper carriages the flat or corrugated steel moulds.
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James A. Main, Vice President, Flintkote Mines Limited, New York City, December 14.

To all these gentlemen we extend congratulations and best wishes of the occasion of their birthdays.

SABS Asbestos Testing Laboratory—A. O. G. LeRoux, Milling Adviser and Director of African Associated Mines (Private) Limited and other associated asbestos producing companies of the **Turner and Newall Group** recently went to South Africa from his headquarters in Bulawayo for the special purpose of advising and assisting the South African Bureau of Standards in equipping its new asbestos testing laboratory. Through its South African company, Dublin Consolidated Mines (Private) Limited, Turner & Newall has offered to make available to the Bureau apparatus designed and developed by the T&N Laboratory for the examination of test methods for the grading of asbestos fibres.

This has risen out of the request made at the 1962 Commonwealth Conference that South Africa, through SABS, should conduct an investigation into the Asbestos Industry in South Africa and that an asbestos testing laboratory should be established to provide the testing facilities required by the Industry.

Pacific Asbestos Corporation has succeeded in recapitalizing its first-mortgage indebtedness and, as a result, current default-foreclosure proceedings upon its mortgages are being terminated. The company is preparing a proposal of recapitalization of its unsecured indebtedness that it plans to submit to securities holders before year-end. Pacific Asbestos has reported a sharp gain in sales and a narrowing of its substantial deficit in the first eight months of this year compared with the 1964 period.

The Nuralite Company, a member of the British Uralite group, is to build a factory at Livingston, near Edinburgh, Scotland. The factory is expected to be in full production in approximately 16 or 18 months and will manufacture Nuralite flexible, weatherproof roofing, membranes, preformed flashings and other asbestos-bitumen building products.

„ Tropag "

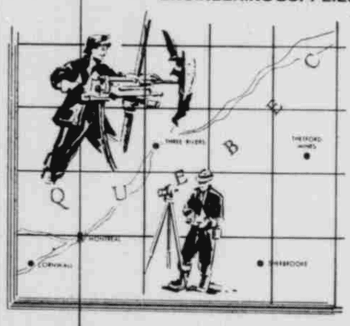
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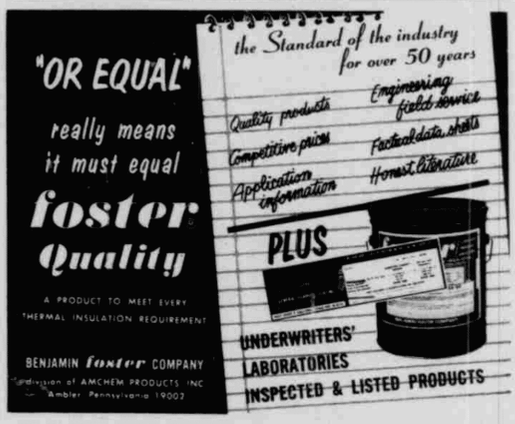
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American Asbestos Textile Corporation has announced the appointment of **Dr. Myril C. Shaw** to the position of Director of Research, effective November 1st, 1965. Dr. Shaw is well known in the asbestos textile industry, having served as Executive Director of the Asbestos Textile Institute from 1946 to 1963. Since that time he has been employed by Certain-teed Products Corporation as Asbestos Fiber Specialist.

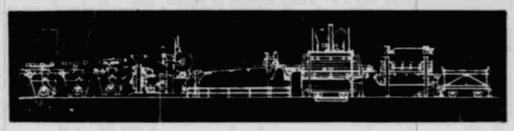
National Gypsum Company has announced the following four new sales management promotions: **J. R. Darling**—District Manager of the Houston, Texas, sales district; **F. K. Ruether**—District Sales Manager for the Buffalo, New York, district and will be responsible for dealer sales in western New York State and Northwestern Pennsylvania; **Jack McKee Smith**—Assistant District Manager of the San Antonio, Texas, sales district; and, **Thomas A. Bokamper**—Field Market Service Supervisor for the Southern Sales Division and will headquarter in Memphis, Tennessee.

Robert L. Klotz has been named Plant Controller for the asbestos-cement plants located at New Orleans, Louisiana, St. Louis, Missouri, and Millington, New Jersey, of **National Gypsum Company.** Mr. Klotz will be headquartered in Buffalo, New York, and will be responsible for asbestos-cement plant control functions, reporting directly to R. C. Goerbing, Assistant Controller.



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Johns-Manville Corporation has named **Murray F. MacDonald** as General Manager of the Building Products Division. He started his career as a salesman in Chicago, Illinois, and now resides in Connecticut.

Raybestos-Manhattan, Inc. has appointed **James J. Espenshade** to the position of Assistant Advertising Manager of the Grey-Rock Division. This appointment was announced by S. R. Robinson, Grey-Rock Advertising Manager.

Cape Asbestos Group—Effective October 1st, 1965, full-time responsibilities for group marketing, exports and public relations have been taken over by **M. A. F. Newton** for the Cape Asestos Company Limited. He will remain on the Board of Cape Building Products Limited and join the Board of Cape Asbestos Fibres Limited. **G. A. Higham** has become Managing Director of Cape Building Products.

H. K. Porter Company—The Friction Materials Division of H. K. Porter Company (Nederland) N.V. has designed and put into operation a new yarn treating installation. The asbestos yarn, after treatment, is used in the manufacture of clutch facings to provide high quality and resilience against bursting.

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Industrial Minerals Processing Plants in Canada—June 1965 (50 cents) has been issued by the Mineral Resources Division of the Federal Department of Mines and Technical Surveys, Ottawa. All of the principal plants are listed and brief notes on the processes are included. Information concerning the dates of the first operation refers to the year that the first plant treated ore from the company's property. The date is not necessarily the year the present plant started. Rock quarries and sand and gravel pits are not included because of their widespread occurrence and intermittent operation.

Orangeburg Manufacturing Company, division of The Flintkote Company, have moved its Flintite regional sales headquarters from Cleveland to the Flintite pipe plant at Ravenna, Ohio. The move was made as part of a program for further coordination of sales and production of Flintite asbestos-cement pipe and Weld-Tite couplings. Among the personnel making the transfer from Cleveland to Ravenna were: Harding Taylor, regional sales manager; Dale Sullivan, sales engineer for northeast Ohio; and, Robert Hunter, manager of installation and service.

Simplicity Engineering Company has prepared Wire Screen Guide SC-65 for engineers and purchasers involved in the selection of woven wire screens for vibratory equipment. The guide covers woven wire screen in wire sizes from .032 to ½ inch in diameter with openings from 1/16 inch up and provides information on screen edgings, ordering specifications and shipping instructions. Simplicity is a leading marketer of wire cloth and perforated plate for vibratory equipment used in the mining, aggregate, brick and clay, foundry and food industries.

U. S. Rubber—Long range plans call for the expansion and diversification of a new installation in Luxembourg to establish a textile and fiber center for the Common Market. The company is now constructing a new tire cord plant there to supply tire cord to its European and Turkish tire plants, but eventually expects to produce many more textile products in Luxembourg, including many of the industrial and consumer textile products now produced exclusively in the United States.

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ASBESTOS PRICES

ARIZONA— Per Ton of 2,000 lbs., f.o.b. Globe, Arizona

(As of July 10, 1964)

No. 1 Crude	$1,410.00 to	$1,650.00
No. 2 Crude	610.00 to	900.00
AAA	..	800.00
Group No. 3 (Non-Ferrous Filtering & Spinning)	425.00 to	750.00
Group No. 4 (Non-Ferrous Plastic & Filtering)	385.00 to	500.00
Group No. 5 (Plastic & Filtering)	250.00 to	400.00
Group No. 7 (Refuse & Shorts)	58.00 to	90.00

CANADA— Per Ton of 2,000 lbs. f.o.b. Mine

(As of January 1, 1965) Canadian Currency

Group No. 1 (Crude No. 1)	$ ..	$1,410.00
Group No. 2 (Crude No. 2, Run of the Mine Crude, Sundry Crudes)	640.00 to	875.00
Group No. 3 (Spinning Fibre)	345.00 to	565.00
Group No. 4 (Shingle Fibre)	190.00 to	320.00
Group No. 5 (Paper Fibre)	115.00 to	156.00
Group No. 6 (Waste, Stucco or Plaster)	..	95.00
Group No. 7 (Refuse or Shorts)	40.00 to	80.00

CASSIAR— Per Ton of 2,000 lbs., f.o.b. Vancouver, B. C.

(As of January 1, 1965) Canadian Currency

AAA grade (non-ferrous spinning fibre)	$ 787.00
AA grade (non-ferrous spinning fibre)	625.00
A grade (non-ferrous spinning—Canadian Group 3)	470.00
AC grade (asbestos cement—Canadian Group 4)	325.00
AD grade (asbestos-cement—Canadian Group 4)	260.00
AK grade (shingle fibre—Canadian Group 4)	220.00
AS grade (shingle fibre—Canadian Group 4)	181.00
AX grade (shingle fibre—Canadian Group 5)	160.00
AY grade (shingle fibre—Canadian Group 5)	120.00

VERMONT— Per Ton of 2,000 lbs., f.o.b. Mine

(As of January 10, 1965) U. S. Dollars

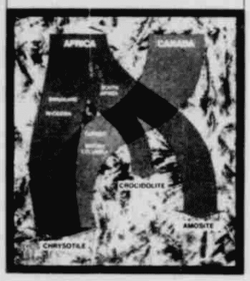
Group No. 3 (Spinning & Filtering)	$ 319.00 to	$ 370.00
Group No. 4 (Shingle Fibre)	176.00 to	296.00
Group No. 5 (Paper Fibre)	121.00 to	144.00
Group No. 6 (Waste, Stucco or Plaster)	.. to	88.00
Group No. 7 (Shorts & Floats)	40.50 to	75.00

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TNS-17

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United States Rubber Company has changed the name of one of its foreign subsidiaries and three more subsidiaries will receive new names in 1966. All the changes provide for the incorporation of the company's worldwide trademark, **UniRoyal,** in the identifications of the subsidiaries.

George M. Spindler has been appointed Director of Marketing for the international company of **U. S. Rubber Company.** He joined the company in 1952 as a tire sales territory manager.

Herbert D. Smith was appointed to the newly created post of Director of Market Development for **U. S. Rubber Company.** He will assist in the coordination of the varied marketing efforts of the company and will help to develop new programs to expand business in all divisions of U. S. Rubber.

George W. Chane has been named a Vice President and member of the operating policy committee of **U. S. Rubber Company.** Formerly executive vice president for finance of the Olin Mathieson Chemical Corporation, Mr. Chane will succeed **Frank J. McGrath** as vice president—finance, on the first of 1966. Mr. McGrath is retiring at that time after 25 years of service with U. S. Rubber.

Theodore V. Herrmann has been appointed Advertising Manager for the Textile Division of **United States Rubber Company** and will be responsible for all textile advertising and sales promotion programs. He succeeds **Philip Bergh** who was named Manager of Trade Activities, a newly-created position to expand the division's participation in textile meetings, markets and exhibitions.

M. H. Arnao has been appointed Factory Manager of the Philadelphia, Pennsylvania, plant of **United States Rubber Company.** He replaces W. H. Onderdonk.

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3. FREQUENCY OF ISSUE: monthly	
4. LOCATION OF KNOWN OFFICE OF PUBLICATION (Street, city, county, state, zip code): 807 Western Saving Fund Building, Philadelphia, Pennsylvania 19107	
5. LOCATION OF THE HEADQUARTERS OR GENERAL BUSINESS OFFICES OF THE PUBLISHERS (Not printers): Same	

6. NAMES AND ADDRESSES OF PUBLISHER, EDITOR, AND MANAGING EDITOR

PUBLISHER (Name and address): Secretarial Service, 807 Western Saving Fund Bldg., Philadelphia, Pa.

EDITOR (Name and address): E. E. Cox, 312 South 12th Street, Philadelphia, Pennsylvania 19107

MANAGING EDITOR (Name and address): E. E. Cox, 312 South 12th Street, Philadelphia, Pennsylvania 19107

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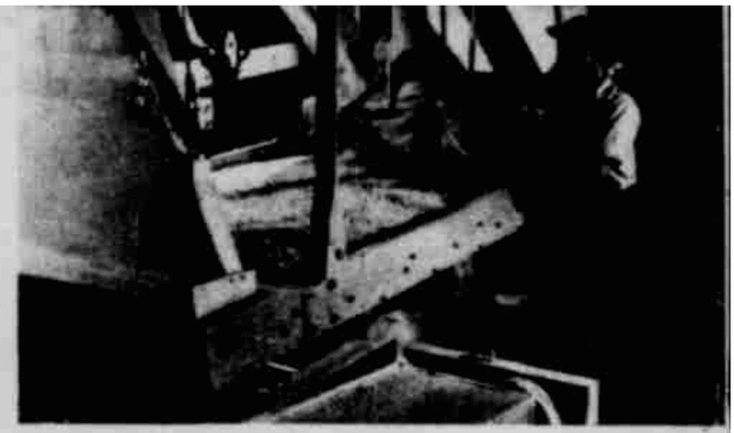
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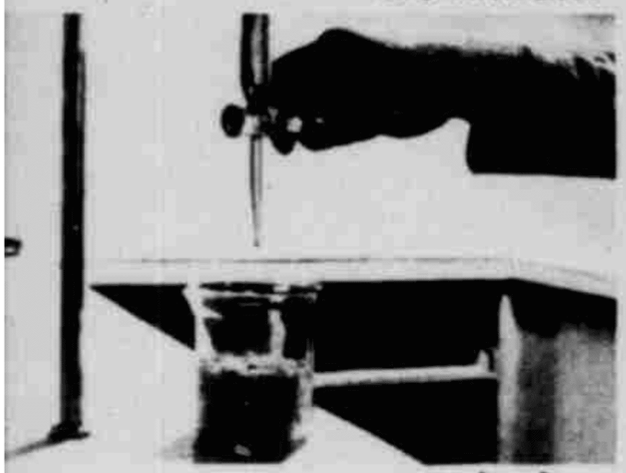
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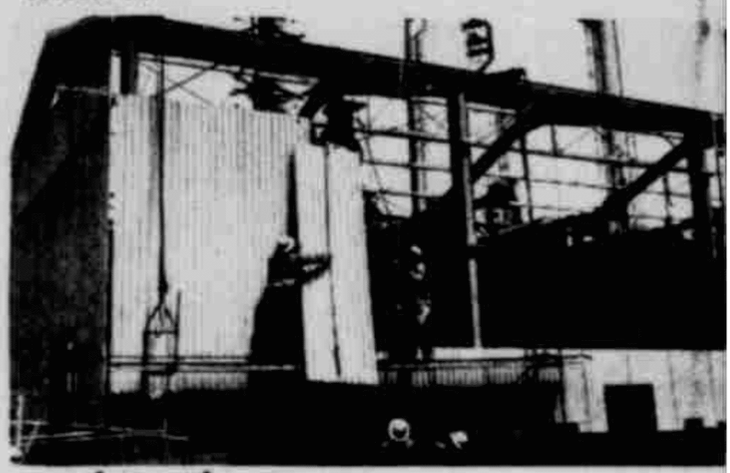
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