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PART 1. ASBESTOS MINING.CANADA.

- 1 CANADIAN MINERAL SHIPMENTS VALUE SLIPS 0.8 PER CENT.
The Gazette, Montreal, Jan.6, 1970.

The value of non-metallic minerals shipped declined to \$444,188,679 from \$446,922,191 in 1968. Within this category value of asbestos shipments rose to \$196,759,000 from \$185,024,662, though the tonnage shipped was virtually unchanged.

- 2 CJM STARTS \$75 MILLION SPEED-UP. Asbestos Producer,
November 1969, p.7.

Canadian Johns-Manville plans to spend some \$75 million over the next five years as part of the accelerated overburden removal programme at the Jeffrey Mine in Asbestos. "For every foot we go down in the pit", said Dr. Lindell, "we must push back the perimeter of the pit so as to maintain safe slopes. And since we plan to go much deeper than our present 800-foot level, we have to move some of our surface facilities." "The mill", he noted, "will not have to be relocated for the next 25 to 30 years, at our current rate of production." The first part of the programme calls for the relocation, as soon as possible, of the primary crushing plant, the concentration system, the dryer complex and the dry rock storage building, Dr. Lindell stated.

- 3 NEW QUEBEC ASBESTOS MINE PROJECT - IT HINGES ON TAXES.
Asbestos Producer, Vol.15, No.9, Oct.1969, p.7.

The subarctic wilderness of Northern Ungava in New Quebec may soon become the scene of resumed asbestos mine development. Barring a major reduction in federal government tax incentives to mining companies, indications are Asbestos Corporation will bring its Asbestos Hill project into production during the early 1970's. Under development from 1962 to 1967, the company's Asbestos Hill orebody is located south of Deception Bay, a mere 300 miles below the Arctic Circle and over 1200 miles due north of Montreal. The company had spent over \$25 million on the project before shelving further activity in 1967 as a result of uncertainty as to future federal tax policy and of unexpected cost increases.

Shortly before A. L. Penhale, then Asbestos Corporation president, announced postponement of development work at Asbestos Hill, the federal government's Carter Royal Commission on Taxation had recommended the elimination of tax incentives to mining companies, particularly in instances of new mine development. Asbestos Corporation plans now call for an operation that would provide employment for

approximately 200 personnel and produce 100,000 tons of fibre a year, all for export. Clarification of federal tax policy is expected in October when Federal Finance Minister, E. J. Benson, tables a White Paper on taxation. "The contents of the White Paper and ensuing legislation will definitely influence our decision whether or not to proceed with Asbestos Hill" stated Company President W. W. Oughtred.

- 4 CASSIAR ASBESTOS CORPORATION LIMITED. PRODUCTION.
Asbestos, Sept.1969, p.36.

Cassiar Asbestos Corporation Limited reports that production from the Cassiar Mine is being maintained at a rate of 75,000 tons of fibre per year and production from the Clinton Mine has increased to the rate of 80,000 tons of fibre per year. Both mines are operating efficiently and sales are at the anticipated level for the six-month period from January through June 1969.

U.S.A.

- 5 MINERAL AND WATER RESOURCES OF ARIZONA BULLETIN 180.
U.S. Geological Survey, the Arizona Bureau of Mines and
the U.S. Bureau of Reclamation.

A very comprehensive and complete chapter on asbestos includes an Introduction, History and Production, Arizona Deposits and an Outlook. The future of asbestos mining in Arizona will depend greatly on the approach taken in the search for undiscovered resources.

MEXICO.

- 6 COMPANIA NACIONAL DE ASBESTOS. Asbestos, Nov.1969, p.46.

Compania Nacional de Asbestos is a new company to be formed by the Government of Mexico to mine and process Chrysotile asbestos in the Novillo Arroyo area, 20 kilometers west of Ciudad Victoria, Tamaulipas. With an initial capitalisation of \$2,800,000, the new company will be 51% owned by the Government and the remainder of the equity will be offered to public and private entities entitled to participate. The mine and mill are expected to commence operating within 15 months. The area has long been known to contain a potentially productive asbestos property and was examined by geologists during World War II. In recent years it was explored by a Federal Trust and determined to contain economic reserves of 1.2 million tons of ore, sufficient to justify the establishment of a plant to treat 300 tons of ore a day.

At present Mexico does not produce any asbestos fibre and its needs of approximately 30,000 metric tons per year are imported, mostly from Canada.

- 7 FREEPORT SULPHUR COMPANY. Asbestos, Sept.1969, p.36.

Freeport Sulphur Company's wholly-owned subsidiary, Freemex, S.A., and a Mexican mining and chemical company, Metallurica Mexicana Penoles, S.A., have been carrying on an exploration programme in southern Mexico through Compania Minera Pegaso, S.A., a company in which Freemex has a 49% interest. As part of the programme, "Pegaso" has completed 12 drill holes on an asbestos prospect and has encountered asbestos-bearing rock ranging in thickness from 93 to 385 feet. While further drilling and testing will be required to obtain an accurate measure of tonnage, quality and grade, current indications are that substantial tonnages of commercial material are present.

AUSTRALIA.

- 8 PACIFIC ASBESTOS/MARUBENI. Asbestos, Nov.1969, p.46.

The Directors of Pacific Asbestos Limited, Calgary, Alberta, Canada, have approved a proposal to sell 210,000 short tons of Grades 4 through 7 Chrysotile fibre, over a 5½ year period, to Marubeni-lida Company Limited, Tokyo, Japan. The fibre will be from Pacific's asbestos properties in Woodsreef, near Barraba, N.S.W. Australia, and the estimated gross value of the proposed contract amounts to approximately \$25 million, at current Canadian prices. The proposal was contained in a letter of intent from Marubeni and grants Marubeni exclusive distributorship rights throughout Japan, South Korea, Formosa, Thailand, Malaysia, Hong Kong, Singapore, Cambodia, Laos, Vietnam and other Eastern-South Asian countries.

U.S.S.R.

- 9 OCCURENCE OF AMPHIBOLE ASBESTOS IN THE KREMENCHUG IRON ORE ZONE. N. A. Kernilov. Dopov. Akad. Nauk Ukr. RSR., Ser.B, 1969, 31, No.3, 202-206.

Mineral identified as cummingtonite asbestos was found in Precambrian ferruginous quartzites in the Kremenchug Quarry. Veins of a thickness up to several centimetres have an irregular shape; lens-like bodies also occur. The colour is white with greenish hue. The fibre length is up to 10 cm. The mineral is soft, finely fibrous and rather brittle.

The results of chemical, optical and x-ray analyses are given. It was found that the mineral contains more than 60 mole % of grunerite.

- 10 GENESIS OF ASBESTOS-BEARING VEINS OF YALTINSKOE DEPOSIT IN CENTRAL KAZAKHSTAN. Yu. D. Fivenshtein, KazSSR Fylym Akad. Khabarbary, Izv. AN KazSSR. Ser.Geol., 1967, No.3, 59-64; Ref.Zhur. Geol., 1967, 1CI70.

Actinolite asbestos occurrences in this region are associated with pyroxene-plagioclase porphyrites and their pyroclasts. They were formed by local metamorphism.

EUROPE.

- 11 TOURMALINE "ASBESTOS" FROM ALPINE FISSURES. V. Dietrich et al. Schweiz. mineral. und petrogr. Mitt., 1966, 46, No.2, 695-7.

The so-called "asbestos" veins in fissures in Alpine spilites and keratophyres consist of asbestos-like tourmaline with addition of minor amounts of chlorite. The diameter of the fibres is about 1500-3000 Å. Parameters of the unit cells are $a = 15,946$, $c = 7,197$ Å. Optical properties of the mineral are described, and results are given of spectral analysis.

- 12 MINERALOGICAL IDENTIFICATION OF SOME CZECHOSLOVAK SERPENTINE ASBESTOS. J. Houskova and J. Kourimsky. Sb.Nar.Mus.Praze, 1968, 246(1), 61-71 (in English).

Czechoslovak serpentine asbestos from four localities was investigated. Data are given on chemical analyses, optical properties, DTA results, and x-ray powder study. The samples from Nova Ves. Prisečnice and Hrubšice represented mixtures of orthochrysotile and clinochrysotile asbestos. The material from Letovice is antigorite containing 4.99% of iron.

- 13 THE MINERAL INDUSTRY OF CYPRUS. Asbestos, Oct.1969, p.38.

The mineral resources of Cyprus continued to hold an important place in the country's economy in 1968. Production of asbestos amounted to 17,242 metric tons. For 1967, exports reached 18,839 tons (principal destinations were Denmark, United Kingdom, Thailand and Belgium) and imports totalled 165 tons (mainly from United Kingdom and West Germany).

In 1967, Cyprus Asbestos Mines Limited produced 11,688 tons of long grade fibres and 8,072 tons of short grade fibres and the asbestos-cement factory at Moni manufactured 31 tons of flat sheets, 874 tons of corrugated sheets and 180 tons of moulded goods.

SYNTHESIS OF ASBESTOS.

14 U.S. PATENT. METHOD OF SYNTHESISING ASBESTOS. U.S.A. as represented by the Secretary of the Interior. For about fifty years, research aimed at synthesising long, parallel asbestos fibres, like or similar to that found in nature, has been practically without success. In every case reported the fibres synthesised were submicroscopic in size and were not parallel except for the occurrence of isolated small bundles or pockets of the fibres. The acute need for methods of synthesising usable asbestos was not fully realised until World War II caught this country and others short on supply of the natural fibres. It has now been discovered that long amphibole and chrysotile asbestos fibres, oriented in a predetermined manner including parallel orientation, can be synthesised by employing solids as the basic reactants, and maintaining a dispersion of large individual masses of the magnesium-containing raw material reactant in the other basic reactant or reactants during the synthetic asbestos-forming reaction. It is therefore an object of this invention to produce synthetic asbestos in fibre lengths comparable in quality and orientation to that of their natural counterparts.

15 FRENCH PATENT NO. 1,540,008. SYNTHETIC FIBRES SIMILAR TO ASBESTOS. Monsanto Co.

Asbestos-like synthetic fibres, resistant to heat, moisture and oils, are produced from a fibre-forming organic polymer of the polyamide type containing one or more fillers. In an example, to a liquid composition comprising 20 g. Si, 20 g. Mg, 10 g. carbon black and 400 g. N-dimethylacetamide were added 200 g. of a 17.5% of a solution of poly m-phenylene-bis(m-benzamide) terephthalamide in N-dimethylacetamide, and the mixture was run into a coagulating bath containing 15 l. water, 75 g. Na_2SO_4 as a surfactant, and a few drops of isooctylphenyl polyoxyethanol as a forming agent. Short fibres precipitated; they were fluffy, highly fibrillated and had a coarse texture.

16 SYNTHESIS OF FIBROUS AMPHIBOLE ON THE BASIS OF RECRYSTALLISED OLIVINE UNDER HYDROTHERMAL CONDITIONS. E.N. Korytkova, A. D. Fedoseev and T. A. Makarova. Doklady Akad. Nauk SSSR, 1968, 182, No. 6, 1396-1398.

The possibility of the amphibolisation of olivine during the metamorphism processes has been confirmed experimentally. Fibrous magnesian arfvedsonite was produced from olivine and clivinite under the action of alkaline solutions in autoclave at varying temperatures (300-650°C) and pressures (300-1500 atm.). The fibre length was 0.2-3mm. (in the presence of NaF, up to 4mm). The chemical formula of the fibrous product was approximately $\text{Na}_3\text{Mg}_4\text{Fe}^{3+}\text{Si}_8\text{O}_{22}(\text{OH})_2$.

- 17 SYNTHETIC FLUORINE-CONTAINING ASBESTOS. XXIII. SYNTHESIS OF FLUORINE-CONTAINING ASBESTOS IN THE VAPOUR PHASE. H. Saito et al. Kogyo Kagaku Zasshi, 1968, 71, No.6, 824-827.

A composition consisting of $\text{MgF}_2 \cdot 2\text{MgO} \cdot 0.5 \text{Al}_2\text{O}_3 \cdot 3\text{SiO}_2$ with addition of NaF was heated in a graphite crucible at 1400°C for 2 hours, then it was cooled slowly to 1245°C and kept at this temperature. High yields of synthetic asbestos fibres were obtained.

- 18 THE SYNTHESIS OF FIBROUS RICHTERITE IN HYDROTHERMAL CONDITIONS. A. D. Fedoseev et al. Zapiski Vsesoyuz. Mineralog, Obshchestva, 1968, 102, No.6, 722-725.

Synthetic fibrous material having chemical composition similar to that of richterite was produced by heating a mixture of chemical substances at $250 - 550^\circ\text{C}$ under a pressure of 300 - 1500 atm. for 24 - 48 hours. The starting material included NaOH, MgCl_2 , and SiO_2 , used in a ratio corresponding to the composition of natural amphiboles with a slight excess of NaOH. An aqueous suspension was prepared with a liquid to solid ratio of 50:30. A felted mass of small fibres was obtained. Some fibres, at the periphery of the mass, reacted a length of 3mm. The chemical formula of the product was - $\text{Na}_{1.86}\text{H}_{0.14}\text{Ca}_{1.05}\text{Mg}_{4.90}\text{Si}_{8.02}(\text{OH})_2$.

- 19 SYNTHESIS OF FLUORO-MANGANESE RICHTERITE BY SINTERING. Saito Hadzime and Takusagawa Nobuo. Kogyo Kagaku Zasshi. J. Chem.Soc. Japan, Industr.Chem.Sec. 1965, 68, No.12, 2347-2351, A128.

Asbestos of the fluorcamphibole type was produced by sintering a batch of composition $2\text{NaF} \cdot \text{MnO} \cdot 5 \text{MgO} \cdot 8\text{SiO}_2$. Good crystals of richterite were obtained by firing at $900-1100^\circ\text{C}$ in a reducing medium. Fibrous crystals were obtained by firing at 1000°C a batch with excess 0.5 NaF. It has been shown that the growth of richterite crystals occurs in the solid phase.

- 20 KINETICS OF THE DEHYDRATION OF CHRYSOTILE ASBESTOS. Yu.G.Vlasov et al. Izvestiya Akad. Nauk SSSR. Neorganicheskoe Materialy, 1968, 4, No.5, 798-800.

Differential thermal analysis of chrysotile asbestos (from the Bazhenova deposits) has shown that absorbed water is expelled at $100-200^\circ\text{C}$ and structural water at $620-720^\circ\text{C}$. An exothermic effect at $790-810^\circ\text{C}$ corresponds to the formation of the forsterite crystalline lattice. Powdered chrysotile asbestos loses its structural water at much lower temperatures than asbestos fibres; the bulk of the water is expelled between 400 and 620°C .

- 21 SYNTHETIC FIBROUS FLUOROSILICATES OF THE ASBESTOS TYPE, THEIR PROPERTIES AND UTILISATION ASPECTS. A. D. Fedoseev et al. Izv. Akad. Nauk SSSR, Neorg. Materialy, 1965, 1, No. 11, 2031-38.

Synthetic fibrous amphiboles can be produced by crystallisation from various silicate melts under such conditions that the hydroxyl anionic groups present in the structure of natural minerals of this class are replaced by fluorine. In the present work, preparation is described of six synthetic fibrous fluorcamphiboles by crystallisation from molten mixtures containing chemically pure oxides and fluorides in proportions corresponding to the composition of related natural amphibole varieties. In this way, magnesium-fluorrichterite, nickel-fluorrichterite, cobalt-fluorrichterite, chromium-fluorcamphibole and lithium-magnesium-fluorcamphibole. Thermal and mechanical properties of the synthesised fluorcamphiboles and their resistance to acids and alkalis have been investigated. It has been found that properties of the synthetic fibrous fluorcamphiboles are not worse than those of better natural asbestos grades, the thermal properties of the synthetic products being even better than those of natural asbestos. The synthetic fibrous fluorcamphiboles can be utilised in filtering, heat-insulating and packing compositions, and also as reinforcing fillers in a variety of resinous composite materials and the like.

- 22 FORMATION OF FIBROUS AMPHIBOLES BY RECRYSTALLIZATION OF SERPENTINE UNDER HYDROTHERMAL CONDITIONS. (PRELIMINARY COMMUNICATION). E. N. Korytkova and A. D. Fedoseev. Sb. "Khimiya vysokotemperaturn. materialov", Leningrad, "Nauka", 1967, 140-142; Ref. Zhur. Khim., 1968, 32237.

Treatment of serpentine minerals, such as antigorite, lizardite, chrysotile and serpophite, with silica solutions at various temperatures and pressures did not lead to fibrous recrystallisation. Treatment of serpophite with sodium silicate solutions under hydrothermal conditions resulted in the formation of a fibrous Na-Mg amphibole. The fibrous amphibole was formed in a wide range of temperatures (350-650°C) and pressures (400 - 1500 atm.) Under similar conditions, chrysotile asbestos recrystallised completely forming a fibrous amphibole (fibre length was about 3 mm). Treatment of serpophite and antigorite with lithium silicate resulted in the formation of fine fibres of the amphibole type.

- 23 HYDROTHERMAL SYNTHESIS OF FERRUGINOUS HORNBLÉNDE AND ACTINOLITE FROM ACIDIC CHLORIDE SOLUTIONS. I. A. Kiseleva. Doklady Akad. Nauk. SSSR, 1966, 171, No. 1, 177-180.

In the experiments, needle-like or fibrous actinolite was produced from solutions containing calcium carbonate, silica, magnesium chloride and ferrous chloride.

- 24 THE CRITERIA OF THE SERPENTINIZATION OF ULTRABASIC ROCKS.
I. A. Malakhov. *Geokhimiya*, 1965, No.7, 880-7.

After discussing various factors influencing the serpentization of ultrabasic rocks, the author arrives at the conclusion that not the degree of the oxidation of iron, but the content of constitutional water or calcination loss is the criterion of the process. The difference between these two values depends on the presence of carbonates, whose content is usually small. Therefore, the author proposes to plot the CO_2 contents against the constitutional water contents; the resulting vector will represent the calcination losses. Examples discussed include, inter alia, chrysotile-serpentine, chrysotile-asbestos, antigorite etc.

- 25 HYDROTHERMAL SYNTHESIS OF FIBROUS NICKEL-CONTAINING AMPHIBOLE AND ITS PROPERTIES. A. D. Fedoseev, T. A. Makarova and L. N. Pivovarcva. *Izvestiya Akad. Nauk SSSR, Neorganicheskiye Materialy*, 1968, 4, No.5, 796-797.

Fibrous Na-Ni amphibole was synthesised in hydrothermal conditions in an alkali medium at 450-500°C under a pressure of about 900 atm. As starting materials, NaOH, NiCl_2 and silica were preferably used. Homogeneous fibrous products containing (in % by wt.) SiO_2 48.79, NiO 40.50, Na_2O 7.96 and water 3.00, were obtained. The general formula of the Ni-amphibole was $\text{Na}_{2.58}\text{Ni}_{5.65}\text{Si}_{8.22}(\text{OH})_2$. Data are given of the crystalline structure, optical properties and resistance to attack by acids and alkalis are given. The Ni-amphibole is dehydrated at 800°C.

PART 2. ASBESTOS CEMENT.

- 26 U.S. PATENT NO. 3,415,674. IMPREGNATION OF ASBESTOS-CEMENT PRODUCTS WITH THERMOSETTING FORMALDEHYDE RESIN. National Gypsum Company, Buffalo, N.Y.

The present invention provides a process in which a durable, weather-resistant finish coating can be applied to an asbestos-cement product without danger of the coating chipping or flaking off, even after prolonged exposure to weathering conditions. According to the present invention, asbestos-cement products, such as sheets, boards, and the like, are impregnated with a water-dilutable, thermosetting formaldehyde resin by applying to a surface of the product an aqueous solution of the formaldehyde resin, and the impregnated asbestos-cement products then heated to cure the resin. Thus, the uncured, diluted formaldehyde resin applied to the surface of the asbestos-cement sheet penetrates the surface of the sheet and impregnated the subsurface area of the asbestos-cement substrate. Upon heating, the resin is cured in situ to provide an integral resin-asbestos-cement layer extending from the surface of the sheet into the interior thereof.

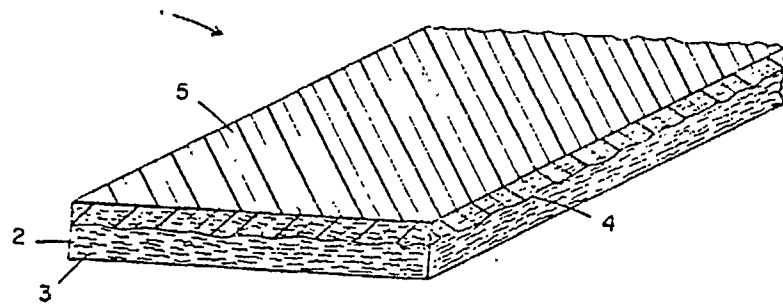


Fig. 1

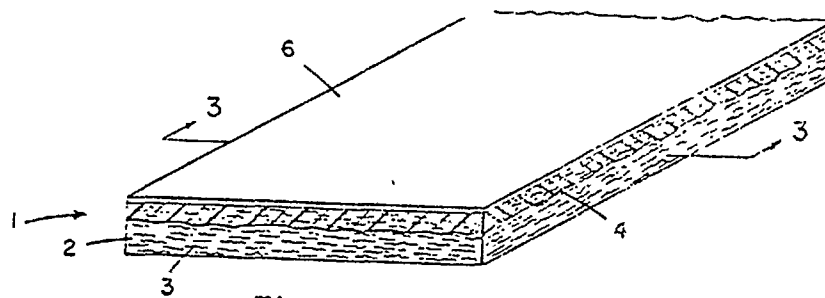


Fig. 2

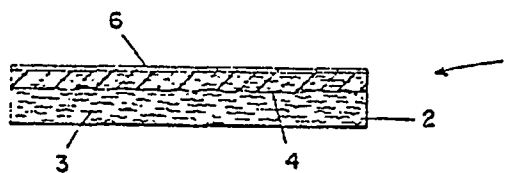


Fig. 3

This layer, when cured, binds together the surface and subsurface asbestos-cement particles and renders the substrate more cohesive, thereby minimising mechanical movement of the particles when the board is exposed to water or water vapours. Thus, the presence of the resin layer in the asbestos-cement sheet serves to bind the asbestos-cement particles firmly in place, thereby minimising expansion and contraction of the asbestos-cement substrate due to repeated wetting and drying of the substrate. As a result, since the finish coatings are no longer subjected to this mechanical movement of the substrate, the coatings are much more durable and weather-resistant. In addition to this bonding effect, the resin layer within the asbestos-cement board serves as a barrier to inhibit movement of the hydrated metal oxides present in the cement to the surface of the board, thereby preventing such oxides from attacking the coating material and weakening the coating bond. In other words, impregnating the asbestos-cement product with the diluted formaldehyde-resin and then curing the resin renders the substrate itself more cohesive and prevents mechanical movement of the particles which serves to loosen the surface and disrupt the coating bond, while at the same time sealing the surface and near surface areas against passage of water and/or water-borne oxides.

After the resin has been cured, any conventional finish coating can be applied to the impregnated surface of the sheet. Thus, coatings such as latex paint, vinyl or acrylic enamel, and the like may be applied and heated to cure or coalesce the coating into a decorative film integrally bonded to the surface of the impregnated asbestos-cement sheet. Since mechanical movement of the asbestos-cement particles at the surface of the board is prevented, due to the cured resin layer, the finish coating has greater adhesion to the substrate when exposed to weathering conditions. As a result, the finish coating is more durable and weather-resistant.

Referring now more particularly to the drawings, numeral 1 generally designated an asbestos-cement product, such as a sheet, a board, or the like, the product comprising a cementing material 2, such as Portland cement, having asbestos fibres 3 uniformly distributed throughout the cement. A resin 4 impregnated the surface 5 and the subsurface areas of the sheet which are to be exposed to weathering conditions. In the embodiment shown in Fig. 1, the impregnating material extends into the board for a distance of about $1/3$ of the thickness of the board. As noted hereinabove, the resin may penetrate into the board to a greater or lesser degree, the only requirement being that the resin penetrate a distance sufficient to bind the particles in the surface and subsurface areas without forming a resin coating over the surface of the board. A conventional finish coating 6 is applied to the surface 5 of board 1, as illustrated in Figs. 2 and 3. This finish coating is integrally bonded to the asbestos-cement substrate and provides a durable, decorative, weather-resistant product.

27

SOIL PHYSICS AND ENGINEERING. V SOIL CORROSION.

H. R. Penhale, New Zealand, Dept.Sci.Ind.Res., Soil Bureau, Bulletin, 1968, No.26 (pt.2), 162-167.

The factors effecting corrosion of concrete and asbestos-cement in soils are aggressive ground waters and some physical properties of the soils. Results of corrosion are described of an asbestos cement and concrete water main laid in podzols and podzolised soils and in a brown loam derived from basalt, and of asbestos cement pipes laid in gley and gleyey soils, and in a saline gley recent soil. The rates of the attack on asbestos cement and concrete were very similar. The attack decreased with time, partly because the matt of asbestos fibres or loosely held aggregates remaining on the surface of the pipes reduce the diffusion of water and corrosion products. The rate of attack is about 0.4 mm/year. The service life of pipes in these solids is probably about 40 years.

28

CERAMIC MATRICES. MECHANICAL PROPERTIES OF GLASS-FIBRE REINFORCED GYPSUM. M. A. Ali and F. J. Grimer. Journal of Materials Science, 4, No.5, p.389(1969). COMPOSITES, Sept.1969, p.60).

The inclusion of approximately 10% of chopped, PVA-coated, E glass fibres in gypsum plaster is shown to produce a composite comparable to asbestos cement in tensile and flexural properties and fire-resistance but with 20-25 times higher impact strength. Composite boards are manufactured by a simple spray suction technique and show no deterioration in mechanical properties after storing for 6 months at 18°C and 40% RH. The authors conclude that ease of manufacture and the excellent mechanical properties suggest that glass fibre-reinforced gypsum can be used in the manufacture of load-bearing components such as floors, partitions and inner leaf walls.

29

FRENCH PATENT NO. 1,524,317. DEFIBERISATION OF ASBESTOS. Centre de Recherches de Pont-a-Mousson.

An asbestos defiberisation process comprises passing an aqueous suspension of asbestos through at least one hydrocyclone classifier; withdrawing fine fibres from the upper part of the hydrocyclone; passing the suspension of the agglomerated fibres from the bottom part of the cyclone into a grinding mill, and recycling it to the hydrocyclone. The pressure of the aqueous suspension in the treatment cycle is of the order of several bars. The concentration of the aqueous suspension leaving the upper part of the hydrocyclone is 2 g. of asbestos per litre.

30

U.S.PATENT NO. 3,232,826. PROCEEDING WITH ITS CORRESPONDING APPARATUS FOR THE MANUFACTURING OF FIBRO-CEMENT ARTICLES. S. B. Sirera, February 1, 1966.

- 31 U.S. PATENT NO. 3,232,829. MACHINE FOR THE MANUFACTURE OF FIBRO-CEMENT PIECES. S. C. Esteve, February 1, 1966.
- 32 FRENCH PATENT NO. 1,537,007. COATINGS FOR FIBROUS CEMENT. Centre de Recherches de Pont-a-Mousson.

Waterproof coatings for asbestos cement products are prepared from epoxy resins, polyamides, vinyl resins, chlorinated rubber or polyurethanes dissolved in a suitable solvent such as white spirit, ethylene glycol acetate etc. Pigments may be added. The coatings inhibit efflorescence.

- 33 BINDERS BASED ON ASBESTOS CEMENT WASTES AND SLAG FROM THE ELECTROTHERMAL PRODUCTION OF PHOSPHOROUS. F. P. Bashev, Tsement, 1969, No. 4, 8-9.

Waste water sediments from the production of asbestos cement and granulated slag from the production of phosphorous by the electrothermal method were combined in varying proportions to produce an hydraulic binder. Optimum asbestos cement content was 10-15%. Calcium chloride may be added as an activator in an amount of 1.8 - 2.0%. A material consisting of the binder and sand in a ratio of 1:3 exhibited good mechanical properties. Light-weight heat-insulating materials (0.6-1.1 t./m³) can be produced without any filler, with addition of 0.1% of aluminium powder.

- 34 EFFECT OF POLYACRYLAMIDE ON THE FLOCCULATION IN DILUTE ASBESTOS SUSPENSIONS. T. I. Pogarskaya et al., Zhur. Priklad. Khim. 1968, 41, No. 10, 2170-2175.

The effect of the addition of polyacrylamide on the rate of sedimentation in asbestos suspensions was investigated. Polyacrylamide exerts a flocculating effect, and improves the filtration characteristics. The optimum amount is about 750g. of polyacrylamide per ton of asbestos. The time of mixing should be 0.5 - 1 min. A detailed description of experiments is given.

- 35 BELGIAN PATENT 705,510. ELECTROSTATIC DEPOSITION OF COMPOSITE MATERIALS. British Uralite Ltd.

Mixtures of fibres and binders in the particulate form are electrostatically charged and then deposited on moulds, which are earthed or charged with opposite polarity. The deposited mixture is then treated in such a manner that cementing of the material takes place. For example, a mixture containing asbestos fibres and portland cement is deposited on a mould, and then moistened with water or steam to effect cementation. Alternatively, bitumen may be used as a binder.

- 36 BRITISH PATENT NO. 1,129,815. ASBESTOS SHEETS. Turner Bros. Asbestos Co.

Asbestos sheets are produced by forming an aqueous dispersion comprising chrysotile asbestos fibres and minor amounts of sodium dodecyl benzenesulphonate, aluminium sulphate and a water-soluble salt. The dispersion is conveyed on an endless carrier, which is wetted with a zinc sulphate solution, as a coagulant, to form a precipitate binding the fibres. The sheet is continuously stripped from the carrier.

- 37 J-M EXPANDS PRODUCTION. Asbestos, Sept.1969, p.22.

New lines of asbestos-cement extrusion (ACE) products developed by Johns-Manville Corporation have gained widespread acceptance so rapidly that demand has surged throughout the United States. The Company is, therefore, investing in full-scale production facilities at Manville, New Jersey, to convert ACE production from new product status to high volume manufacturing. The new facility is expected to be completed by the end of this year. The materials to be produced are primarily Corspan and Facespan, masonry architectural materials used as sidewall, fascia and spandrel panels.

- 38 TURNALL WEATHERALL. Asbestos, Sept.1969, p.32.

As a result of a nation-wide survey, Turners Asbestos Cement Co.Ltd. has introduced a new product called Turnall Weatherall asbestos-cement slates. Blue-black in colour, the slates are manufactured in 6.35 mm thickness and can be applied without tail rivets. The company recommends a minimum pitch of 25° for the 24" x 12" slates, although in certain applications a 22½° pitch may be used. Site tests of the slates have been carried out over a period of 18 months in varying weather conditions and the results have been satisfactory. Turners Asbestos is a Turner & Newall company located in Trafford Park, Manchester, England.

PART 3. ASBESTOS TEXTILES.

- 39 BRITISH PATENT NO. 1,164,137 (17th Sept.1969) APPLICATION (France No.40546 and 677188) 2nd December 1965 and 30th June 1966.

Heat-insulating materials and expansion joints made from mineral fibres are specified which will withstand higher temperatures than asbestos. The heat-proof material is made up of an inner core of refractory ceramic fibres encased in a slackly braided network of mineral or metallic threads. Silico-alumina fibres are specified.

- 40 GERMAN APPLICATION NO. 1,495,902. ORGANOPOLYSILOXANES.
General Electric Co.

Organopolysiloxanes of the phenylsilsesquioxane type are produced by heating octaphenylsilsesquioxane with a catalyst (pref. KOH) to produce a prepolymer, which is then heated in a solvent (pref. o - dichlorobenzene) in the presence of a catalyst to complete the polymerisation. Heat-resistant laminates can be manufactured by impregnating glass or asbestos fabric with the polysiloxane in solution. The products are suitable for electric insulations, rocket cones, etc.

- 41 U.S. PATENT NO. 3,449,230. MANUFACTURE OF ASBESTOS
PRODUCTS. Turner Brothers Asbestos Co.

Asbestos articles are formed by disposing chrysotile asbestos in water using anionic dispersing agents, such as soaps (whereby the fibres acquire negative charges on their surfaces), and passing the dispersion between two electrodes, across which an electric potential is applied. The asbestos is deposited on the anode, wherefrom it can be removed by dry stripping or, continuously, in the wet state, as the deposit has a high wet strength. The high wet strength is obtained by using long asbestos fibres and a binder, such as a water-insoluble soap formed in situ by reaction between the ions from the anode and the soap solution.

PART 4. ASBESTOS FRICTION MATERIALS.

- 42 U.S. PATENT NO. 3,462,387. FRICTION MATERIAL. Raybestos-
Manhattan Inc.

It is an object of the present invention to minimise, if not eliminate, drum scoring and high lining wear rates. Although attempts have been made to control this by removing conventionally employed hard fillers and substituting therefor less abrasive ones, in general no significant progress was made until it was found that the cause of the high lining wear rate and drum scoring was due to the magnetite content of the fibrous asbestos material employed. As a result of this it was found that there was a straight line function between magnetite content of the fibres and lining wear, when the magnetite content is above about 1% by weight, even though the magnetite particles are fine, i.e. pass through a 320 mesh screen. The same type of curve is also true for drum or disc surface finish. Moreover, it was found that as use and temperature of the friction couple increases, the deleterious effects of magnetite, as it occurs in most asbestos, is heightened. Magnetite has a Mohs' scale hardness of approximately 6, whereas conventional cast iron brake drums and discs have a Mohs' scale hardness of about 4-5, and this disparity presumably accounts for the high wear rates both in friction of the composition asbestos-

containing friction composition element and the metal mating member.

A typical batch of commercial fibrous asbestos, such as might have been heretofore employed in the production of brake lining, contains approximately 4-5% by weight of magnetite particles largely attached to the asbestos fibres. For example, a No. 7 grade Canadian chrysotile asbestos contains 3.3% magnetite (Fe_3O_4), 45.6% of which is retained on a 60 mesh screen and the balance finer, some of which passes a 320 mesh screen.

The method covered by this Patent comprises forming friction materials by combining asbestos fibres having a magnetite particle content of less than 1% by weight and wherein all magnetite particles pass a 320 mesh screen with heat hardenable binder and friction augmenting and modifying agents.

- 43 BRITISH PATENT NO. 1,162,893. FRICTION OR ANTIFRICTION BODIES. ZVL Mokrad. (Met.Pat.J. 29th Sept. 1969, 9(38), Met.Abstr., p.5)

The manufacture is described of products such as clutch facings or thin walled plain bearings containing 10 to 70% lead, 10 to 80% copper, 0 to 5% graphite, balance iron. A homogeneous mixture of lead, graphite (and optionally copper) is introduced and compacted into the interstices between the particles of a layer produced from iron and copper powders. The wear rate of the resulting layer can be reduced by annealing in an inert gas at 300°C for 15 min.

- 44 STRUCTURES. HOLOGRAPHIC NON-DESTRUCTIVE TESTING (HNNDT). R. M. Grant and G. M. Brown. Materials Evaluation, 27, No. 4, p.79 (April 1969). (COMPOSITES, Sept. 1969, p.63).

Tyres, sandwich structures, disc brakes, honeycombs etc., can now be quickly tested by a holographic interferometry method. A pair of similar but slightly different holograms of the object before and after deformation are superimposed so as to create optical interference patterns where they do not exactly coincide as well as the holographic picture of the object. The position, shape and size of subsurface defects, such as interlaminar separation, caused by heat, pressure, vibration well below the elastic limit are dramatically indicated.

PART 5. ASBESTOS REINFORCED PLASTICS.

- 45 GERMAN PATENT APPLICATION NO. 1,802,552. POLYPROPYLENE FILLED WITH CHRYSOTILE ASBESTOS. Turner Bros. Asbestos Co.

Thermal stability of asbestos-polypropylene compositions is increased by pretreating asbestos fibres with silicon compounds and using a stabiliser, which consists of a mixture of melamine with dilauryl 3,3'-thiobispropionate.

- 46 REINFORCING PLASTICS WITH INORGANIC AND METALLIC FIBRES.
R. Taprogge and R. Kleinholz. Plastverarbeiter, 1969, 20,
No.2, 99-106.

The reinforcement of unsaturated polyesters and epoxy resins with asbestos fibre mats, and unidirectional quartz fibres and steel wires was investigated in comparison with glass fibre reinforcement. The use of asbestos mats increases the stiffness of the product compared with glass fibres, because of the higher modulus of elasticity of asbestos. Immersion of asbestos-reinforced plastics in water at 80°C only slightly affected the mechanical properties of the material. The adhesion of the plastics to the steel wires is rather poor. The quartz fibres are useful above 400°C, when glass fibres lose most of their strength.

- 47 U.S.PATENT NO. 3,449,202. STRUCTURAL ABLATIVE MATERIALS.
Martin-Marietta Corp.

Structural ablative materials, which are highly efficient dielectric and are resistant to nuclear radiations, contain 5-10% by wt. of polyclefine fibres, 45-55% by wt. of dried asbestos fibres and 13-18% by wt. of MgO powder in phenylsilane resins.

- 48 DETERMINING BOND STRENGTH IN FIBRE REINFORCED COMPOSITES.
R. C. Devekey and A. J. Majumdar. Magazine of Concrete
Research 20, No.65, p.229 (Dec.1968) (COMPOSITES, Sept.1969,
p.64)

A pull out technique for determining the interfacial bond strength for 0.5 to 1.00 mm diameter fibres embedded in cements, plasters or resin matrices, is described. Results show that bond strength between E-glass fibres and cement is the same order as that between steel and cement, but higher than reported values for asbestos in cement. Also bonding between E-glass and gypsum plaster is similar, but is significantly affected by variations in the water/plaster ratio.

- 49 U.S.S.R. PATENT NO. 235,122. ELECTRICALLY INSULATING
LACQUER. L. T. Ponomarev and N. V. Stavrcvietskaya.

An electrically insulating lacquer suitable for the application on asbestos-glass fabrics comprises a fluorine-containing rubber, fillers and vulcanising agents. The manufacture of the lacquer comprises preheating the rubber to 300°C with exclusion of air, and then dissolving in rubber in methyl methacrylate, butyl phthalate or dicryl sebacate. Then the remaining components are added.

PART 6. PLASTIC BUILDING MATERIALS AND PIPES.

- 50 SOLID PLASTICS ACHIEVEMENT AT THE BUILDING EXHIBITION.
 British Plastics, Dec. 1969, p.101,102.

The solid achievement of plastics penetration into the building industry was the keynote of the Building Exhibition at Olympia last month. Especially striking was the substantial representation of rainwater and soil systems in rigid PVC; these systems are now available in such a diverse range of shapes that the requirements of the most revolutionary architect, one feels, could scarcely fail to find satisfaction. A new trend however at the show was the number of underground drainage components that are now being launched. These are a natural progression from the success of rigid PVC in soil systems. They have weight, cost, installation and other advantages in addition to their intrinsic corrosion resistant properties. Provision is made for connections to plumbing services through purpose-built adapters which fit into soil and rainwater systems. Typical of these underground systems was one, shown by Hepworth Iron with a polyester/glass inspection chamber with 18 in. dia. supplied with a cast iron lid and structural frame. Standard depths of 24 in. and 36 in. are available but such is the flexibility of this plastics chamber that it can be simply hack-sawn to depth on site. Another interesting rigid PVC product was Plasduct rigid PVC square and rectangular hollow sections exhibited by Muntz and Barwell, Alexandra Works, West Bromwich. On the BXL stand, in addition to the familiar range of building applications for plastics there were two novel items. One was a protective grease formulated from phenolic resin and zinc powder used for protecting steel rope which has been proved, it is stated, on a recent large Danish bridge contract. The other was a polyester based gap filling adhesive for nosing and insert strip exemplified on the BXL stand bonding aluminium strip to a concrete step. BIP showed a grade of its well-known Filon polyester/glass roofing sheet specifically developed for improved light diffusion as well as double roofing sheet for insulated rooms. The light transmission of high diffusion grade is of the order of 72% and it conforms to B.S.4154: 1967. Also shown were techniques of applying urea formaldehyde foam which seems to be gaining favour currently in combating serious condensation on interior walls. With the exception of the gable cavities the whole work can be carried out outside the house with little disturbance to its occupants.

- 51 BRITAIN'S LARGEST PLASTICS SUBMARINE PIPELINE. Pipes & Pipelines International, Dec. 1969, Vol. 14, No. 12, p. 26.

A submarine pipeline project recently completed by Land & Marine Contractors Ltd. at Lough Neagh, N. Ireland, for British Enkalon Ltd. is said to be the first of its kind in Britain to use large-bore plastic pipe. More than 2000 ft. of 32 in. dia. high density polyethylene pipe was used on the project.

- 52 PLASTICS PIPES. Pipes & Pipelines International, Nov.1969, Vol.14, No.11.

The British Standards Institution has published a revision of BS3867: Specification for dimensions(outside diameters) and pressure ratings of pipes of plastics materials which is intended to act as a basis for specifying the outside diameters and pressure ratings of plastics pipe in other British Standards wherever this is practicable. It is also intended to act as a guide to manufacturers and users for pipes not specifically covered by other British Standards.

PART 7. ASBESTOS PACKING, SEALING & COATING COMPOSITIONS.

- 53 FRENCH PATENT NO. 1,522,850. POLYETHYLENE-POLYPROPYLENE COATINGS. Kalle A.G.

Composite sheets suitable for use as firmly adhering coatings for metals, glass, asbestos, etc., are prepared from polypropylene films (m.p. = 100-110°C), which is pretreated by flaming, electrical discharges, u.v. irradiation, ozonising, vapour-halogenation, or modification with chromic sulphochromic acids, to improve its adhesive properties.

- 54 U.S.S.R. PATENT NO. 237,674. EMULSION MASTICS. O. T. Pavlyuk et al.

Emulsion mastics of improved physico-mechanical properties are prepared by first heating the organic binder, e.g. petroleum bitumen, to a temperature at which its viscosity is $10^3 - 10^4$ pdses, and then introducing the binder into a preliminarily prepared aqueous suspension of a solid emulsifier and asbestos fibres, having a density of 1.35 - 1.50 g./cm³. The mixture is stirred at 15-100°C. Clay, argillaceous soil or slaked lime can be used as an emulsifier. The mastic may be diluted with water prior to use.

- 55 FACTORS AFFECTING THE STRENGTH OF PARONIT. G. V. Poroshin et alia. Proizvod. Shin, Rezinotekhn. i Asbestotekhn. Izdelii, 1968, No.2, 6-8. Ref.Zhur.Khim., 1968, 20S797.

The strength of Paronit (rubberised asbestos) is increased by rolling. The strength is also affected by the nature and amount of the binder (optimum 15-16%) and of the filler. The best results were obtained using carbon black and hematite as fillers.

PART 8. ASBESTOS PAPER & HEAT INSULATING MATERIALS.

- 56 GERMAN PATENT APPLICATION NO. 1,906,746. HEAT-INSULATING MATERIAL. Newalls Insulation & Chemical Co.

Heat-insulating material with improved dimensional stability, for use at high temperatures, is produced from calcium silicate reinforced by addition of approximately 15% of asbestos fibres. The material is heated at a temperature, at which it is to be used, until changes in physical and chemical properties associated with shrinkage are terminated. The density of the material is 192 kg/m³.

- 57 FRENCH PATENT NO. 1,538,743. ASBESTOS-REINFORCED PAPER. Union Carbide Corp.

Packaging paper with improved physical properties is produced by coating paper sheets (prepared e.g. from groundwood and coniferous wood) with a composition containing asbestos or serpentine chrysotile and a binder, such as a styrene-butadiene latex. Fillers, such as clay, and pigments, such as titanium dioxide, may be added. Advantageously, two successive layers are applied; the top layer may contain 85% of asbestos, whereas in the inner layer fillers are included and the binder content is higher.

- 58 U.S. PATENT NO. 3,441,472. GLASS FIBRE-ASBESTOS WATER-LAID SHEETS FOR USE IN PRINTED CIRCUITS. Hollingsworth & Vose Co.

Printed circuits boards can be manufactured from water-laid paper sheets prepared by mixing an aqueous asbestos fibre dispersion with a binder dispersion having negative charges on its particles, and then mixing the resulting dispersion with another aqueous dispersion containing glass strands and reinforcing glass monofilaments, forming a web from the mixture and drying. The web may be sprayed with e.g. - aminopropyltriethoxysilane before heat-curing. The sheets so produced have excellent dielectric properties and good mechanical strength.

PART 9. REFRACTORY FIBRES.

- 59 U.S. PATENT NO. 3,418,076. PRODUCTION OF ALUMINA WHISKERS. Lexington Laboratories Inc.

Alumina whiskers are grown by vapour-deposition on Al₂O₃ nuclei vibrated in a carrier gas mixture containing CO and CO₂. The size of alumina particles is 5 - 10 microns. The length of the whiskers reaches 0.75 in.; the diameter is about 7 microns, and the tensile strength is 1.8 - 2 x 10⁶ psi.

- 60 WHISKER-MATRIX BONDING AND INTERACTION. S. M. Wolf and A. P. Levitt. U.S. Clearinghouse Fed. Sci Techn. Inform., AD-682005, 1968.

Factors affecting whisker-matrix wetting, bonding and interaction are discussed. The bond must be strong enough for load transfer from the matrix to the fibre and stable; it should not adversely affect the fibre or the matrix. As an illustration, alumina and silicone carbide whiskers in metals are discussed in detail.

- 61 X-RAY INVESTIGATIONS ON THE GROWTH OF CADMIUM WHISKERS. A. R. Verma and S. Peneva, J. Cryst. Growth, 1968, 3-4, 700-704.

Cadmium whiskers grown in vacuum (10^{-6} mm.Hg.) and in an inert atmosphere were studied by the x-ray method. Addition of a small amount of tin promoted the growth of the whiskers.

- 62 BRITISH PATENT NO. 1,142,083. MAGNESIUM CASTINGS REINFORCED WITH SILICON CARBIDE WHISKERS. Dow Chemical Co.

Reinforced magnesium of Mg-base alloy castings are produced by pouring the metallic melt into a hot mould containing a felted mat of SiC whiskers (10-40% by volume). The whiskers are preferably 50-500 micron long, 0.3 - 3 micron thick. They are matted by suspending in alcohol and filtering. The mould and the whiskers are preheated to 760°C. Up to 2 hours are allowed for the melt to completely infiltrate the whiskers. With the addition of 10% of whiskers, the tensile yield was 15,800 psi; the ultimate strength 16,900 psi; the compression yield strength 23,000 psi; and the compression ultimate strength 44,000 psi.

PART 10. MISCELLANEOUS.

- 63 U.S. PATENT NO. 3,440,072. AMMUNITION CARTRIDGE WADS. Remington Arms Co.

Ammunition cartridge wads are produced by blending at an elevated temperature asbestos (preferably 40%) with a filler (pref. 60% of wood flour) with addition of a wax binder (pref. 8% with respect to the total weight of asbestos and wood flour). The composition is heated preferably to 180-200°F. Calcium resinate may be added in an amount of 4-5% by wt. Water is added to bring the moisture content to 4-6.5%. The resulting material is impermeable for gases.

- 64 BRITISH PATENT NO. 1,099,145. HOT BLAST STOVE. Yawata Iron & Steel Co. Ltd.

A hot blast stove wherein the adiabatic refractory and compressible material is blue asbestos.

- 65 DETERMINATION OF POLYMER CONTENT BY PYROLYSIS-GAS CHROMATOGRAPHY. J. D. O'Neil. J. Compos.Mat.,1968,2,No.4,502-505.

The phenol content of a phenolic novolak-asbestos composite was determined by pyrolysis-gas chromatography. The errors were less than 1%. The method is more convenient for the determination of the resin content of asbestos composites than the conventional ashing techniques.

- 66 JAPANESE PATENT 1731/68. METAL CASTING PROCESS. Union Carbide Corp.

A metal casting process comprises using a liquid vehicle mixed with finely pulverised asbestos. There is an asbestos fibre-containing layer between the casting and the mould wall.

- 67 NETHERLANDS APPLICATION 6,709,091. CASTING MOULDS. H. J. Danssan.

Casting moulds for ferrous metals are prepared from a composition comprising 5-25 wt.% of a porous particulate refractory material, such as expanded perlite or globular alumina; 50-80% of a non-porous particulate refractory material, such as silica sand, magnesia etc; 5-25% of a fibrous refractory material, such as asbestos or glass fibres; and 2-12% of an organic and/or inorganic, synthetic or natural binder, such as sodium silicate, phenol-formaldehyde resin etc.,

PART 11. REVIEW OF JOURNALS.

"ASBESTOS", September 1969.

131 North York Road, (P.O.Box 471) Willow Grove, Penn.19090,U.S.A.

- 68 CAREY-CANADIAN MINES USES ONE TRACTOR SHOVEL TO MINE 2 PITS, p.2.
 69 ASBESTOS AND APOLLO 11, p.8.
 70 MARKET CONDITIONS, p.20.
 71 BUILDING, p.26.
 72 PRODUCTION - IMPORTS - EXPORTS, p.36.
 73 ASBESTOS PRICES, p.52.
 74 ASBESTOS PATENTS, p.54.

"ASBESTOS", October, 1969.

- 75 RESEARCH-BASED DEVELOPMENT OF ASBESTOS PRODUCTS, p.2.
 76 ASBESTOS HILL PROJECT, p.20.
 77 MARKET CONDITIONS, p.30.
 78 PRODUCTION - IMPORTS - EXPORTS, p.38.
 79 ASBESTOS PRICES, p.52.
 80 ASBESTOS PATENTS, p.54.