GM 58590

ASBESTOS MARKET SURVEY, PHASE A FOR THE LAC ROBERGE PROJECT OF RIO ALGOME MINES LIMITED

ASBESTOS MARKET SURVEY

PHASE A

FOR

THE LAC ROBERGE ASBESTOS PROJECT

OF

RIO ALGOM MINES LIMITED

Toronto, Canada
March 22, 1971

Watts, Griffis and McOuat Limited
Consulting Geologists and Engineers

TABLE OF CONTENTS

LIST OF TABLES

Page No.

LIST OF FIGURES

1. SUMMARY

This report describes the results of a survey of world asbestos markets, with particular emphasis on Japan, Europe and North America. Consumers in each of these areas were visited, while a great deal of correspondence was carried out with consumers and government agencies throughout the world.

The uses of asbestos have been outlined and the questions of substitutions and the normal distribution structure discussed. The degree of vertical integration which exists in the industry is quite significant and an outline of this is included.

World production of asbestos has been detailed and estimates have been made of new production likely to be achieved through 1975.

Consumption of asbestos has been studied in detail for Japan, Western Europe and North America. We have shown that growth in Japan makes that market most attractive. The European market is more variable, but we have pointed out the opportunities which exist with various companies in different countries.

North American asbestos consumption is rather stagnant and minimal growth is expected. Nevertheless, the market is large, and even minor growth results in meaningful additional tonnage requirements. Also individual companies can be identified which are more optimistic and these represent possible market opportunities.

Our study of prices indicates that real growth in prices has taken place and that they will continue to at least meet inflationary trends. At the present time, there is a certain amount of discounting being practised. However, we feel that this will gradually lessen over the next several years.

Our study of transportation costs indicates that a freight disadvantage, relative to Thetford Mines, of about $5 to $10 per ton will exist for fibre from Chibougamau. These costs can only be defined following negotiation and it is likely that a figure close to $5 will result.

We have concluded that if the Lac Roberge fibre can be successfully treated to meet commercial specifications, that a definite market exists. Supply and demand will likely be in relative balance through 1973. However, by 1975 a shortfall approaching 200,000 tons is indicated. Thereafter the gap in supply and demand will widen unless new productive capacity becomes available. The market opportunity for Lac Roberge fibre therefore exists and every effort should be made so that Lac Roberge is in a position to take advantage of this opportunity.

We now recommend that fibre samples be prepared and sent to some typical consumers. We have presented a recommended list. Once some reaction is received, further investigations and discussions with the more encouraging consumers will be required.

2. INTRODUCTION

This report summarizes the results of an asbestos market survey carried out by Watts, Griffis and McOuat Limited over the past four months. The study was authorized in November, 1970 by Rio Algom Mines Limited to form part of their evaluation of the Lac Roberge asbestos project in the Chibougamau district of the Province of Quebec, Canada.

Our approach to the study has been strongly influenced by the unique features of asbestos marketing. The most significant of these is the importance of technical specifications. Because of the variety of grades and the variety of specifications for these grades which each individual consumer considers important, it was felt that personal contact with major potential consumers was requisite. The following describes the methods used.

1. General statistics have been obtained from standard government sources (Dominion Bureau of Statistics; U.S. Bureau of Mines; Department of Industry, Trade and Commerce, Ottawa; and national customs statistics from various countries) as well as several reliable sources within the industry.

2. The European market was studied during the course of a four-week trip by Ross D. Lawrence. Interviews were held with potential consumers and the information obtained was augmented by data available in the files of Watts, Griffis and McOuat Limited and Rio Algom Mines Limited. Correspondence was conducted with consumers who were not contacted in person. Assistance with this phase was provided by the various Canadian trade missions, both by correspondence and in arranging interviews for Mr. Lawrence.

3. The North American market has been surveyed by Frank Everard through personal visits to key consumption centres in the United States and by correspondence with U.S. government agencies, Canadian trade commissions, and potential consumers and agents.

4. The Japanese market has been the subject of detailed study by Watts, Griffis and McOuat Limited over several years. This information has been updated by correspondence. In addition, Tsutomu Iwasaki visited several major importers of asbestos in Tokyo and ascertained their interest in handling potential Lac Roberge fibre.

5. Other world markets have been studied primarily by referring to Watts, Griffis and McOuat Limited files on the subject, which in many cases were up-to-date and reasonably detailed.

This survey should be considered as preliminary in nature, as was the stated objective of Phase A of the marketing programme. Our recommendations for future market investigations are detailed in Section 10.

3. GENERAL STRUCTURE OF WORLD ASBESTOS MARKET

ASBESTOS TYPES

There are three commercially important asbestos minerals. Two are amphiboles (crocidolite and amosite) and while important for certain specific uses, represent a very small proportion of world trade in asbestos.

Crocidolite (blue asbestos) is found in South Africa, where about 125,000 tons are mined annually. It is a fine, resilient fibre which is extensively used in the asbestos-cement industry as an aid to rapid drainage in production processes.

Amosite is also found in South Africa and 100,000 tons are mined annually. It is acid-resistant as compared with crocidolite. As a consequence, several specialized product applications have been developed, most notably various industrial insulations.

Chrysotile asbestos is the most common asbestos mineral and represents over 90 percent of world production. It occurs in two forms, either as "cross fibre" or as "slip fibre". The former in which the individual fibres of asbestos are oriented at right angles to the face of the fracture is the form most commonly exploited on a commercial scale.

Slip fibre occurs less frequently but is being recovered from deposits in the United States and Italy and probably soon from a deposit currently being evaluated in Greece. The fibre in such deposits generally lies parallel to the fracture planes but also may be found throughout the rock matrix.

PRINCIPAL SOURCES AND CONSUMERS OF ASBESTOS

Three areas in the world have been traditionally the main suppliers of chrysotile asbestos; the Thetford District of Quebec in Canada, the Brazhenov field in the U.S.S.R. and Rhodesia. Almost all of the amphibole asbestos production in the world originates in South Africa.

Canada's position as the leading producer in the world has been changed as the result of the exceptionally rapid growth of Russian fibre production since the mid 1950's. Today Russia produces almost half of the world's supply of asbestos and consumes about 85 percent of this amount internally. The quantity of fibre that Russia will have for export in future years remains the greatest unknown in attempting to forecast future fibre supply.

It is probable that the U.S.S.R. will maintain its sizeable lead over Canada despite some major expansion projects planned by Canadian producers and the likely commencement of production from other deposits currently being evaluated.

In line with its impressive productive capability, Russia is also the foremost user of asbestos both in terms of total tonnage and per capita consumption.

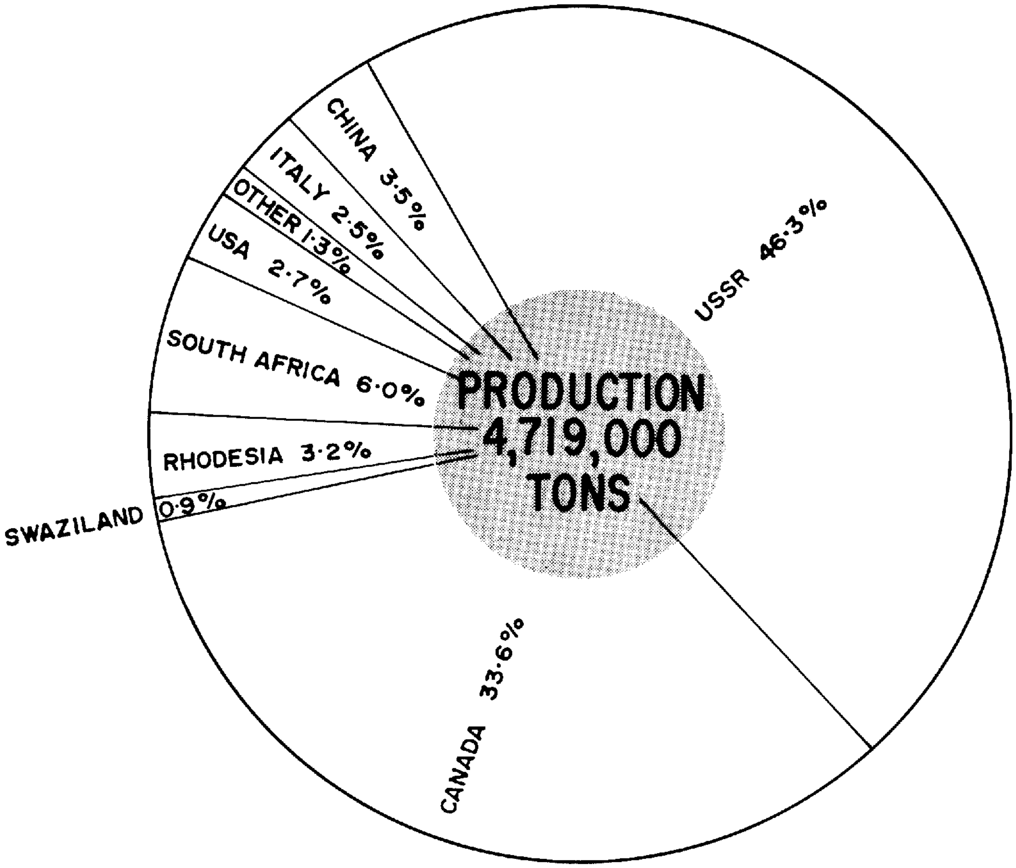
The United States is the second largest consuming nation but its rate of growth as a consumer of asbestos has been slower than that of most other industrialized nations.

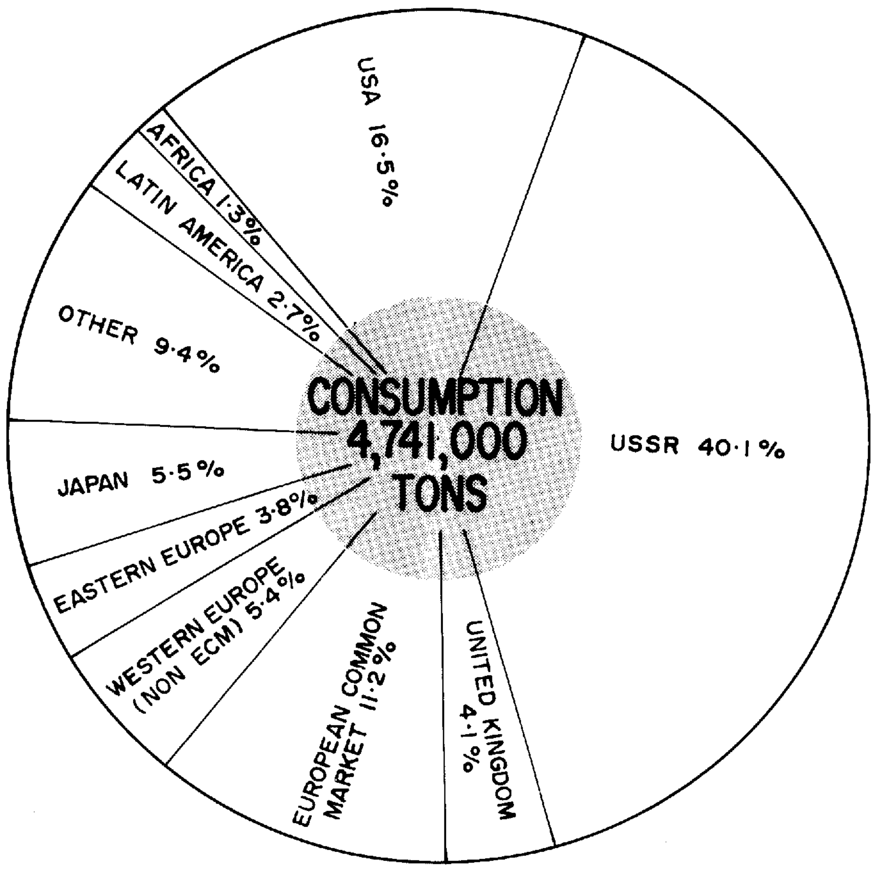
The European Common Market and Japan represent other sizeable asbestos markets. The lesser developed areas of the world in Africa, South America and Asia use asbestos to a lesser extent than the industrialized nations. This will undoubtedly change with the development of these countries and with the availability of fibre from an increased number of sources in various parts of the world.

A summary of the principal sources and consumers of asbestos by geographical area is given in Tables 3-1 and 3-2. This is also illustrated graphically in Figure 3-1.

USES OF ASBESTOS

It has been estimated that there are over 3,000 uses for asbestos. Beginning with the limited use of long fibres for textile applications less than a century ago, product research in the past 50 years has been responsible for this remarkable range of uses. Since the Second World War, the most dramatic growth has been in the use of asbestos-cement products in the construction industry.





PRINCIPAL ASBESTOS PRODUCING AND CONSUMING AREAS OF THE WORLD-1969

FIGURE 3·1

TABLE 3-1

WORLD ASBESTOS PRODUCTION - 1969

Short Tons

Countries	Tons
Russia	2,200,000
Canada	1,596,000
South Africa	260,000
Rhodesia	150,000
China	150,000
United States	127,000
Italy	100,000
Swaziland	40,000
Finland	35,000
Cyprus	21,000
Japan	20,000
Brazil	10,000
Yugoslavia	10,000
TOTAL	4,719,000

The major application areas for asbestos are identified in Figure 3-2 both on the basis of dollar value and tonnage of asbestos consumed.

Broadly speaking, the development of the wide range of applications can be separated into two principal groups:

1. Those applications in which the heat and fire-resisting properties of the asbestos fibres are of prime importance.

2. Those in which the asbestos fibres are combined with cement, the asbestos acting as a reinforcing material. Fire-resisting properties are a secondary consideration.

TABLE 3-2

SUMMARY OF WORLD CONSUMPTION OF ASBESTOS

1969 - Short Tons

Country		Tons
North America		
Canada	70,000	
United States	784,000	854,000
Latin America		
Mexico	41,000	
Brazil	31,000	
Colombia	13,000	
Argentina	18,000	
Other	23,000	126,000
European Common Market		
France	147,000	
West Germany	180,000	
Italy	108,000	
Belgium-Luxembourg	71,000	
Netherlands	23,000	529,000
United Kingdom		193,000
Other West European Countries		
Spain	94,000	
Denmark	27,000	
Austria	38,000	
Sweden	18,000	
Switzerland	17,000	
Norway	8,000	
Other	55,000	257,000
Eastern Europe		180,000
Russia		1,900,000
Asia		
Japan	263,000	
China	165,000	
India	44,000	
Israel	10,000	
Other	100,000	582,000
Africa		60,000
Australia		60,000
TOTAL		4,741,000

In the first group are included such materials as asbestos yarn, asbestos cloth, plaited gland packings, asbestos rope for pipe wrappings, brake band and clutch linings, together with sheet packing for engine and pipe joints, mill-board and asbestos paper. The second group incorporates asbestos-cement sheets, tiles and slates in a wide variety of form and colour, and an extensive range of pipes, fittings and moulded products.

Briefly described below are some of the major uses for asbestos.

Asbestos-Cement Products

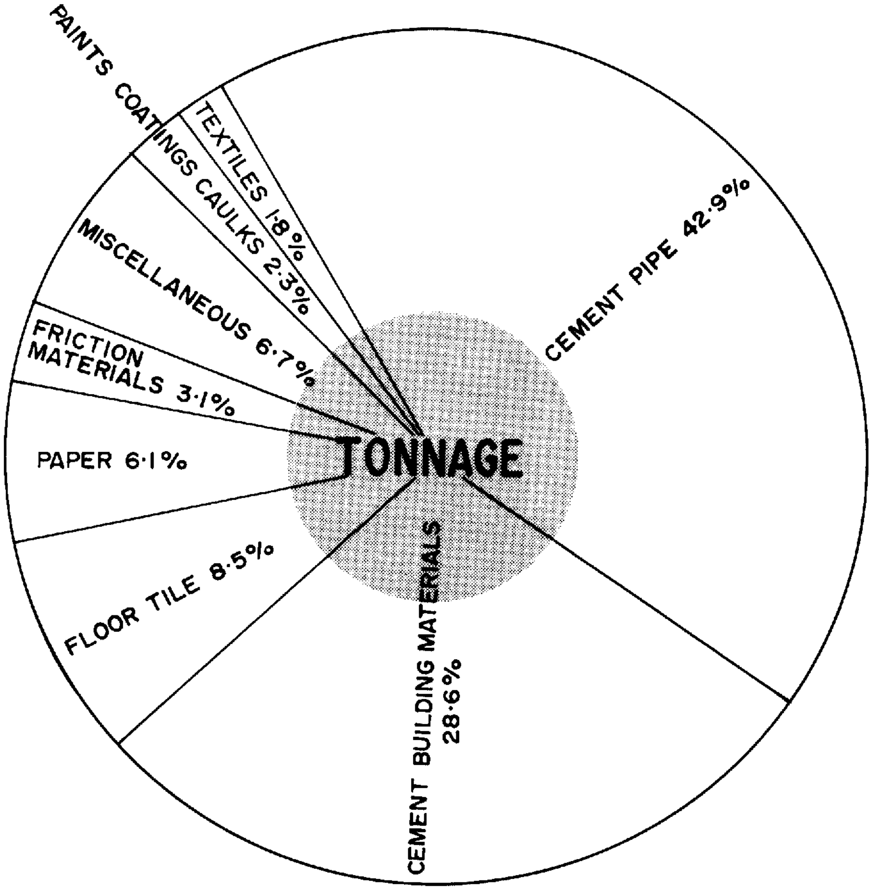
The asbestos-cement industry is the principal consumer of asbestos both in terms of tonnage and dollar value. Most countries of the world have one or more asbestos-cement operations which can be broadly classified as asbestos-cement pipe or asbestos-cement building material plants.

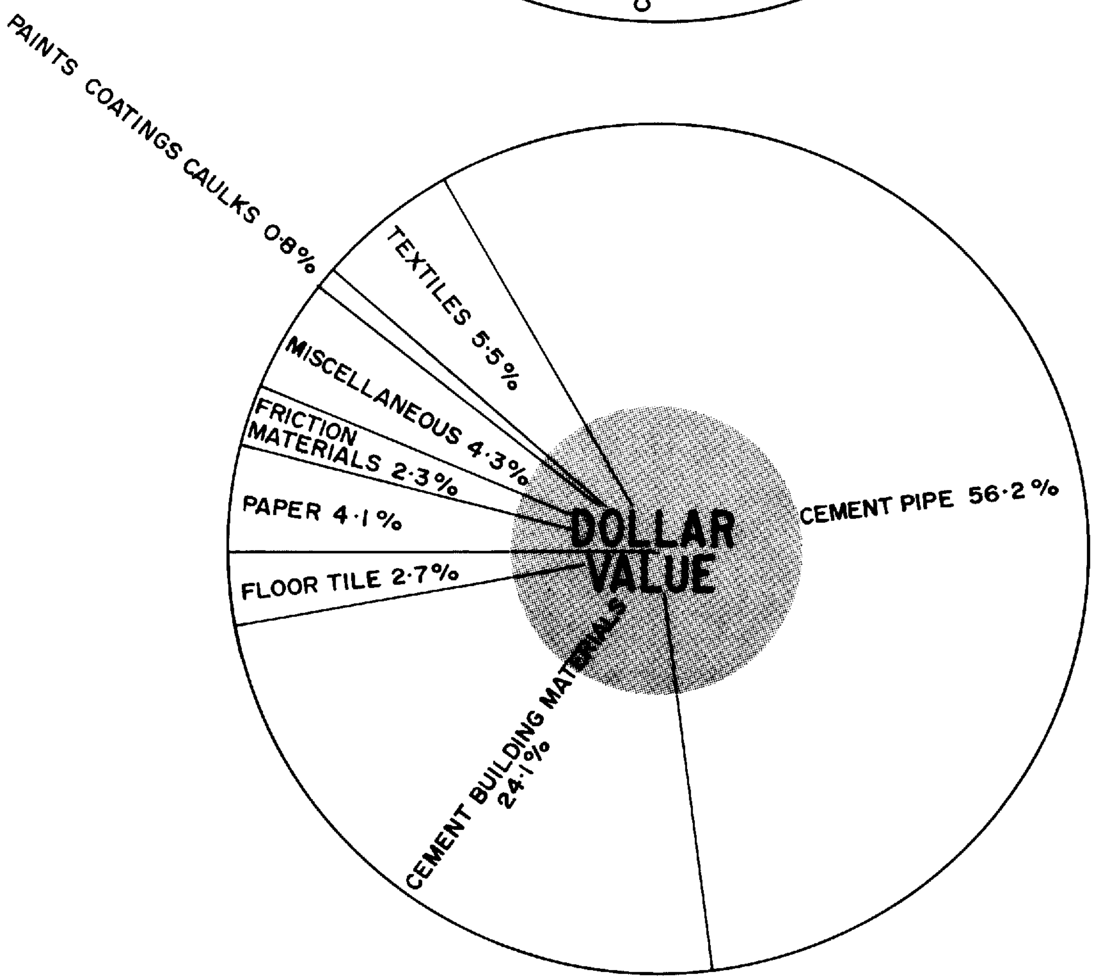
(a) Asbestos-Cement Pipes, Conduits and Ducts (42.9% of asbestos consumption)

Asbestos-cement piping, in diameters ranging from two inches to over seven feet, is used because of its resistance to corrosion and electrolytic action, its light weight and ease of installation, and its excellent strength properties. It is competitive with other types of piping and has replaced cast iron pipe in many fields.

In the making of asbestos-cement pipe, a mixture of Portland cement, silica and additions of 15 to 20 percent asbestos by weight are thoroughly mixed with water and formed around a rotating mandril. As the time required for manufacture is governed largely by the drying period, the use of asbestos with rapid filterability is vital. In another relatively new asbestos-cement pipe manufacturing process, the pipe is extruded from a dense mix containing group 5 fibres instead of the more expensive group 4 currently being used in the rotating mandril process. This trend of using shorter grade asbestos fibre for the manufacture of pressure pipe should lead to increased demand for these fibres and tend to reduce the growth in demand for group 4 fibres.

Another factor which asbestos-pipe manufacturers will have to contend with is competition from extruded PVC pipe. This subject is discussed in more detail in the section on "Substitution".





WORLD USAGE OF ASBESTOS

FIGURE 3-2

(b) Asbestos-Cement Building Materials (28.6% of asbestos consumption)

The weather and fire resisting properties of both cement and asbestos, along with their adaptability to mass manufacturing processes using unskilled labour and having consequently a low cost, led to their combined use in a great variety of building materials. These include flat and corrugated sheets and shingles. The asbestos fibres serve as a reinforcing medium for the cement. Depending on the product, the proportion by weight of asbestos to cement may vary from 15 to 90 percent.

Asbestos-cement building products have never been too popular in the United States and Canada because of the many varieties of more attractive building materials available. In other world markets, asbestos-cement products have been able to capture a much larger share of the building materials market. Some of the reasons for the popularity of asbestos-cement products in these markets are: (i) asbestos-cement building products are almost indestructible and are able to stand up to hot and humid weather and termites, (ii) asbestos-cement building materials lend themselves to prefabrication building techniques, (iii) the capital costs involved in setting up an asbestos-cement plant are cheaper than those of a comparable building material plant, (iv) asbestos fibre is the only raw material that has to be imported to supply an asbestos-cement plant, an important consideration for the developing countries which are often hard-pressed for foreign currencies, (v) there is a relatively limited supply of forest resources in many countries, and (vi) asbestos-cement products have a significant price advantage over many competing products.

The greatest growth in the use of asbestos-cement building materials is expected to occur in the developing countries.

Asbestos Textiles - (1.8% of asbestos consumption)

The asbestos textile industry is the major consumer of asbestos fibre groups 1, 2 and 3. The chrysotile content in most asbestos textile products varies from 80 to 100 percent. In the manufacturing of asbestos textile products, the asbestos fibres are separated and spun into strands for weaving much like any other textile fibre.

As a result of competition from heat-resistant synthetic fibres, no significant growth has been experienced in the use of asbestos textiles over the last several years. However, recent manufacturing advances have made it possible to use shorter fibres for textile products and pending the successful marketing of these products, the growth rate in this area could increase from present levels.

Asbestos Paper - (6.1% of asbestos consumption)

Asbestos paper accounts for the fourth largest consumption of asbestos fibre both in terms of tonnage and dollar value. The asbestos content in most papers consists of groups 5 and 6 fibre, which make up from 80 to 90 percent of the end product. The major uses of asbestos papers are as heat and electrical insulators.

Floor Tile - (8.5% of asbestos consumption)

The floor tile industry is the second largest user of chrysotile asbestos in terms of tonnage, but is far down the list in dollar value of fibre used. This is caused by the fact that the floor tile industry uses only the shorter members of group 7 chrysotile fibre and often only the float products. The asbestos serves as a filler and reinforcement media in asphalt, synthetic resin and vinyl asbestos floor tiles and makes up from 15 to 30 percent of the material in the tiles. Colour is an important characteristic when considering fibre for use in floor tile.

Friction Materials and Gaskets - (3.1% of asbestos consumption)

Friction materials and gaskets are the fifth largest consumers of asbestos fibre with respect to tonnage and the sixth in terms of dollar value. A variety of chrysotile grades are used in the manufacture of friction materials. Chrysotile is used in these products because of its heat stability and because it is less abrasive than other heat stable fillers in the same price range. The asbestos content may vary from 30 to 80 percent of the total composition.

One noteworthy trend concerns brake linings. Woven brake linings contain 60 percent asbestos. Moulded brake linings, which are now most common, contain only 30 percent fibre and the grades used are shorter. Disc brake pads, which will probably become universal in the near future, contain only 20 to 25 percent asbestos.

Paints, Roof Coatings, Caulking Compounds - (2.3% of asbestos consumption)

The shorter grades of asbestos are used as an inexpensive filler as well as a reinforcer in paints, roof coatings, caulks, sealants and joint fillers. Usage of fibre for this purpose is dependent upon the source of fibre being close to the market.

Plastics - (0.6% of asbestos consumption)

The shorter grade asbestos fibres are used as fillers in a wide range of plastic products. The high strength and large surface area of asbestos fibre gives it excellent bonding characteristics, which coupled with its high resistance to heat and chemicals, has resulted in the material finding increasing uses in combination with various plastics.

Asbestos in Asphalt Roads - (new use)

The Johns-Manville Corporation has done a considerable amount of test work on asphalt paving mixtures containing group 7D asbestos fibres. The results indicate that the addition of 2 or 3 percent by weight of short asbestos fibres prevents bleeding of the asphalt, increases the impact strength and increases the resistance to cracking due to weathering. It is a little early to tell, but this application could develop a very strong growth rate, particularly in northern Europe and North America.

A recent example of the use of asbestos in road paving is the 3,715-foot long deck of the new "Pierre Laporte Bridge" across the St. Lawrence River at Quebec City. Fifty-eight tons of 7M fibre were mixed in the proportion of two percent, with the asphalt paving material. It is felt that this will increase the life of the pavement by binding the other ingredients, by preventing seepage of the contained oils and by diminishing the porosity.

SUBSTITUTION

Synthetic Asbestos

Synthetic asbestos, while technically possible, has not yet been made commercially and the prospects of producing a saleable synthetic asbestos in the near future do not appear to be very promising. In any event, any immediate substitution would likely be in the longer grades.

Asbestos-Cement Pipe

Competition in the pipe market is probably more severe than for any other asbestos market. Buyers are, on average, more sophisticated and price and technical qualities are more important than esthetic considerations.

PVC pipe is readily substituted for asbestos-cement pipe in the smaller diameters. In Italy, for instance, PVC pipe is cheaper up to 8-inches diameter for low pressure pipe, and up to 6-inches diameter for high pressure and sewer pipe. The same general price relationship is true in most countries. In the larger diameters, cast iron and concrete pipes are competitive in some applications, but asbestos-cement pipe has become traditional in many applications where its physical characteristics are superior. Such markets are not likely to be lost.

Some progress is being made in extruding pipes. This method, which among other factors allows the use of shorter asbestos, shows promise of allowing lower production costs.

Asbestos-Cement Building Products

Corrugated sheet, with its greatest use for industrial roofing and sheathing, is not seriously threatened by corrugated plastic, fiberglass or galvanized steel.

Flat sheets, which are more generally used in housing applications, depend more on the effectiveness of consumer marketing techniques than on technical characteristics, although price is obviously a factor. The use of such products in Europe is much more widespread than in North America, where it is largely confined to shingles. In Europe, many types of sheet have been successfully developed with various finishes and colours. The use of various moulded shapes for window sills, door steps, stairs, etc. is also more widely developed in Europe. Such products are now being made by a few companies using extrusion processes. These processes, while not direct substitution, do allow the use of shorter asbestos grades than formerly.

Alternate Materials

Fiberglass is used as a replacement for asbestos in some applications, chiefly in the field of heat insulation and in the electrical industry. However, fiberglass is not a satisfactory substitute for asbestos in friction materials such as brake band linings, asbestos-cement products, nor in some highly specialized electrical insulation uses.

The development of an alkali-resistant fiberglass reinforcement for cement has been recently announced by Fiberglass Ltd. and the British National Research Development Corporation. Until now, glass fibres have been destroyed by the alkalies released during the curing of cement. Costs for this product have not yet been published, but the manufacturer foresees an application in various building components.

VERTICAL INTEGRATION IN THE ASBESTOS INDUSTRY

Ever since the first commercial exploitation of asbestos fibre in North America, vertical integration has been a major characteristic of the asbestos industry. In this section, some of the major asbestos groups in which vertical integration is most evident are described.

Johns-Manville Corporation

The Johns-Manville Corporation acquired control of the Jeffrey mine in 1916 when the previous operators were unable to exploit profitably what has now become the largest single deposit of asbestos in the world outside of Russia. Prior to the acquisition, the Johns-Manville Corp. had been the prime customer of the mine.

Today the Johns-Manville Corporation is not only the largest producer of asbestos but is also the largest producer of asbestos-based products outside of Russia. A substantial percentage of the production from its mines in Quebec, Ontario and California is consumed in its 46 manufacturing plants in North America and in its plants in the United Kingdom, Europe and Mexico. It is difficult to estimate the exact percentage but some estimates are in the order of 50 percent.

Canadian Johns-Manville is a wholly-owned subsidiary of the American corporation and operates the Jeffrey mine in Quebec and the Reeves Mine in Ontario. Management of Advocate Mines Ltd. in Newfoundland is also the responsibility of Canadian Johns-Manville.

Advocate Mines has an annual production of approximately 65,000 tons and of this amount, Johns-Manville and the Eternit group have agreed to take a minimum of 25,000 tons under an agreement due to expire in 1973. Ownership of Advocate Mines is distributed as follows:

- Canadian Johns-Manville	30.6%
- Amet Corp.	22.0%
- Panec Inc.	8.6%
- Compagnie Financière Eternit S.A.	16.6%
- Public	22.2%

Financing of the Advocate project called for the issuance of preferred stock paying a $4\frac{1}{2}$ percent dividend to the suppliers of finance which were Canadian Johns-Manville, Amet and Eternit. No dividends have as yet been paid to the holders of common equity.

Turner and Newall Ltd.

The Turner and Newall group of Manchester, England, has asbestos interests in Canada and in Africa. Its manufacturing operations are located primarily in the United Kingdom but also in Canada, Europe and elsewhere.

In Canada, Bell Asbestos Mines Ltd. is a wholly-owned subsidiary and has been in operation since 1887. Turner and Newall consumes internally about one-half of the output from the Bell mine and is responsible for marketing of Bell fibre outside of North America.

Cassiar Asbestos Corp. Ltd. may also be considered to have a strong tie to Turner and Newall through the substantial holdings in Cassiar held by Bell Asbestos Mines. Bell Asbestos acts as sales agent for Cassiar in North America while Turner and Newall is the sales agent for Cassiar fibre in most other parts of the world.

Turner and Newall probably are purchasing about 15 percent of Cassiar's production for use in their own plants. Another major consumer of Cassiar fibre and also a shareholder is the James Hardie Asbestos Ltd. of Australia. This latter group will probably be taking even more of Cassiar's production in future particularly with the bringing into production of the Clinton Creek mine and the consequent availability of more asbestos-cement grade fibre.

Management of Cassiar is the responsibility of Conwest Exploration Co. Ltd. Ownership is distributed as follows:

- Bell Asbestos Mines Ltd.	23.4%
- Newmont Mining Corp.	13.2%
- Raybestos-Manhattan Inc.	10.0%
- James Hardie Asbestos Ltd.	6.4%
- Conwest Exploration Co. Ltd.	10.0%
- Central Patricia Gold Mines Ltd.	2.6%
- Public	34.4%

In Africa, Turner and Newall has substantial interests in the Gaths, King and Shabanie mines in Rhodesia and in the Havelock mine in Swaziland. The bulk of production from these mines was utilized directly by Turner and Newall and the remainder marketed through their own sales organization. However, since the advent of economic sanctions against Rhodesia, the United Kingdom is not importing fibre from Rhodesia. It is almost certain, however, that Rhodesian exports have not diminished.

The Eternit Group

The third major group to be considered in the international asbestos market is the Eternit organization. They are most frequently to be encountered in Europe and South America. Manufacturing facilities have been established in the majority of countries on these two continents. As a consequence, the purchasing power of the group as a whole is enormous.

The Eternit group of companies is not as directly involved in the mining of asbestos as are Johns-Manville or Turner and Newall. Minority interests are maintained in many mining operations. While these investments do not usually result in direct management control, the fact of the investment and the personal relationships established usually are sufficient, when combined, to lead to some firm understanding and arrangement on the marketing of the fibre produced.

In Canada, Eternit holds about five percent of Asbestos Corporation Ltd. and 17 percent of Advocate Mines Ltd. The Balangero mine in Italy is probably owned almost 100 percent by the Eternit group. In Brazil, a new mine scheduled to come into production in 1972 is stated to be owned 50 percent by Eternit.

Purchases by the Eternit group are co-ordinated on a world-wide basis and effected through a Panamanian purchasing company. This gives the group tremendous purchasing strength and concurrently makes a precise analysis of the source of supply difficult. However, in total the Eternit group would appear to consume about 310,000 short tons of fibre of which as much as 30 percent may be said to be virtually non-competitive for corporate reasons. At the same time, the group is cost and quality conscious so that an offer of significant cost savings or quality improvement could displace some traditional purchases. Of greater significance though is the fact that Eternit is strong and is likely to be in the forefront in taking advantage of growing markets. A good example is the recently established plant in Libya. Thus, Eternit purchases are likely to grow at a better than average rate in their market areas, and so there is a strong interest in new sources of supply.

Other Vertically Integrated Producers

Carey-Canadian Mines Ltd. is a wholly-owned subsidiary of Philip Carey Corporation of Lockland, Ohio. The parent company is a medium-sized manufacturer of building products. Sales agents are located in many parts of the world.

The Carey mine is particularly noted for the unusual whiteness of the fibre produced. As a result, a substantial proportion of the fibre is used in applications where colour is of prime importance such as for floor tile. Over 60 percent of the asbestos produced at the mine is shipped to the United States but it is not known what portion of this is purchased by the parent company.

Flintkote Mines Ltd. is a wholly-owned subsidiary of the Flintkote Company of White Plains, New York. Flintkote is also a manufacturer of building products and it is probable that the bulk of the fibre production from the mine, the smallest in the Eastern Townships, is purchased by the parent company.

National Asbestos Mines Ltd. is a wholly-owned subsidiary of National Gypsum (Canada) Ltd. which in turn is a subsidiary of National Gypsum Co. of Buffalo, N.Y. Approximately one-third of its production is consumed by the parent company. Other sales are known to be made in Japan and South America.

In Africa, the dominant supplier of amosite and crocidolite, Cape Asbestos Fibres Ltd., is a major consumer of its own fibre in factories in the United Kingdom and Europe. All other fibre producers in Africa outside of the Cape Asbestos group and the Turner and Newall group are believed not to be involved in manufacturing operations.

In the United States, the GAF Corporation is a large consumer of fibre from its mines in Vermont. It is not known what the exact proportion is, but it is known that some fibre is exported to consumers in underdeveloped countries.

No other major producers of fibre with associated manufacturing operations are known.

Independent Producers

In Canada, there are only two major asbestos mining companies which do not possess a high degree of vertical integration. These are Asbestos Corporation Ltd. and Lake Asbestos of Quebec Ltd.

Asbestos Corporation is Canada's second largest producer of fibre after Canadian Johns-Manville. It is controlled by General Dynamics Corporation of New York which has no asbestos manufacturing interests. Eternit of Belgium owns about five percent and while only a minority interest, is an indication of the long and friendly relationship existing between the two companies. It is probable that the bulk of new production from the Asbestos Hill property soon to come into production will be purchased by the Eternit companies in Europe.

Lake Asbestos of Quebec Ltd. is a subsidiary of American Smelting and Refining Company of New York. The mine near Black Lake, Quebec, is operated as a joint venture with United Asbestos Corp. Ltd. of Montreal from whom the original properties were acquired. A wide variety of products are produced and distributed on a world-wide basis. Strict sales agreements have been maintained with key distributors in some countries such as Japan.

Other independent producers are located in Africa, Cyprus, Australia and in the states of California and Arizona. In the majority of cases and particularly where the fibre produced is in strong demand, firm sales agreements are in effect.

Summary

From the foregoing, it should be evident that vertical integrations is an important characteristic of the asbestos industry. The degree of vertical integration varies from one geographical area to another but is probably strongest in North America. This reflects the high proportion of American ownership of the Canadian mines.

In Africa, the proportion of fibre produced which is consumed by parent manufacturing companies is not as great as in North America but nevertheless is substantial.

The strong ties that exist between Asbestos Corporation and Eternit, while not officially vertical integration in the purest sense, must be considered a quasi-form of such.

On the one hand, vertical integration lends support to price stability. On the other hand, it limits the markets available to independent producers.

However, of encouragement to prospective future producers is the fact that more additions to world ore reserves of asbestos are being made by independent mining groups than by the large integrated groups and these deposits will be required to supply much of the assured increase in demand for asbestos.

STRUCTURE OF DISTRIBUTION SYSTEM

Traditionally the major European asbestos consumers have made their commitments to their Canadian suppliers for the following year in October or November. These commitments are rarely in the form of formal contracts, but are based on a background of mutual trust established over a period of years. Such discussions are often carried out in person either in Europe or Canada so that a strong personal relationship has developed between executives of the major consumers and the major producers of fibre.

However, these same major producers have a wide network of agents throughout the world. In many cases, the agency agreements exclude the major consumers.

The smaller and newer Canadian producers find themselves filling the smaller orders and the spot sales.

This pattern is somewhat different in the case of Japan. Here the major importers are the Japanese trading companies who generally have exclusive agency agreements with a single supplier. Fibre is distributed by them to the many Japanese manufacturers of asbestos products. However, this structure is now beginning to change as it is not uncommon for a trading company to act as agent for a Canadian mine and also to import Russian fibre.

In the case of purchases from Russia, these are generally made on a spot basis, or by a definite contract over a short period of time. A contract for 90,000 tons of Russian fibre has recently been concluded by a major German consumer (Fulgurit). This fibre will be delivered over a period of 18 months.

Virtually, all Canadian production is exported. About half is shipped by rail to customers in the U.S.A. and the remainder is sold overseas. The fibre from Quebec is shipped by sea through the St. Lawrence which is closed to normal shipping for about three months during the winter. This means that shipments are very heavy in October, November and December. As these fall shipments to markets outside North America account for at least 25 percent of annual Quebec shipments, the fibre must be produced and warehoused earlier in the year.

4. PRODUCTION OF ASBESTOS

Asbestos occurs in many countries of the world, yet only three countries account for approximately 90 percent of the world's production. Canada supplies about 35 percent and is by far the world's largest exporter. The U.S.S.R. is the largest producer with 45 percent of the world's production and is also the largest consumer. South Africa is the world's main source of the amphibole fibres, crocidolite and amosite. Table 4-1 lists the production by each country in 1969.

The geographical distribution of producing asbestos mines is rapidly widening as deposits are being brought into production in areas where asbestos production has no past history. Additional deposits are under evaluation. Part of the reason for this trend is the increased utilization of asbestos-cement products in the less industrialized countries. Another major factor responsible for the increased attention being given asbestos is the realization by mining companies of the rapidly increasing demand for this mineral commodity.

Brief comments on each of the producer nations are given in this section, noting where expansion of output has been announced or indicated.

RUSSIA

It has been extremely difficult to obtain any reliable statistics on Russian production or on what is intended to be produced in the near future. It is known that a substantial increase in output was planned for the late 1960's. Published data on the results of this planned expansion have varied considerably. It is hoped that more reliable data will be available shortly, from enquiries made via various contacts to which responses have not yet been received.

Production in Russia originates from three regions in the country at present, although new discoveries have been reported from other areas. The largest proportion of fibre production comes from the Bashenovo deposit in the Ural Mountains. Several mills are in operation in the district, and the most recent, the Asbiest No. 6 mill began operation in 1969 with a rated capacity of 600,000 tons of fibre per year. Deposits in this region are believed to account for about 80 percent of total Russian fibre production.

TABLE 4-1

WORLD ASBESTOS PRODUCTION - 1969

Short Tons

Russia	2,200,000
Canada	1,596,000
South Africa	260,000
Rhodesia	150,000
China	150,000
United States	127,000
Italy	100,000
Swaziland	40,000
Finland	35,000
Cyprus	21,000
Japan	20,000
Brazil	10,000
Yugoslavia	10,000
TOTAL	4,719,000

In Kazakhstan, the Dehetygara deposit is being exploited at a rate sufficient to produce some 400,000 tons of fibre per year in 1971. It is reported to consist mainly of the shorter grades of fibre.

Near Mongolia, west of Lake Baikal, the Tuvo region contains the newest producing deposit in Russia. This deposit is reported to contain the best quality fibre of any Russian deposit. Production has been expanding steadily since 1966 and additional production is planned. It is probable that Russian sales of fibre to Japan originate from this source.

A new asbestos area is under evaluation in the Burgat region, east of Lake Baikal which presumably would also be exploited with the idea of further export sales to Japan. Other deposits are to be found in the southern Urals and construction has already started at one, the Kiembay deposit.

TABLE 4-2

RUSSIAN FIBRE EXPORTS

Country	Metric Tons	
	1967	1968
Australia	6,500	9,800
Belgium	4,100	5,600
Bulgaria	17,500	20,600
Britain	3,200	2,400
Hungary	12,200	13,800
East Germany	36,500	34,900
Denmark	2,600	3,400
India	8,600	1,000
Italy	9,200	9,900
Cuba	9,900	9,700
Netherlands	1,500	1,100
Norway	1,800	1,500
Poland	24,100	25,600
Rumania	7,200	7,800
West Germany	25,000	38,800
Finland	4,100	1,900
France	38,900	40,200
Czechoslovakia	21,800	19,500
Switzerland	400	2,400
Sweden	5,300	4,200
Yugoslavia	9,800	10,700
Japan	21,500	22,000
Other	13,500	16,800
TOTAL	285,200	303,600

Russian production is currently estimated at 2,200,000 tons. The distribution of fibre by groups is estimated as follows:

Groups 1, 2, 3	- 5%
Group 4	-10%
Group 5	-35%
Group 6	-20%
Group 7	-30%

Exports from Russia are given in Table 4-2. These are believed to be reasonably reliable as they have been checked with several sources.

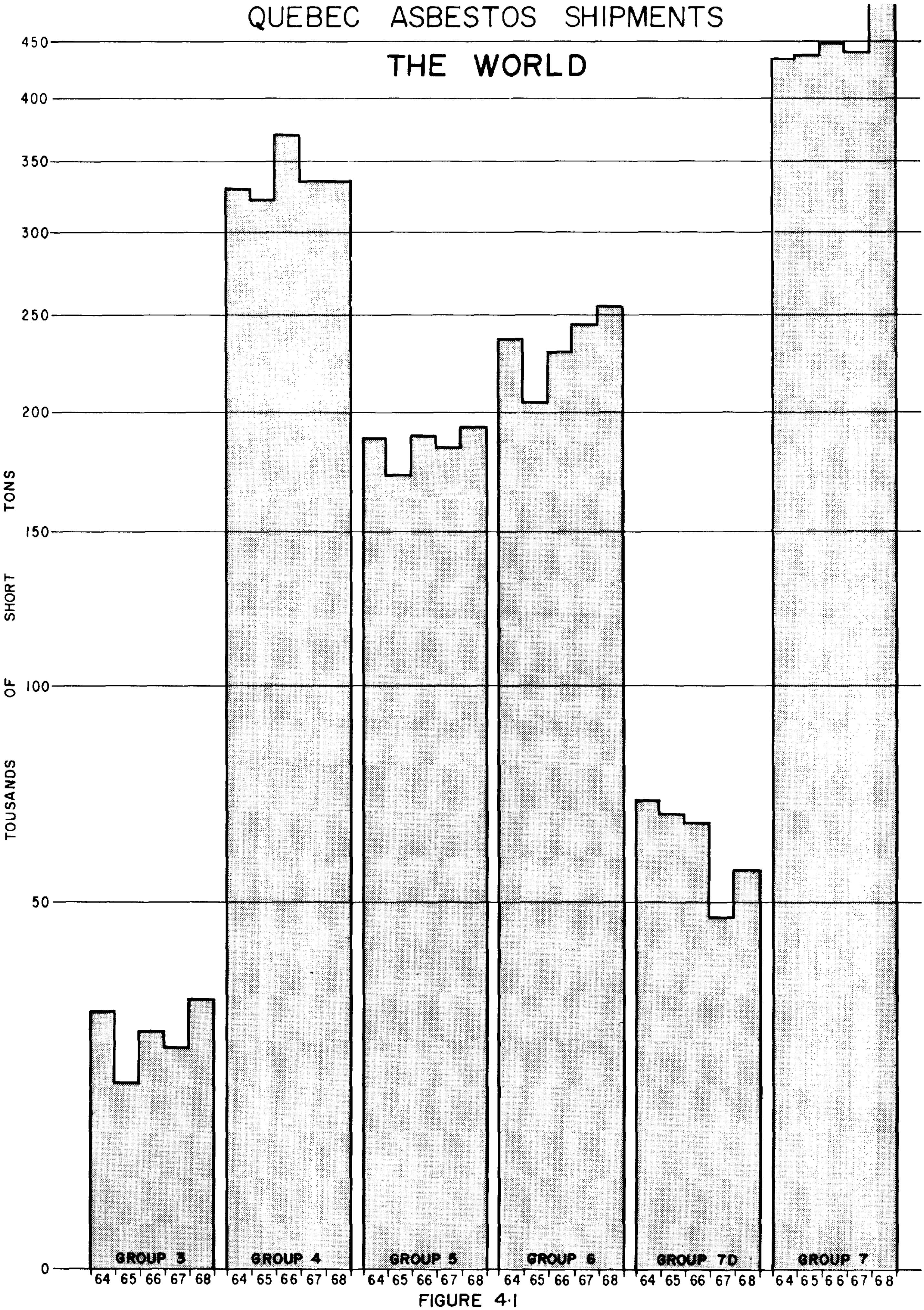
To what extent the pattern of Russian exports will change in the future is most difficult to forecast. It is certain that Russian productive capacity will continue to expand although probably not at the rates achieved in the 1960's. What is not known is whether the domestic consumption will absorb the increased production as planned in Russia, or whether there will be additional quantities available for export.

CANADA

Canada is the largest producer of asbestos with the exception of Russia, but is the largest exporter of fibre with shipments going to over 80 countries in the world in 1969. About 95 percent of total production is exported. There is probably no other single product exported by Canada that receives such a wide geographical distribution.

Shipments of chrysotile asbestos from Canadian producers totalled about 1,650,000 tons in 1969. Over 85 percent of this was produced in the Eastern Townships area of the Province of Quebec by seven companies. Shipments of chrysotile from Quebec for the period 1963-1968 to various geographical markets are shown in Figures 4-1 to 4-6. Other asbestos production comes from mines in Newfoundland, Ontario, British Columbia and the Yukon.

Canadian Johns-Manville operates the Jeffrey mine at Asbestos, Quebec, the Reeves mine near Timmins, Ontario, and has management responsibility for the Advocate mine in Newfoundland.


QUEBEC ASBESTOS SHIPMENTS
THE WORLD
TOUSANDS OF SHORT TONS
450
400
350
300
250
200
150
100
50
0
GROUP 3
GROUP 4
GROUP 5
GROUP 6
GROUP 7D
GROUP 7
64 65 66 67 68
64 65 66 67 68
64 65 66 67 68
64 65 66 67 68
64 65 66 67 68
64 65 66 67 68
FIGURE 4·1

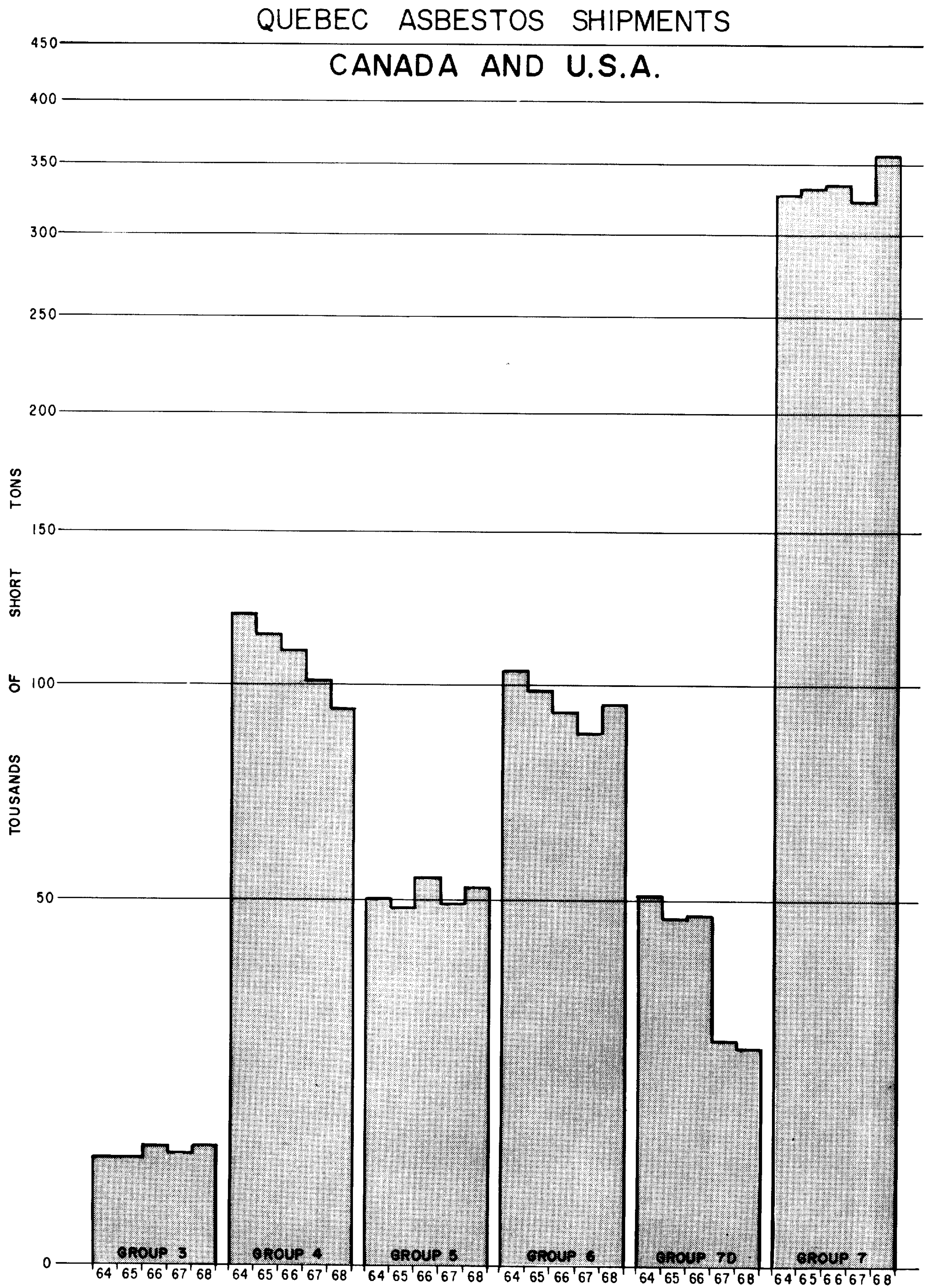
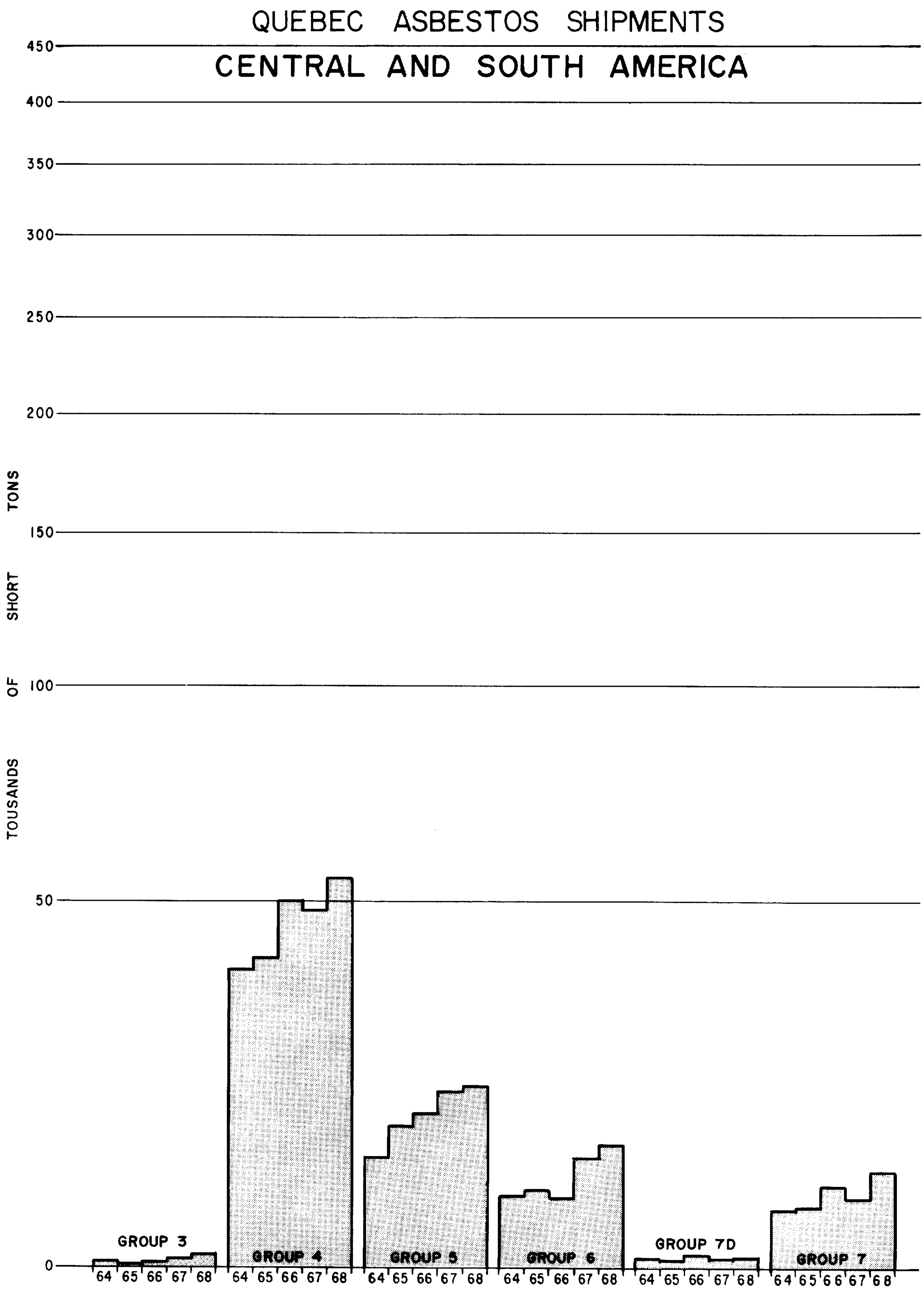

QUEBEC ASBESTOS SHIPMENTS
CANADA AND U.S.A.
450
400
350
300
250
200
150
100
50
0
TOUSANDS OF SHORT TONS
GROUP 3
GROUP 4
GROUP 5
GROUP 6
GROUP 7D
GROUP 7
64 65 66 67 68

FIGURE 4·2



QUEBEC ASBESTOS SHIPMENTS
CENTRAL AND SOUTH AMERICA
450
400
350
300
250
200
150
100
50
0
TOUSANDS OF SHORT TONS
GROUP 3
GROUP 4
GROUP 5
GROUP 6
GROUP 7D
GROUP 7
64 65 66 67 68

FIGURE 4·3

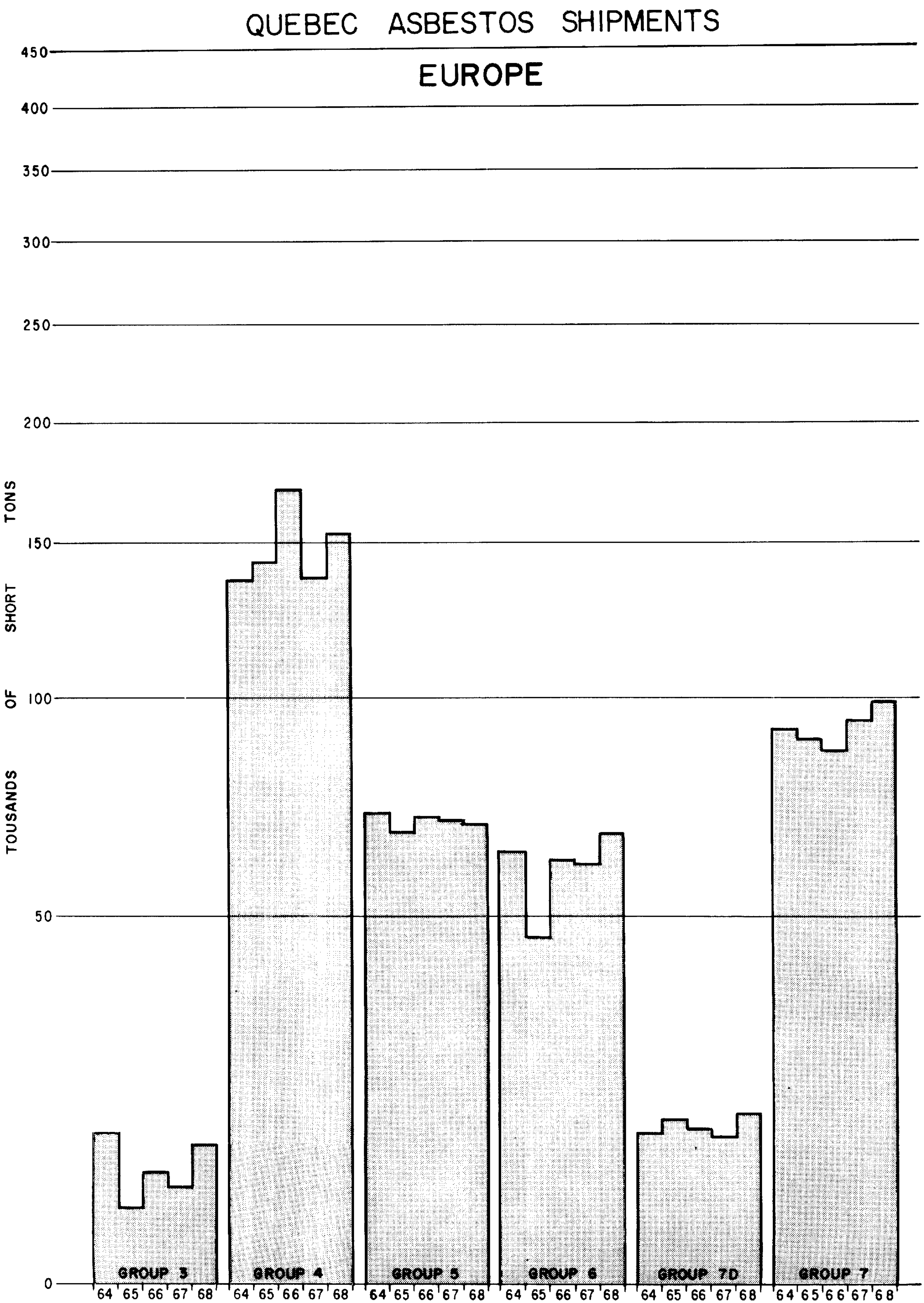

QUEBEC ASBESTOS SHIPMENTS
EUROPE
TOUSANDS OF SHORT TONS
450
400
350
300
250
200
150
100
50
0
GROUP 3
GROUP 4
GROUP 5
GROUP 6
GROUP 7D
GROUP 7
64 65 66 67 68
64 65 66 67 68
64 65 66 67 68
64 65 66 67 68
64 65 66 67 68
64 65 66 67 68

FIGURE 4·4

QUEBEC ASBESTOS SHIPMENTS

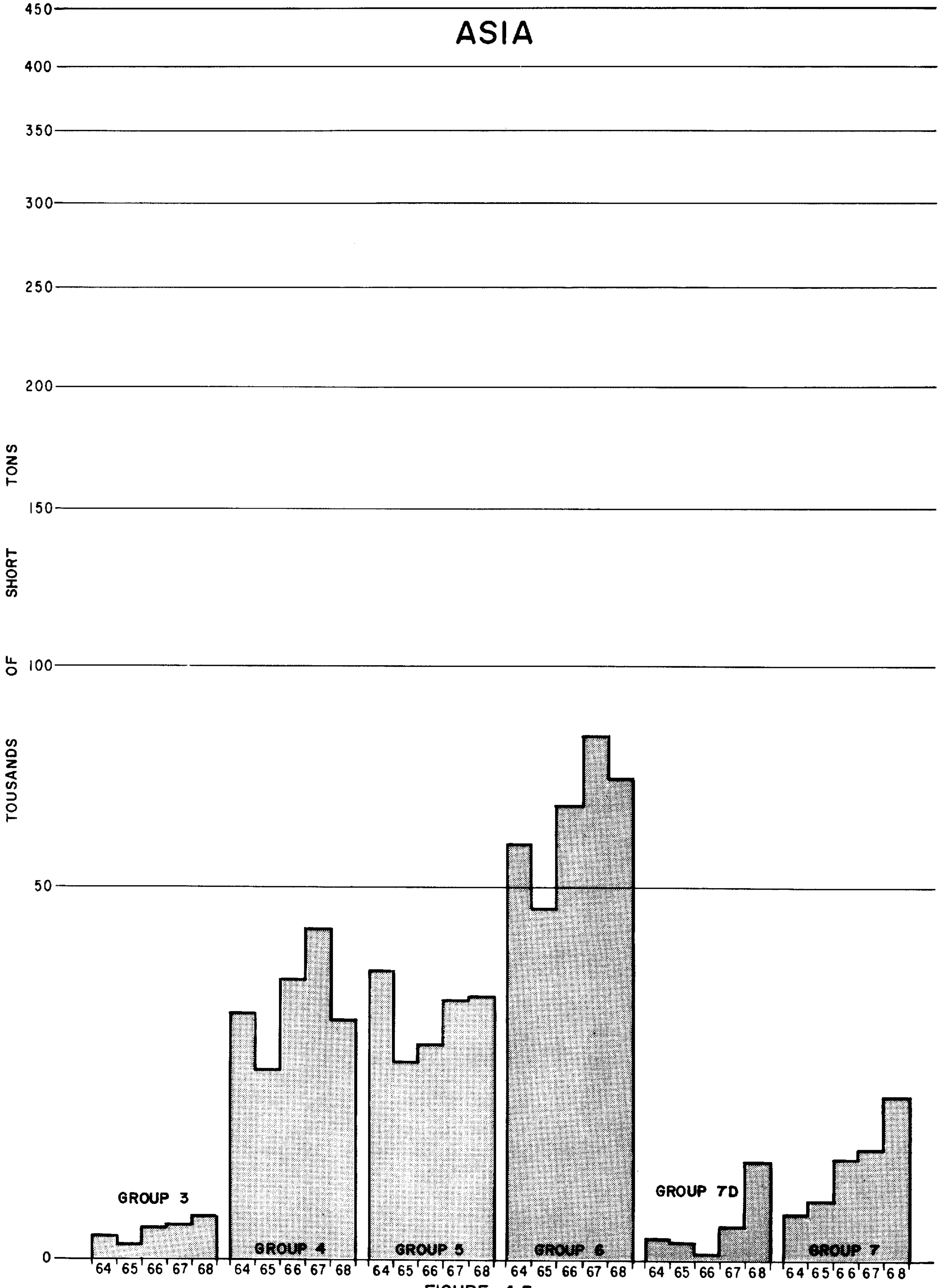


FIGURE 4·5

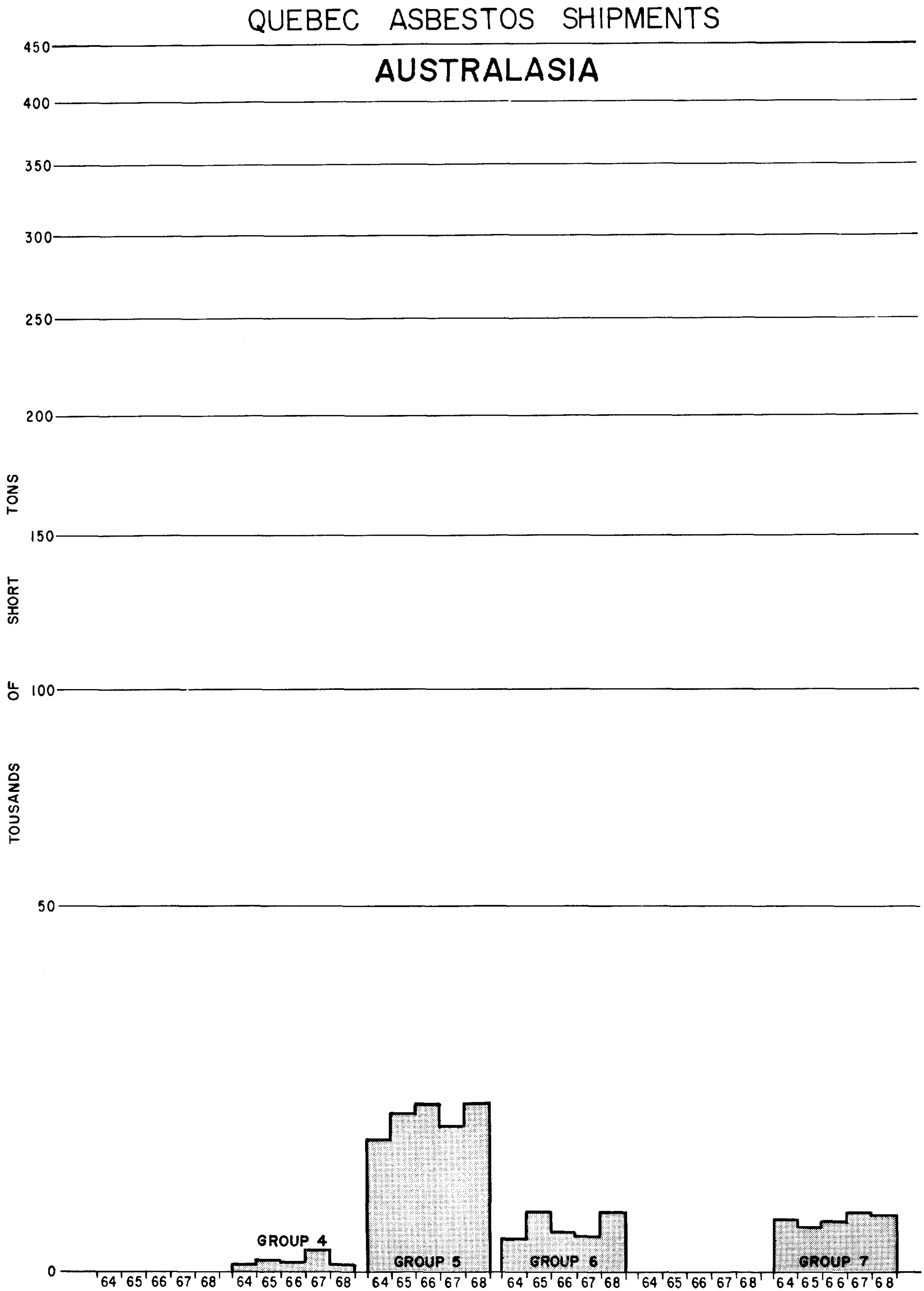

QUEBEC ASBESTOS SHIPMENTS
AUSTRALASIA
450
400
350
300
250
200
150
100
50
0
TOUSANDS OF SHORT TONS
GROUP 4
GROUP 5
GROUP 6
GROUP 7
64 65 66 67 68
64 65 66 67 68
64 65 66 67 68
64 65 66 67 68
64 65 66 67 68
64 65 66 67 68

FIGURE 4·6

The Jeffrey mine is the largest asbestos mining operation in the western world, currently producing 600,000 tons per year with expansion to 700,000 scheduled to be completed by 1972. This will be accomplished by mining at an increased rate using 200-ton haulage trucks and the installation of a new crushing and beneficiation plant. In addition, production of group 6 is to be increased by treating tailings from pre-1930 operations estimated to contain four percent or more of group 6 fibre.

Expansion plans are also underway at Advocate Mines in Newfoundland to raise fibre output from the present 65,000 tons to 100,000 tons. Output from this mine is predominantly group 4.

The Reeves mine in Ontario is currently producing about 35,000 tons annually of groups 4, 5 and 7. No change is expected. Considerable work is planned for 1971 on the further evaluation of the Garrison property near Matheson, Ontario, and a production decision could be made by 1972.

Asbestos Corporation Limited currently operates four treatment mills; the King-Beaver, the British Canadian No. 1 and No. 2, and the Normandie. Ore is provided from three open pits and one underground mine. Production in 1969 was 300,000 tons. The company is currently undertaking a major expansion programme. Expansion of the King-Beaver operation by 50 percent was essentially completed at the end of 1970. The British Canadian and Normandie mills are being expanded and modernized. It is estimated that total capacity will be raised to 375,000 tons by the end of 1971.

In addition, the company is currently constructing a mine, concentrator, and ancillary facilities at Asbestos Hill in Ungava, Quebec, and a finishing mill at Nordenham in northern Germany to produce 100,000 tons of fibre per year. The German mill is scheduled for start-up in August, 1972. However, since mining is not scheduled to begin in Quebec until April, 1972, full production is not likely to be achieved until 1974. During 1973 we would estimate production at about 75,000, while 20,000 tons might be produced in the last quarter of 1972.

None of the other Thetford area producers are planning significant expansion of production, although Bell Asbestos is currently completing a new underground shaft and crushing facilities which will probably result in a modest increase.

TABLE 4-3

ASBESTOS CORPORATION LIMITED

PRODUCTION-1969

Group	Production Short Tons	Percent of Production
1 and 2	75	0.02
3	10,445	3.49
4	100,821	33.74
5	91,092	30.48
6	39,314	13.15
7D	23,756	7.95
7	33,090	11.07
8	211	0.10
TOTAL	298,804	100.00

Cassiar Asbestos continues to expand almost annually. Current programmes will increase capacity at the Cassiar, British Columbia mine to 100,000 tons of groups 3, 4 and 5, operating five days per week. Plans are being made to produce group 6 fibre and a sixth day per week of operations would add an additional 20 percent. Capacity will then be 130,000 tons annually.

At the Clinton Creek mine in the Yukon, equipment is being added to the mill to allow the production of group 6 fibre to raise production capacity to 120,000 tons annually.

Cassiar is also carrying out detailed exploration on two additional properties (Kutcho Creek, British Columbia and Eagle, Alaska) where very encouraging results are being obtained.

A very small asbestos operation is the property of Hedman Mines Ltd. near Matheson, Ontario. The plant treats 300 tons per day and produces only a group 7 product. The ore reserves are small and its profitability is dependent upon a high fibre content. The company has been financed by Gulf and Western Industries.

In the province of Quebec, in addition to the Lac Roberge deposit, there is the Abitibi Asbestos deposit north of Amos, currently being evaluated. One major feasibility report has been prepared and further fibre evaluation and marketing studies are in progress concurrently with negotiations for financing. If a production decision could be made before the end of 1971, it would be 1974 at the earliest before fibre would be available for marketing. The development of the property is hindered by a substantial overburden problem.

Other asbestos properties are being examined elsewhere in Canada but none have reached the point where fibre production in any significant quantity would be available until after 1975.

Distribution of Canadian fibre production among the producing mines is given in Figure 4-7 on the basis of published statistics for 1969 and on estimates for 1975.

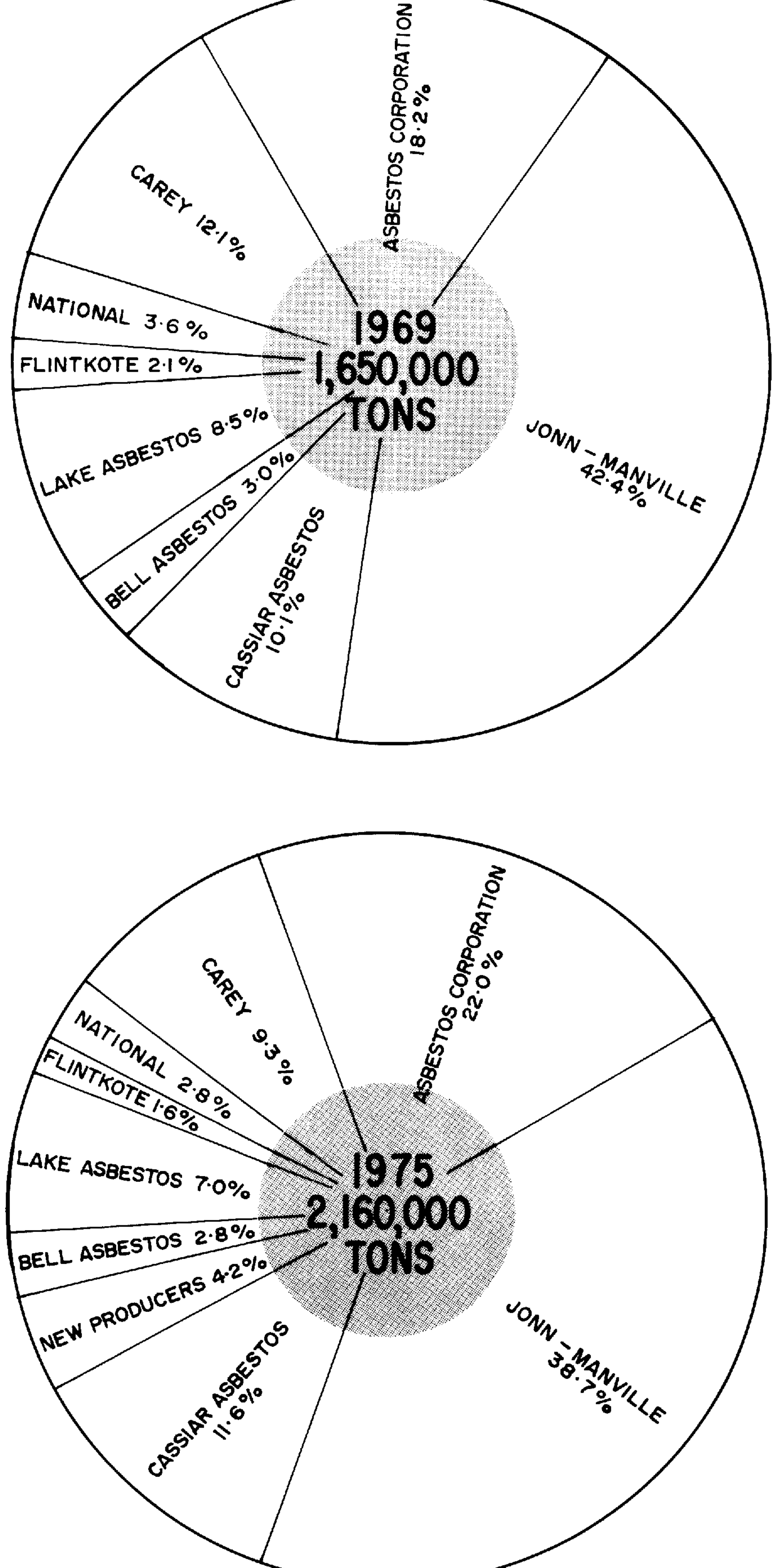
Table 4-4 provides in tabular form the present and anticipated fibre output from Canadian mines.

TABLE 4-4

CURRENT AND ANTICIPATED PRODUCTION CAPACITY

OF CANADIAN MINES

		1969	1973
Cdn. Johns-Manville	Asbestos, Quebec	600,000	700,000
Cdn. Johns-Manville	Timmins, Ontario	35,000	35,000
Advocate Mines	Baie Verte, Nfld.	65,000	100,000
Asbestos Corp.	Thetford Mines, P. Q.	300,000	375,000
Asbestos Corp.	Asbestos Hill, P. Q.	-	75,000
Carey Canada	Thetford Mines, P. Q.	200,000	200,000
Bell Asbestos	Thetford Mines, P. Q.	50,000	60,000
Flintkote	Thetford Mines, P. Q.	35,000	35,000
Lake Asbestos	Thetford Mines, P. Q.	140,000	150,000
National Asbestos	Thetford Mines, P. Q.	60,000	60,000
Cassiar Asbestos	Cassiar, B.C.	88,000	130,000
Cassiar Asbestos	Clinton Creek, Y.T.	80,000	120,000
TOTAL		1,653,000	2,040,000



DISTRIBUTION OF CANADIAN FIBRE PRODUCTION
1969 AND 1975 (ESTIMATED)

FIGURE 4·7

UNITED STATES

Asbestos fibre production in the United States for 1969 was approximately 126,000 short tons having a value of $10,650,000. The low dollar value per ton underlines the fact that the bulk of production originates from short fibre deposits in California.

Pacific Asbestos Ltd., a subsidiary now of the H. K. Porter Co., operates a mine at Copperopolis, California, from which it produces groups 4 to 7 with a capacity of 45,000 tons per year. The mine has never been a profitable operation since its inception, although it is understood that some progress in this regard is being made. Ore reserves are estimated to be sufficient for another 20 years.

The Coalinga region has three producing mines; Coalinga Asbestos (subsidiary of Johns-Manville), Atlas Asbestos, and Union Carbide. All produce groups 7 and 8 fibre that is used almost exclusively in the floor tile and acoustic tile industries. The fibre is in demand because of its low grit content and high colour reflectance. It is able to command a premium and be competitive with Canadian fibre in markets in the eastern United States. Despite the attractiveness of their product, the mines in the Coalinga district have been operating for several years with excess capacity and have not been able to increase their sales significantly. Substantial ore reserves in the order of 100,000,000 tons grading five percent are known to exist.

The Ruberoid mine in Vermont, belonging to the GAF Corporation, has an annual production of about 40,000 tons of slip fibre. It is understood that the parent company requires additional tonnages of all groups in excess of their own production although this has not been confirmed. Consideration has been given in the past to an expansion of output but this would require modifications to the mining method and it is believed that a firm decision has not as yet been made.

A minor amount of production is forthcoming from small deposits in Arizona notable for their long fibre and relatively low iron content. The market for this fibre has largely been taken by fibre from Cassiar Asbestos Corp. Small amounts of anthophyllite are mined in the United States, particularly in Carolina.

No plans have been announced for increased production from the existing mines. No new mines are contemplated in the United States. Consequently, any increase in consumption will have to be almost completely supplied by either the expansion of current producers or the start-up of new mines in Canada.

SOUTH AFRICA

South Africa is unique in that all three major asbestos types, chrysotile, crocidolite and amosite, are produced.

The principal amosite and crocidolite mines are operated by the Cape Asbestos group. Amosite production is currently about 100,000 tons of which over 90 percent is produced from three mines at Penge in Transvaal province.

Crocidolite asbestos production from South Africa is in the order of 125,000 tons annually. One-third of this is produced by the Cape Asbestos group in the northern Cape province at Pomfret, Korgas and Westerberg. The next largest mine is operated by Griqualand Exploration Co. which produces about 30,000 tons annually. Most of the other crocidolite mines are very small operations.

The Msauli mine near Barberton in the eastern Transvaal is the major source of South African chrysotile production. With the erection of a new mill in 1969, the mine now has an annual output of slightly more than 40,000 tons of groups 4, 5, 6 and 7.

For 1969, the production of South African fibre by fibre type is given in Table 4-5.

Crocidolite and amosite from South Africa are exported around the world. The crocidolite is used almost everywhere in asbestos-cement products as a minor constituent to improve the filterability of the cement mix during manufacturing.

The chrysotile from South Africa has found its main markets in Spain, Germany, Australia, United Kingdom and Argentina in that order. The Australian market will undoubtedly be lost with the advent of production from the Woodsreef mine in New South Wales.

TABLE 4-5

SOUTH AFRICAN FIBRE PRODUCTION

1969

Type	Short Tons
Amosite	97,251
Chrysotile	42,540
Crocidolite - Cape Blue	114,370
- Transvaal Blue	6,369
TOTAL	260,530

Table 4-6 gives a list of those countries importing fibre from South Africa together with the quantities. All three fibre types are included.

TABLE 4-6

SOUTH AFRICAN FIBRE EXPORTS

1969

	Country	Tons
Europe:		
	United Kingdom	39,900
	Italy	25,790
	Denmark	13,838
	France	13,724
	Spain	12,083
	Belgium	9,987
	West Germany	6,116
	Netherlands	5,198
	Greece	4,314
	Ireland	3,773
	Rumania	2,815
	Czechoslovakia	2,120
	Poland	1,700
	Portugal	1,465

TABLE 4-6

SOUTH AFRICAN FIBRE EXPORTS

1969

Country		Tons
Europe: (continued)		
	Norway	795
	Sweden	627
	Finland	512
	Austria	465
	Switzerland	105
North America:		
	United States	29,028
	Canada	5,886
	Mexico	4,133
South America:		
	Argentina	2,479
	Chile	1,406
	Colombia	1,170
	Brazil	186
	Venezuela	125
	Guatemala	100
Asia:		
	Japan	47,941
	Turkey	3,233
	Israel	2,187
	Ceylon	481
Australasia:		
	Australia	9,753
	New Zealand	1,950
Other:	(includes Swaziland production)	58,812
TOTAL		306,872

SWAZILAND

Located on the same geological structure as the Msauli mine is the Havelock mine in Swaziland. It is a subsidiary of Turner and Newall. Production has been consistent at 40,000 tons per year of chrysotile fibre, much of which is of spinning quality.

RHODESIA

Since 1965 when Rhodesia became independent it has been impossible to obtain any true production statistics. Capacity is in the order of 150,000 tons annually of low-iron spinning fibre and asbestos-cement grades. The parent company of the three major mines is Turner and Newall and although they have not confirmed the fact, it is widely acknowledged that the fibre is being exported through Mozambique and South Africa. From there it probably gets into the continental European market and possibly South America and Asia.

The fact that the gross value of Rhodesian mineral production has increased since independence is evidence that Rhodesian fibre is still entering world markets.

ITALY

Italian production is virtually all achieved from the Balangero mine near Turin, which is controlled by the Eternit group. The operating company, Amiantifera di Balangero, has recently concluded a modernization programme which resulted in a 15 percent capacity increase to over 100,000 tons annually. Production is believed to be principally concentrated in three grades; 4Z, 5D and 6D. Strength and prices are believed to be about one grade lower, however, as the fibre is a relatively weak slip fibre, if classified according to the Quebec Standard Test.

The fibre content of the deposit is low (thought to be about two percent), and the major reason for its viability is its closeness to markets and consequent freight advantage over all imported fibre.

An asbestos deposit has been reported from Sardinia, but nothing further is known at present.

YUGOSLAVIA

Reports indicate that asbestos milling facilities on a former producing property have been replaced by a new mill stated to have a capacity of 40,000 tons. If this is the case then Yugoslavia will become self-sufficient in fibre and also have some available for export to Eastern European countries.

CYPRUS

During 1969, 12,000 tons of long grade fibre and 9,000 tons of short grade fibre were produced at the Amiandos mine of Cyprus Asbestos Mines Ltd. The company is a subsidiary of F. L. Smidth and Company of Denmark.

FINLAND

Short anthophyllite asbestos is produced by Pargas Kalkbergs Antiebolag which is also the main asbestos consumer in Finland. The bulk of the production is consumed locally and only minor quantities exported.

CHINA

Any estimates about asbestos production in China must necessarily be considered as only very approximate. It is believed that output is in the order of 150,000 tons. Expansion is thought to be underway from the main deposits at Shihmien in Szechuan province. Chrysotile is also produced in Chihli (Hopeh) province and Manchuria. On a per capita basis, the consumption of asbestos in China must be considered as being astonishingly low and provided that proper trading arrangements could be established, it would seem that the new Russian deposits north of Mongolia are situated next to a huge potential market.

JAPAN

Japanese domestic production of asbestos is expected to remain at about 20,000 tons per year of short fibre, predominantly group 7D. Nozawa and Yamabe Asbestos, a subsidiary of Chichibu Cement Company is the operating company. Ore reserves are sufficient for 20 years at the current rate of production and no expansion is planned.

AUSTRALIA

The Woodsreef deposit in New South Wales will be starting production in 1972. Plant construction is presently in progress. Annual production will be 65,000 tons of fibre of groups 4 to 7. Initially 40,000 tons per year will be exported to Japan with the remainder being consumed locally and in other nearby export markets. Generous allowances for expansion have been made in plant design and it is possible that increased output will be forthcoming in 1975, provided that markets are available.

NEW ZEALAND

While not officially announced as yet, there are strong rumours to the effect that Kennecott Copper Corporation has discovered a very promising asbestos orebody in the South Island of New Zealand. It is known that a substantial amount of drilling and test work has already been carried out.

BRAZIL

The largest producer of asbestos in Latin America is Brazil, which produced 10,500 tons in 1969, an increase of 6,000 tons from 1967. The only company operating a mill in Brazil is Sociedade Anonima Mineracao de Amianto, of Salvador, Bahia, which produces short fibre chrysotile.

The company, which is associated with the French group Pont-a-Mousson and with the Eternit group, recently transferred its mill to new chrysotile deposits which were discovered in 1966 in the state of Goias. Production is sold to Brazilian producers of asbestos-cement sheet and products.

A new chrysotile asbestos mining project near Uruaçu, in the state of Goias, has been reported in the press and is expected to raise Brazilian production from 10,000 tons per year to 27,000 tons. This deposit is also owned by Sociedade Anonima Mineracao de Amianto.

Anthophyllite is also found in Brazil. It is produced by several companies and production is in the order of 1,500 tons per year.

COLOMBIA

The Las Brisas chrysotile deposits in the province of Antioquia were discovered in 1964 and evaluation of the deposits has reached the stage where a production decision has been made with the first fibre likely to be available early in 1973. The operating company is Asbestos Colombianos, a wholly-owned subsidiary of Nicolet Industries Inc. and the project is a joint venture with local Colombian interests.

Once full capacity is attained, probably in 1974, output is hoped to be 60,000 tons per year of groups 3, 4, 5 and 6. It is expected that about 15,000 tons will be consumed in the domestic market and the remainder available for export. The prime markets being considered are Japan, South America and Western Europe.

MEXICO

At present, there is no asbestos production in any of the other countries of South America and Central America. However, in Mexico a new company, Cia. National de Asbestos S.A., has been established to develop deposits in the state of Tamaulipas near the town of Ciudad Victoria. Production is scheduled to begin in 1972 at the rate of 300 tons per day giving a probable annual production of 10,000 tons of short fibre chrysotile.

Proven reserves are said to total only 1.2 million tons, but may be larger than five million tons, fibre content being approximately 12 percent. The plant is expected to supply about a quarter of Mexican fibre requirements. The government owns a 51 percent interest in the new company.

Freeport Sulfur Company has a large asbestos property in association with Mexican interests. The reserves are reported to be very substantial with the fibre being of the slip fibre variety. An extensive work programme is believed to be currently in progress.

5. CONSUMPTION OF ASBESTOS

GENERAL

Asbestos consumption in the world increased sharply from 1967 to 1969 as compared to the consumption growth prior to 1967. This is due primarily to the commencement of large scale production from new mines in Russia and the consequent consumption increase in that country.

Using consumption totals for the years 1963 to 1969 as a base period, a rate of growth for world asbestos consumption has been forecasted at approximately five percent per year.

In making forecasts for the growth of asbestos consumption in the major asbestos consuming countries of the world, we have used a forecasting technique which employs exponential smoothing. The utilization of a computer has made possible the application of this technique.

Most commonly forecasting systems use a moving average as the basis for making forecasts. The major weakness in using this approach is that all data in the base period is weighted equally. With exponential smoothing, greater weight is given to the most recent data with less and less weight being given to data as it becomes older. Thus, trends which appear in the most recent data receive the proper emphasis in predicting the future.

There are many instances where forecasts based on mathematical techniques must be tempered by factors which cannot be expressed mathematically. These may include such things as the knowledge of a new mine about to start production in a country where asbestos consumption has been minimal or knowing that a new factory is to be constructed.

Accuracy of data is the most important requirement for good forecasting. A second requirement is that the data not be unreasonably erratic. It is extremely difficult to make a forecast with any meaning if consumption of asbestos is more influenced by the availability of hard currency (in turn dependent on perhaps an agricultural crop), than by the true demand for asbestos. This is particularly true in the case of many countries in Asia and South America. In some cases, consequently, our estimates have been to some extent subjective. However, in the majority of countries and all of the key consuming areas, our forecasts are felt to be soundly based and reasonable.

Microfilm

PAGE DE DIMENSION HORS STANDARD MICROFILMÉE SUR 35 MM ET POSITIONNÉE À LA SUITE DES PRÉSENTES PAGES STANDARDS

Numérique

PAGE DE DIMENSION HORS STANDARD NUMÉRISÉE ET POSITIONNÉE À LA SUITE DES PRÉSENTES PAGES STANDARDS

Statistics on past asbestos production and consumption are available in bits and pieces from a great number of sources. Unfortunately the variability in the data is just as diverse as the number of sources. Consequently, the reader should not be dismayed to find some inconsistency or minor discrepancies in the statistics presented in this report. We feel that these have been kept to a minimum and any major differences have been resolved through additional research and verification.

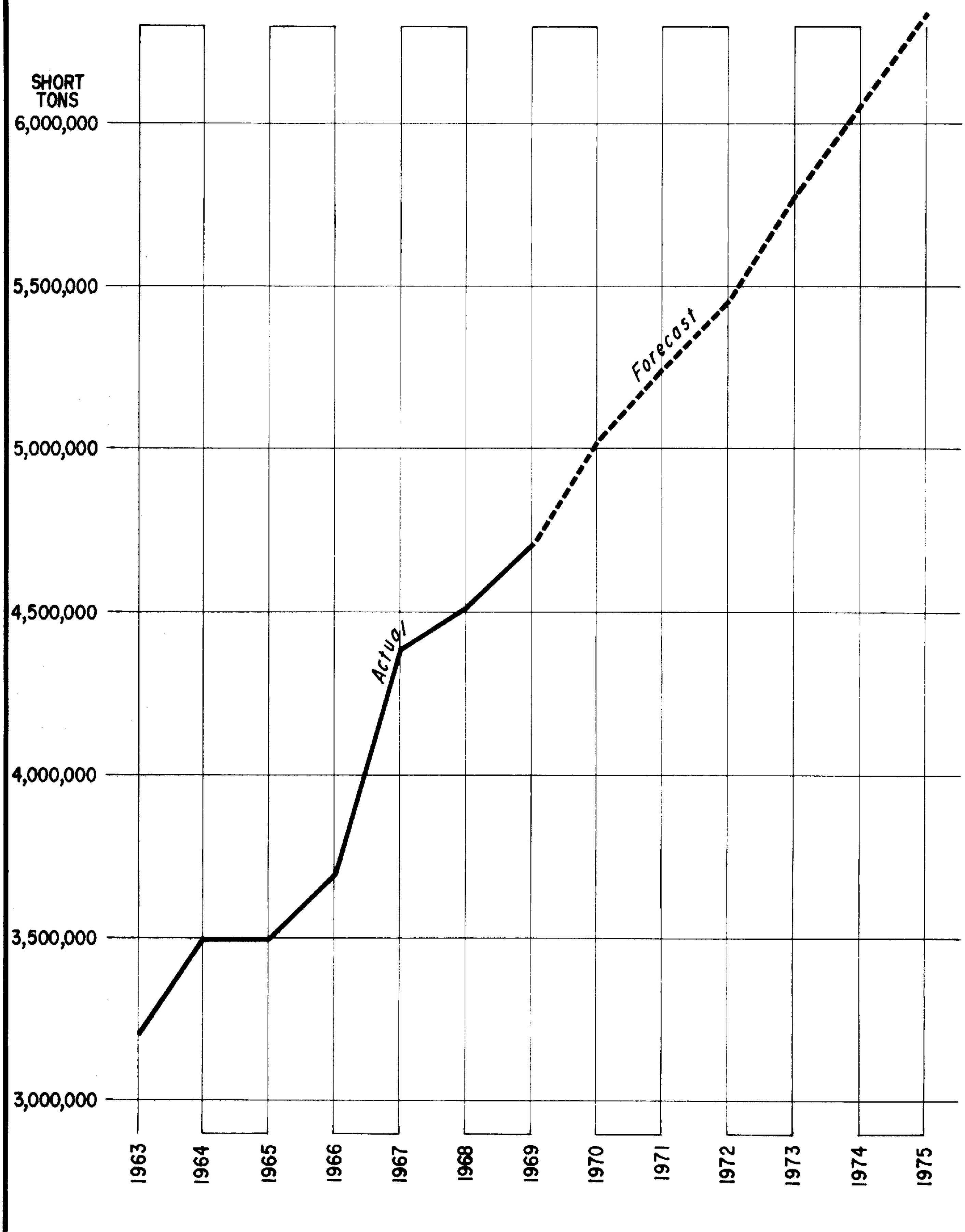
In this section, we have attempted to show the current asbestos consumption pattern in the important market areas with particular emphasis on western Europe, Japan and North America. The availability of detailed data to illustrate these patterns is quite variable, ranging from complete published statistics in Japan to a limited amount of data available for the United States and Canada.

Incongruous as it may seem, one of the most difficult countries for which to try and determine true consumption is Canada. The fact that 95 percent of production is exported with a consequent wide variation in inventories from year to year together with the substantial degree of vertical integration that exists in the industry requires that estimates of past consumption can only be considered as approximate.

For those countries where data is incomplete, we have attempted to extrapolate using various sources of indirect or confidential information. Thus, some of the information shown in this section is difficult to document and may not necessarily agree with some published data.

On Figure 5-1, we have plotted the relationship between Gross National Product per capita and grams of asbestos consumed per capita for most countries in the world. As would be anticipated, those countries with the highest standard of living are also the largest consumers of asbestos. Some peculiar situations can be noted such as Spain which consumes as much fibre per capita as that of many of the more wealthier nations thus indicating that asbestos products relatively speaking are more important or more widely used.

If one was able to predict which economies were likely to exhibit the greatest growth, reference to the chart might indicate the potential for asbestos consumption in those countries. We have made no specific reference to the chart in this report but have included it for general interest.



WORLD CONSUMPTION OF ASBESTOS

FIGURE 5-2

EUROPE

The manufacture of asbestos products in Europe is dominated by two large groups: the Eternit group in western continental Europe and the Turner and Newall group in the United Kingdom.

The Eternit group has control of mines in Italy and Cyprus, and has factories in Germany, France, Belgium, Denmark, Sweden, Norway, Austria, Switzerland, Greece and Italy. The group is also strong in South America and has factories in Libya and Lebanon.

The Turner and Newall group accounts for almost half of United Kingdom asbestos consumption and has some minor interests on the continent.

It is apparent, therefore, that a study of European markets must recognize the importance of these two large international organizations.

Consumption of asbestos in Europe excluding Russia is shown in Table 5-1.

Eternit Group

Purchasing operations of the Eternit group are centralized but the degree of control varies from plant to plant. The major controlling companies for the group are Compagnie Financière Eternit S.A. in Belgium and Amiantus S.A. in Switzerland. It is believed that share control of the various operating companies is maintained by these two parent companies. However, the analysis of the ownership of European companies is difficult and often impossible.

The requirements of each member of the group for the following year are transmitted to Mr. Eric De Bruyn in Brussels in the fall of each year. Allocations are then made and preliminary purchasing plans decided. Responsibility for negotiating purchases are generally split between Mr. De Bruyn, who looks after Canadian purchases, and Mr. Robert Dower, in Switzerland, who looks after the group's mining operations and non-Canadian purchases.

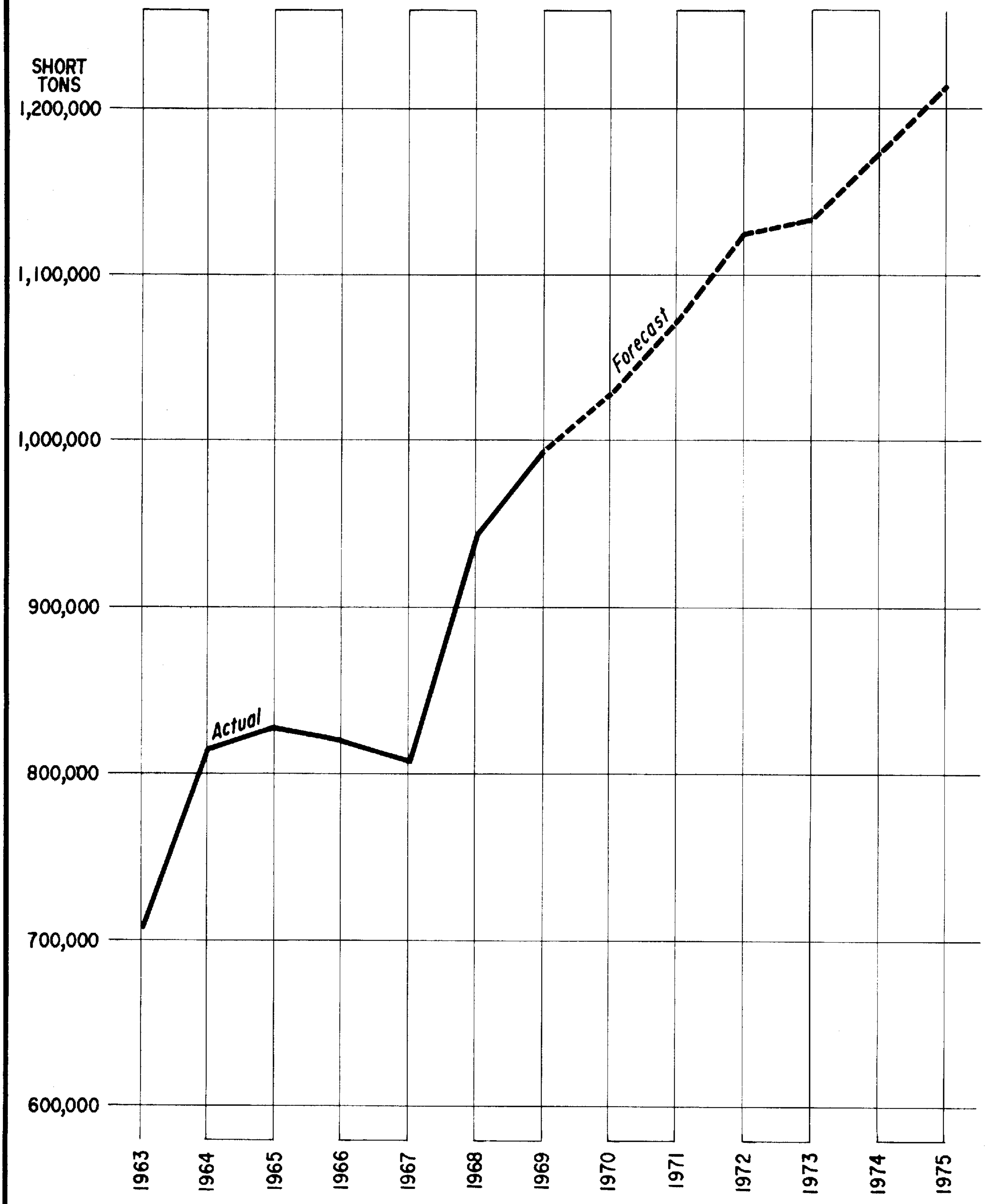
TABLE 5-1

CONSUMPTION OF ASBESTOS

EUROPE - 1969

Short Tons

Austria	37,900
Belgium-Luxembourg	70,900
Denmark	27,000
Finland	27,200
France	148,000
Germany	181,600
Greece	12,800
Ireland	7,200
Italy	119,000
Netherlands	25,000
Norway	7,600
Portugal	3,800
Spain	94,000
Sweden	17,700
Switzerland	19,500
United Kingdon	198,600
Eastern Europe	180,000
TOTAL	1,177,800



CONSUMPTION OF ASBESTOS WESTERN EUROPE

FIGURE 5-3

Specifications are not standardized but are set by each works manager. Consequently, we are told that Eternit probably buys 40 different grades of fibre. It becomes important, therefore, when submitting samples of fibre from a new mine, to work through the purchasing organization, so that maximum distribution and consideration is given to the samples.

Another complicating factor is that we understand that most purchasing is actually done by a Panamanian company, which makes any precise analysis of the group quite impossible.

In determining the quantity of purchases made by members of the group, we have attempted to interview responsible officials of each company. Where this was not possible, we have relied on correspondence, or in some cases, indirect information.

The Eternit group, being the largest European consumer of asbestos, is most interested in any new source of fibre. As the growth of their fibre requirements is at least equal, and possibly greater than the European average, the additional tons of fibre required each year are significant. Eternit, therefore, must be on the top of the list of potential consumers.

Turner and Newall Group

The activities of this group are detailed in the section on consumption of asbestos in the United Kingdom, and in the section on vertical integration. Insofar as this study is concerned, the group activities are confined to the United Kingdom and need no special comment here.

AUSTRIA

Details of Austrian consumption are difficult to obtain. The Eternit factory relies very much on Eternit-Switzerland for its fibre requirements and officials were not disposed to give details of their consumption. However, it is certainly the largest consumer in Austria and probably accounts for a majority of the fibre consumed.

Consumption in 1969 was 8 percent more than1968. Forecast of future consumption, using the mathematical forecasting technique, indicates that consumption should reach 46,500 tons by 1975.

TABLE 5-2

IMPORTS OF ASBESTOS BY AUSTRIA - 1969

Short Tons

Canada	17,800
South Africa	8,000
Russia	5,615
Italy	1,915
Cyprus	1,900
Other, net	2,645
TOTAL	37,875

TABLE 5-3

CANADIAN ASBESTOS SHIPMENT TO AUSTRIA - 1969

Short Tons

Supplier	Group						TOTAL
	3	4	5	6	7D	7	
ACL	25	2,500	2,500		25	25	5,075
C J-M	-	4,500	-	2,000	-	-	6,500
Lake	-	1,500	300	300	-	150	2,250
National	125	-	-	-	-	100	225
Total Quebec	150	8,500	2,800	2,300	25	275	14,050
Other							3,700
TOTAL							17,750

BELGIUM AND LUXEMBOURG

Total apparent consumption of asbestos in Belgium-Luxembourg in 1969 was 70,941 short tons. Canada supplies at least 65 percent of this requirement, followed by South Africa, Russia and Italy.

Growth in the past three years has averaged about 7.5 percent per annum but this figure is not expected to be maintained. Using the 1963-1969 data, a growth rate of 2.7 percent is forecasted which should result in consumption of 80,700 tons in 1975.

Eternit dominates the Belgian market consuming about half of total imports. Johns-Manville, with two plants, is the second largest consumer. Between these two consumers, sales by Canadian Johns-Manville account for more than half of the fibre supplied to Belgium.

Table 5-4 shows the major consumers and their source of supply. This table has been constructed from a variety of sources, which did not give a complete picture. The total consumption shown is several thousand tons too high and this excess is within the figures shown for South Africa. Because of the nature of the available figures, it was impossible to realistically remove this error. The general picture is thought to be quite meaningful.

Further details of the Belgian market can be obtained from Table 5-5 which shows the shipments of Canadian suppliers by grade of fibre.

The potential for sales of fibre to Belgium from a new source is probably limited at present, with the exception of the Eternit group. We have discussed the Eternit group separately earlier in this section.

Johns-Manville, being an integrated group, does not represent an opportunity. Scheerders-Van Kerchoven is vehemently biased against slip fibre. The next group of consumers (which includes Coverit, Alfit, Modernit and Manufacture Belge d'Amiante) each consume about 2,000 tons of fibre and do represent potential but small sales.

TABLE 5-4

IMPORTS OF ASBESTOS BY BELGIUM - 1969

Short Tons

CONSUMER	CANADA						ITALY	S. AFRICA		RUSSIA	CYPR.	OTHER	TOTAL
	ACL	C J-M	Lake	Carey	Other	Total		Chrys.	Blue				
Eternit	2,590	19,460				22,050	2,890	3,900	3,500	4,300	1,000		37,640
Johns-Manville		14,900				14,900			1,650				16,550
Scheerders-Van Kerchoven	550					550		1,700	500	2,200			4,950
Coverit	1,100	550				1,650		330					1,980
ALFIT				1,230	530	1,760			440				2,200
Modernit					1,100	1,100		550	220	330			2,200
Manufacture Belge d'Amiante			1,100			1,100		550					1,650
S.A. des feutres					330	330	110	110					550
Til. & Tiss.					1,650	1,650		1,650					3,300
Don International	110	550				660							660
Other												2,100	2,100
TOTAL	4,350	35,460	1,100	1,230	3,610	45,750	3,000	8,790	6,310	6,830	1,000	2,100	73,780

TABLE 5-5

CANADIAN ASBESTOS SHIPMENTS TO BELGIUM - 1969

Short Tons

Supplier	Group						Total
	3	4	5	6	7D	7	
ACL	230	3,100	400	200	100	300	4,330
Bell	-	-	-	-	-	25	25
C J-M	-	5,400	200	12,700	-	1,700	20,000
Carey	-	800	-	50	-	300	1,150
Lake	40	2,800	-	1,000	-	900	4,740
National	-	-	-	-	-	500	500
Total - Quebec	270	12,100	600	13,950	100	3,725	30,745
Cassiar							4,000
Other Canada							10,800
TOTAL							45,545

DENMARK

Consumption of asbestos in Denmark has been relatively steady over the past several years. In 1969, 27,018 short tons were used, of which over 40% is given by Dansk Eternit Fabrik as their consumption. The figures given by Eternit appear to be understated, probably by a significant amount, as no other large consumers in Denmark are known. For instance, the second largest consumer, Roulunds Fabriker, buys 1,000 tons of fibre - all from Canada. For this reason, we have not attempted to construct a detailed table of consumers and suppliers.

TABLE 5-6

IMPORTS OF ASBESTOS BY DENMARK - 1969

	Short Tons
Canada	15,077
South Africa	5,157
Cyprus	5,021
Russia	955
U.S.A.	116
Italy	11
Others	681
Total	27,018

Complicating the Eternit picture in Denmark is the partial ownership of Dansk Eternit-Fabrik by F.L. Smidth & Co., the owner of the asbestos mine in Cyprus. Displacement of the Cypriot sales would probably be difficult.

TABLE 5-7

CANADIAN ASBESTOS SHIPMENTS TO DENMARK

1968

Supplier	Group				Total
	5	6	7D	7	
ACL	2,450	1,200	-	11	3,661
C J-M	4,050	2,500	6	350	6,906
Carey	350	-	5	383	738
Lake	-	-	650	30	680
Total Quebec	6,850	3,700	661	774	11,985
Other Canada					805
TOTAL					12,790

During 1969, Canada supplied over 55 percent of total Danish imports. It is believed that Eternit bought a high proportion of the Canadian fibre.

Growth of consumption has been somewhat erratic over the past seven years, but we forecast that 1975 consumption will grow to 35,400 short tons, or a rate of 4.3 percent.

FINLAND

Finnish consumption of asbestos is small (27,200 tons in 1969) and is satisfied to a significant degree by local production of anthophyllite. Imports in 1969 were 5,200 short tons of which more than half was from Russia. Owing to the strong Russo-Finnish economic and political ties, this pattern is likely to continue. Canadian sales to Finland of about 1,500 tons in 1969 are mostly shorts, supplied by National Asbestos and Canadian Johns-Manville, with some longer grades supplied by non-Quebec producers (probably group 4 from Advocate).

Finnish production of anthophyllite in 1967 was said to be 35,400 short tons of which 22,000 were consumed in Finland and the balance exported.

Imports by Finland over the past seven years have been falling steadily, and we forecast that by 1975, these will reach 3,400 tons. Assuming consumption of domestic anthophyllite remains steady at 22,000 tons, then in 1975 total consumption would be 25,400 tons.

FRANCE

France is probably the most difficult of the European markets to effectively investigate. Generally, French companies are reluctant to reveal details of their operations to those they do not know well. This observation is probably more applicable to smaller companies than large, and is largely caused by the French preoccupation with avoiding taxes and the consequent variety of financial records which are kept. As a result, this review is much less detailed than we would like.

The following table shows the pattern of end-uses for French asbestos, and highlights the predominant position of the asbestos cement industry.

TABLE 5-8

END USE OF FRENCH IMPORTS OF ASBESTOS - 1969

	Short Tons	
Asbestos cement	105,950	74.4%
Floor tile	11,500	
Paper and cardboard	9,700	
Spinning	4,075	
Moulded brake linings	3,850	
Moulded products	2,750	
Packings and jointings	1,800	
Miscellaneous	1,050	
Resales, etc.	1,650	
TOTAL	142,325	

TABLE 5-9

IMPORTS OF ASBESTOS BY FRANCE - 1969

Short Tons

Canada:			
	Asbestos Corporation	13,700	
	Canadian Johns-Manville	28,500	
	Carey-Canadian	4,000	
	Lake Asbestos	12,600	
	Other	14,200	
	Total Canada		73,000
Russia			45,000
South Africa			17,200
Italy			11,000
U.S.A.			1,450
Others			350
TOTAL			148,000

One company which was helpful is Everitube S.A. which uses asbestos in four plants and is opening a fifth this year. Everitube's current consumption is about 40,000 tons and they are looking for about 5 percent growth in their output. Their requirements are for about 12,000 tons each of groups 4, 5 and 6 plus about 4,000 tons of blue asbestos and amosite. Russia supplies the shorter grades of chrysotile, while Lake Asbestos and Asbestos Corporation of Canada provide the longer fibre required. They have used Balangero fibre in the past, but stopped using it because of its cost and incompatability with their total fibre blend.

Eternit in France is thought to use about the same amount and grade proportions as Everitube.

Group 7 fibre is widely used by such firms as Dalami S.A. (an Eternit subsidiary) which uses 8,000 to 9,000 tons annually for vinyl-asbestos tile, which is bought from Johns-Manville; Sarlino which buys 2,500 tons of group 7 from Carey-Canadian; and Voisin and Pascal who purchase 900 tons of 7D as well as 900 tons of 6D and 500 tons of 5R for paper manufacture.

Consumers in France seem to be generally small and located throughout the breadth of the country. Agents are definitely required to assist with sales.

TABLE 5-10

CANADIAN ASBESTOS SHIPMENTS TO FRANCE - 1969

Short Tons

Supplier	Group						Total
	1,2,3	4	5	6	7D	7	
C J-M	-	17,770	19	3,197	258	7,197	28,441
ACL	1,632	4,301	6,611	87	779	297	13,707
Lake	12	870	6,333	1,339	1,990	2,071	12,615
Carey	6	209	-	199	5	3,603	4,022
National	-	-	-	-	-	1,808	1,808
Bell	83	-	-	-	454	-	537
Flintkote	-	-	-	10	-	20	30
Sub-total Quebec	1,733	23,150	12,963	4,832	3,486	14,996	61,160
Cassiar							1,250
Other							10,590
TOTAL-Canada							73,000

Russia and France have a trade agreement which calls on France to take 40,000 tons of fibre annually. Since trade generally is heavily in favour of France, it is practically obligatory that this fibre be purchased from Russia.

Our forecast of French consumption indicates that by 1975 it should be 211,800 tons. This growth, at a rate of 6.3 percent, is one of the highest in Europe.

WEST GERMANY

Penetration into the German market will depend very much on the acceptability of Lac Roberge fibre by the Eternit group. German consumption of asbestos is entirely dominated by Eternit and the Fulgurit group, which together apparently consume over 85 percent of the total fibre used.

The likelihood of successfully selling fibre to Fulgurit would appear to be poor, owing to their long association with and reliance upon Russian producers. Fulgurit claims to be Russia's oldest and largest customer since the 1930's. They are completely satisfied with the quality, price and service which they receive in dealing with the Russians. They have just signed a contract with the Russians for 90,000 tons of fibre to be delivered over the next one and one-half years. Thus, although they showed interest in the Lac Roberge project, it is not likely that any significant sales could be made.

The next largest consumer is Wanit, which consumes 10,000 tons of fibre annually. In discussions with Wanit's technical director, it was determined that Wanit has tested slip fibre from the Balangero and Ruberoid mines and found these to be quite unsatisfactory to their needs. Wanit is therefore prejudiced against slip fibre and is not interested in even looking at a sample.

The remainder of German consumption is shared by a number of very small firms, which leaves Eternit as virtually the only significant consumer with a reasonable degree of interest.

Eternit-Germany consumes about 75,000 tons of fibre annually in seven asbestos-cement factories throughout West Germany and Berlin. Sales over the past 10 years have more than doubled. Fibre requirements range from 3D to 6D and are obtained from a variety of sources, but purchasing is done by Eternit-Geneva. Canada provided groups 3 and 4 fibre, while the shorter grades are supplied by South Africa and Italy.

Growth in Germany is expected to be a relatively modest 2.3 percent, resulting in consumption of 212,600 tons in 1975.

TABLE 5-11

IMPORTS OF ASBESTOS BY WEST GERMANY - 1969

Short Tons

Canada	90,570
Russia	33,005
South Africa	26,142
Italy	22,965
U.S.A.	4,235
Finland	3,220
Other, net	3,550
TOTAL	181,615

TABLE 5-12

APPROXIMATE CONSUMPTION OF ASBESTOS BY WEST GERMAN MANUFACTURERS - 1970

Short Tons

Fulgurit	80,000
Eternit	75,000
Wanit	10,000
Toschi	10,000
Other	20,000
TOTAL	195,000

TABLE 5-13

APPROXIMATE CLASSIFICATION OF

CANADIAN SHIPMENTS TO GERMANY - 1969

Short Tons

Supplier	Group						Total
	1,2,3	4	5	6	7D	7	
Asbestos Corp.	3,000	9,000	8,000	400	300	1,300	22,000
Bell Asbestos	-	-	100	1,600	100	200	2,000
Can. J-M	-	3,500	1,500	7,500	500	7,000	20,000
Carey	-	-	100	100	1,000	9,800	11,000
Flintkote	-	-	50	-	-	-	50
Lake Asbestos	300	10,500	5,000	3,700	2,500	1,000	23,000
National	200	-	100	-	-	700	1,000
Total Quebec	3,500	23,000	14,850	13,300	4,400	20,000	79,050
Cassiar							6,000
Other Canadian							5,000
TOTAL							90,050

GREECE

There are three companies consuming asbestos in Greece which used 12,774 tons in 1969. The oldest, Hellenit, a member of the Eternit group, has been in operation for many years. Hellenit has two plants producing asbestos cement products, one near Athens and a second at Thessalonica. The bulk of Hellenit's requirements are normally obtained from Canada and Russia although South Africa consumption seems to have been higher in the past two years.

TABLE 5 - 14

IMPORTS OF ASBESTOS BY GREECE - 1969

Short Tons

	CANADA					RUSSIA	SOUTH AFRICA	OTHER	TOTAL
	ACL		C J-M		TOTAL				
	4	5	6	4					
Hellenit	-	-	-	794	794	1,101	5,616	1,164	8,674
Amiantit	2,100	1,800	100	-	4,000	-	-	-	4,000
Evelit	50	50	-	-	100	-	-	-	100
TOTAL	2,150	1,850	100	800	4,894	1,101	5,616	1,164	12,774

Amiantit, with an asbestos-cement plant at Patras, is presently consuming about 4,000 tons of Canadian fibre supplied by Asbestos Corporation. It is believed that an expansion of 25 percent from this plant is possible.

Evelit has just started production and has yet to establish a record. It is believed that the plant has a capacity to consume 5,000 tons of fibre annually. To-date its minor needs have been met from Canada by Asbestos Corporation.

A fourth company, Evepy, has announced that it will begin production of vinyl asbestos tiles this year, under a long-term arrangement with Dunlop-Semtex of Britain. Asbestos requirements for this plant are not known but will probably be confined to group 7 fibre.

Growth over the past several years has been in the order of 30 to 40 percent per annum. We believe that this will probably level off somewhat over the next several years, and forecast a growth rate of 10.8 percent per annum or 18,900 tons consumption by 1975.

The present Greek situation is shown in Table 5-14. Eternit would seem to be the only consumer of interest, as the others have stated that they are quite satisfied with their present supplier. This could change as the plants achieve greater use of their productive capacity.

IRELAND

Consumption of asbestos in Ireland in 1969 was 7,215 tons, up sharply from about the 5,000-ton level in the years immediately preceding. Using the base period of 1963-1969, we forecast a growth rate of 6.2 percent. Consumption should, therefore, reach 9,200 tons in 1975.

TABLE 5-14A

IMPORTS OF ASBESTOS BY IRELAND - 1969

	Short Tons
Canada	1,407
Russia	1,060
South Africa	3,039
Other	1,708
TOTAL	7,215

ITALY

The market for asbestos fibres in Italy is unique among European markets because of the significant domestic production. The Balangero mine, owned by Amiantifera di Balangero S.p.A., which is controlled by Eternit, produces about 100,000 tons of fibre annually. This fibre is marketed as 4Z, 5D and 6D and is slip fibre.

Those operating officials visited were extremely uncooperative and seemingly uninformed. Both are probably a good indication of the strong control excercised by Eternit-Geneva.

The mine has been in production for 50 years and has sufficient reserves to continue in operation for many years. New equipment was introduced into the pit about two years ago consisting of a portable crusher and belt conveyor system which has virtually eliminated trucks from the pit. Total number of employees is said to be 106, which would indicate a very favourable cost structure.

About half of the total production is consumed in Italy, and the balance exported. Since total Italian consumption in 1969 was about 119,000 short tons, almost half of the Italian market is probably "captive".

The Italian member of the Eternit group is strong, and is the largest producer of asbestos cement products, but its share of the Italian market is less than 20 percent. Eternit consumes about 21,000 tons of fibre annually. The next group of consumers are smaller (about one-third the size of Eternit). This group includes Sacelit, Fibronit, Italtubi, Amiantit and Cemental. A further half dozen or so companies consume fibre at the rate of about 2,000 tons annually. This group of about a dozen companies consume about 70,000 tons of fibre, leaving a further 49,000 tons to be accounted for by a large number of small companies. Thus, the Italian consumption of asbestos is much more fragmented than most European countries and much less dominated by major groups.

TABLE 5-15

APPARENT CONSUMPTION OF ASBESTOS IN ITALY - 1969

		Short Tons
Production		100,000
Exports		46,000
Consumption of Italian asbestos		54,000
Imports:	Canada	19,800
	Russia	9,300
	South Africa *	29,750
	Other	6,150
Apparent Consumption		119,000

* Shipments of apparent South African origin are thought to be about half from Rhodesia.

The prospects for selling Lac Roberge fibre in Italy are probably reasonably good, but because of the many consumers, this will not be an easy task. In the case of Eternit, the ease with which the fibre mixes with Balangero fibre will be a determining factor. In general, the Italian consumers are more price conscious when compared with other European consumers. An agent is an absolute necessity.

TABLE 5-16

CANADIAN SHIPMENTS TO ITALY - 1968

Short Tons

Supplier	Group						Total
	3	4	5	6	7D	7	
ACL	600	7,500	-	100	-	100	8,300
Bell	-	-	100	-	-	-	100
C J-M	-	4,500	-	100	300	600	5,500
Carey	200	100	-	100	-	1,600	2,000
Lake	250	2,500	100	350	-	300	3,500
National	-	-	-	-	-	400	400
TOTAL	1,050	14,600	200	650	300	3,000	19,800

Future growth of asbestos consumption in the Italian market is difficult to gauge. Much depends upon the degree of political stability which can be attained, and the prospects for this are not too good. The government has approved an immense plan to aid the development of southern Italy and the islands. The plan is to cost $11.3 billion, with $4.8 billion to be spent over the next five years. If this plan is quickly and efficiently implemented, there will undoubtedly be a tremendous growth in the demand for asbestos-cement products. However, there are number of political and administrative bridges to cross and the road to success may not be an easy one for the Italian government. Thus, based on fundamental reasoning, the future consumption could be very much higher or relatively stagnant. The odds favour the latter.

Using our mathematical forecasting technique, a growth rate of 4.8 percent is predicted, which would result in 1975 asbestos imports of 78,900 tons. Assuming the same growth in the use of domestic fibre to 70,000 tons, total consumption would be 148,900.

NETHERLANDS

The Dutch market is relatively small, currently averaging about 25,000 tons per year. Over 60 percent of this is provided by Canada, with the balance coming from Italy and several other sources, as shown in Table 5-17.

The local Eternit company is again the dominant consumer, probably accounting for 90 percent of the total. Eternit produces asbestos-cement products only. The balance of the consumption is accounted for by several small companies which produce brake linings, tile, insulation, etc.

Success in the Dutch market will depend largely upon Eternit, with an agent required to call on the numerous small consumers. Growth in the use of asbestos will probably be unspectacular. We forecast a rate of 2.9 percent, or 28,500 tons in 1975.

NORWAY

Norway is a relatively minor consumer of asbestos - 7,640 tons in 1969 - virtually all of which is consumed by Norsk Eternit Fabrikk. Canada supplies over 60 percent of this requirement, with most of the balance supplied by Russia.

Production in Norway consists of corrugated and flat sheet, roofing slate and moulded products. A growth in total asbestos consumption of at least 10 percent by 1974 has been forecasted by one Norwegian authority. Our forecast is similar: 4.3 percent annually or 8,900 tons in 1975.

PORTUGAL

Total consumption of asbestos in Portugal in 1969 was 3,830 short tons, down about 20 percent from the level of 1967 and 1968. The source of this fibre is shown in Table 5-19. It is probable that Rhodesia is the source of that fibre not originating in Canada or South Africa.

TABLE 5 - 17

IMPORTS OF ASBESTOS BY THE NETHERLANDS - 1969

Short Tons

	CANADA						RUSSIA	SOUTH AFRICA	ITALY	OTHER (Net)	TOTAL
	4	5	6	7D	7	Total					
ACL	1,500	400	-	-	200	2,100					
Bell	-	-	-	-	500	500					
C J-M	4,500	-	2,000	100	500	7,100					
Carey	100	-	-	500	1,500	2,100					
Lake	-	-	75	-	150	225					
National	-	-	-	-	3,352	3,352					
TOTAL	6,100	400	2,075	600	6,202	15,377	1,084	1,332	2,439	2,486	22,718

Note: The Canadian figures shown are very approximate and probably do not take into account Cassiar shipments of several thousand tons.

TABLE 5-18

IMPORTS OF ASBESTOS BY NORWAY - 1969

Short Tons

Supplier		Group	Amount
Canada	Asbestos Corp.	4	1,300
		5	1,800
		6	934
	Cdn. Johns-Manville	4	100
		5	500
		7	50
Total Canada			4,684
Russia			2,167
South Africa - amosite			504
U.S.A.			92
Others			192
TOTAL			7,640

TABLE 5-19

IMPORTS OF ASBESTOS BY PORTUGAL - 1969

Short Tons

Canada	1,415
South Africa	1,400
Mozambique	500
Other, net	515
TOTAL	3,830

This quantity of fibre is consumed by three asbestos-cement producers and at least four other companies. Apparently, the competition from plastics has been largely responsible for the weakness in fibre consumption in Portugal. If this situation continues, the future might not be too bright. On the other hand, based on trends over the past seven years, a strong rate of growth is indicated. This would result in an increase in consumption to 6,900 tons in 1975.

SPAIN

Consumption of asbestos in Spain is dominated by Uralita S.A. and is one of the few continental European countries not dominated by the Eternit group.

Uralita accounts for some 65 percent of Spanish consumption of asbestos-cement fibre - 60,000 tons in 1969. Total Spanish consumption in 1969 was 93,990 short tons which was supplied principally by Canada and South Africa.

Russia has not penetrated the market. There are said to be no political reasons for this, except that any trade would have to be two-way. It has been suggested that Spain would like to export oranges in exchange for Russian products. In view of the fact that Morocco is exporting significant quantities of citrus fruit to Russia, this would not seem to be a valid argument. One can only conclude that there are political reasons which preclude the trade, or that Russia is not in the position to push exports of asbestos to Spain.

In the past two or three years, there has been a significant expansion of Spanish asbestos-cement factories by existing manufacturers. This has been prompted by the current Four-Year Development Plan which calls for large government investments to increase agricultural output, which will necessitate large-scale irrigation with consequent increased demand for asbestos-cement pipe. Demand for high-pressure pipe will also be stimulated by the Four-Year Plan provision for improvements to the drinking water supply to many Spanish cities, towns and villages.

Consumption in 1966 totalled 83,385 short tons - a record high. Asbestos consumed in 1967 fell to 52,529 short tons. This drastic decrease was caused by two factors: the economic recession throughout Spain in 1967, and the implementation of year-round shipping from Quebec in 1967, which allowed Spanish consumers to postpone shipments to 1968. The years 1968 and 1969 have shown strong increases (32 percent and 36 percent) and 1969 was another new record at 93,990 short tons. The Spanish market must be regarded as strong.

TABLE 5-20

IMPORTS OF ASBESTOS BY SPAIN - 1969

Short Tons

Group	Origin				Total
	Canada	S. Africa	Italy	Others	
2 & 3	400	100	-	-	500
4	22,000	32,000	-	-	54,000
5	10,000	11,291	-	444	21,735
6	13,000	-	1,490	-	14,490
7	1,580	-	1,685	-	3,265
Total	46,980	43,391	3,175	444	93,990

Note: Totals in this table are correct. Breakdown is extrapolated and may be incorrect in detail.

TABLE 5-21

CANADIAN SHIPMENTS TO SPAIN - 1968

Short Tons

	3	4	5	6	7D	7	Total
ACL	-	6,000	300	-	-	-	6,300
Bell	-	-	150	-	200	150	500
C J-M	-	11,000	400	12,000	100	1,000	24,500
Carey	-	100	100	100	100	300	700
Lake	100	700	1,500	100	500	100	3,000
National	25	-	-	-	-	25	50
TOTAL	125	17,800	2,450	12,200	900	1,575	35,050

Note: These figures cannot be reconciled with Canadian export or Spanish import statistics, but indicate a pattern.

It is obvious from these figures that Uralita is placing large orders with traditional suppliers in Canada, Canadian Johns-Manville. This long-standing type of relationship is believed to be general throughout Spain. There are few, if any, newcomers in the industry. All expansion has been achieved by existing companies.

A good growth rate can be anticipated in Spain (probably averaging 6.6 percent), but gaining a share of these increased requirements may be quite difficult. Undoubtedly a good agent will be a necessity. If our forecast is correct, consumption in 1975 would be 120,700 tons.

SWEDEN

Swedish asbestos consumption in 1969 was 17,673 short tons, down 14 percent from 1968. Over 65 percent of consumption was taken by the Swedish member of the Eternit group, as indicated in Table 5-22. The Eternit requirements were provided by Russia (one-third), Canada (one- third) and most of the balance by Cyprus. The bulk of the Canadian fibre was purchased from Johns-Manville.

The second largest consumer, Tarbett AB, is a floor-tile manufacturer which obtained its requirements of group 7 fibre from Canada.

As in many of the smaller European countries, sales to Eternit are the key to sales success in Sweden. However, the possibility of a significant sale to Tarbett should not be overlooked.

Consumption over the past seven years has been fairly erratic, but exhibits a slight downtrend which, if continued, would result in a figure for 1975 of 16,800 tons.

SWITZERLAND

Swiss consumption of asbestos was 19,500 short tons in 1970, up from 17,230 tons in 1969.

TABLE 5 - 22

IMPORTS OF ASBESTOS BY SWEDEN - 1969

Short Tons

	CANADA					Russia	Cyprus	S. Africa	Others	Total
	ACL	C J-M	Nat.	Other	Total					
Eternit	500	4,000	-	-	4,500	4,730	2,000	500	170	11,900
Tarbett AB	-	1,500-7	1,500-7	-	3,000	-	-	-	-	3,000
Svenska Brom	-	110	-	-	110	-	-	-	-	110
Others	-	390	-	129	519	-	-	225	1,919	2,663
Total	500	6,000	1,500	129	8,129	4,730	2,000	725	2,089	17,673

TABLE 5 - 23

IMPORTS OF ASBESTOS BY SWITZERLAND - 1969

short tons

	CANADA*				RUSSIA	S. Africa	USA	ITALY	OTHER (net)	TOTAL
	ACL	C J-M	Lake	Total						
Eternit	1,350	4,540	2,900	8,790		2,990		1,920		13,370
H&G Meister					330					330
SIKA Int.	50			50				140		190
IMAG							40			40
Other					2,240		220		510	3,300
TOTAL	1,400	4,540	2,900	8,840	2,570	2,990	260	2,060	510	17,230

*Breakdown is extrapolated

The market is absolutely dominated by Eternit who consume about 80 percent of total Swiss asbestos imports. The remaining consumers who number at least eight, are involved in various specialty uses such as insulation, while Eternit has two asbestos-cement factories, one at Zurich and one at Lausanne.

The bulk of the non-Eternit purchases are made indirectly through agents. Eternit purchases directly from Canadian Johns-Manville, Lake Asbestos and Asbestos Corporation in Canada, and from the Eternit mine in Italy.

The trend of consumption over the past seven years indicates that consumption will reach 21,000 tons by 1975 at a rate of growth of 3.6 percent.

TABLE 5-24

CANADIAN EXPORTS TO SWITZERLAND - 1969

Short Tons

	4	6	7	TOTAL
ACL	1,000	-	400	1,400
C J-M	1,000	1,200	-	2,200
Lake	2,650	200	50	2,900
Advocate	2,340	-	-	2,340
TOTAL	6,990	1,400	450	8,840

UNITED KINGDOM

The structure of the asbestos market in the United Kingdom is quite different from the rest of Europe. The Eternit group is not represented in the U.K. Instead this market is dominated by the Turner and Newall group and the Cape Asbestos group, whose combined asbestos consumption represents about 70 percent of the total.

There is no domestic production, and imports are virtually all from Canada and South Africa. Canada maintains about 60 percent of the market while South Africa and Swaziland have about 37 percent.

The Turner and Newall group has, in the U.K., 16 asbestos-cement plants, two asbestos textile factories, two brake-lining plants and one plant producing insulation products. Over 60 percent of Turner and Newall's chrysotile requirements formerly came from their mines in Rhodesia. While Rhodesian fibre undoubtedly enters many countries under other guises, it is fairly certain that it does not come to the U.K.

The loss of Rhodesian supplies has been made up in large part by increased purchases from Cassiar, in which Turner and Newall has a 24.5 percent interest. These purchases are concentrated in group 3 and 4.

Bell Asbestos Mines in Quebec is owned by Turner and Newall and approximately half of Bell's output is consumed in the U.K. This supply has been relatively steady in recent years and consists of groups 5, 7D and 7 with lesser amounts of group 4 and 6.

The Cape Asbestos group has factories at 10 locations in the United Kingdom producing a variety of asbestos products. The major concentration is in insulation products (with high amosite content), brake-linings and corrugated asbestos-cement sheeting. The group purchases about 20,000 tons of chrysotile for its U.K. plants. This consumption is probably matched or exceeded by group consumption of amosite and crocidolite (blue) asbestos.

This high proportion of non-chrysotile consumption is accounted for by the group's mining activities. Total world production of amosite asbestos is about 100,000 tons annually, of which Cape produces 90,000 tons from its own mines in South Africa. World production of blue asbestos is 125,000 tons, one-third of which is produced by Cape from its mines in South Africa. With this captive supply, the Cape group has concentrated on developing specialized uses for these amphibole asbestos fibres.

Thus 130,000 to 140,000 tons of the nearly 200,000 tons of fibre consumed in the United Kingdom is accounted for by the two major groups. The balance of the fibre is consumed by a large number of small companies, located in widely-dispersed areas of the country.

Successful sales in the United Kingdom will depend therefore upon the reaction received from the Turner and Newall and Cape Asbestos groups, and upon an agent visiting the many smaller companies.

Growth of the U.K. market will not likely be dynamic. Problems with pollution lobbyists and the general malaise of the U.K. economy will probably hold growth to a nominal 2.2 percent, which will result in 1975 consumption of 221,800 short tons.

TABLE 5-25

IMPORTS OF ASBESTOS BY UNITED KINGDOM - 1969

Short Tons

Canada:		
Asbestos Corporation	25,000	
Bell Asbestos	21,000	
Canadian Johns-Manville	17,000	
Cassiar Asbestos	16,000	
Carey-Canadian	14,000	
Others	23,500	
Total Canada		116,500
South Africa		39,900
Swaziland		32,000
Cyprus		6,700
Other (mostly Russia)		3,500
TOTAL		198,600

EASTERN EUROPE

Statistics for the communist countries of eastern Europe are rather difficult to find with any consistency. Table 5-26 will give an indication of the importance of the requirements of these countries.

We estimate that asbestos consumption in 1969 for Poland, East Germany, Czechoslovakia, Hungary, Rumania, Bulgaria and Yugoslavia totalled 180,000 short tons.

Exports to eastern Europe depend upon a unique combination of factors:

- availability of Russia fibre for export
- political relations between Russia and a particular country
- availability of foreign exchange to allow purchases of western asbestos
- existence of trade agreements with Canada or Russia.

Consequently imports from a certain country are often quite erratic from year to year and trends may not be too relevant. Our forecast, based on incomplete data from another source, is 10.1 percent. Using our estimate of 180,000 tons in 1969, imports would grow to 320,600 tons in 1975. Adding 40,000 tons of Yugoslav production results in a consumption forecast of 360,600 tons in 1975.

TABLE 5-26

SOME ASBESTOS STATISTICS FOR EASTERN EUROPE

	Quebec Shipments 1968	Total Imports	
	Short Tons	Short Tons	Year
Czechoslovakia	9,273	35,800	1967
Hungary	285	15,600	1967
Poland	4,546	47,600	1968
Rumania	3,714	-	-
Yugoslavia	5,738	18,900	1968

More detailed statistics are available from Poland, as outlined in Table 5-27.

TABLE 5-27

IMPORTS OF ASBESTOS BY POLAND

Short Tons

	1967	1968	1969
Russia	26,630	29,630	30,950
Canada	7,260	2,870	15,265
Britain	3,850	5,090	7,515
Bulgaria	3,460	3,885	4,115
Hungary	2,200	1,850	3,750
Austria	2,170	2,525	150
Other	1,430	720	1,155
TOTAL	47,000	46,570	62,900

We are advised that Poland imported 16,436 short tons of Canadian fibre in 1970, predominantly groups 4 and 5. Canada thus maintained its share of this growing market.

ASIA

The Asian continent (excluding China and Russia) used an estimated 418,000 short tons of fibre in 1969 of which Japan accounted for 264,000 short tons or 63 percent. Japan is probably the most dynamic market in the world at present, although many of the countries of southeast Asia have the potential for a strong rate of growth in their consumption of asbestos.

JAPAN

Consumption of asbestos in Japan is growing at a rate faster than any other industrial country. Since there is only limited domestic production, asbestos is a very important import item for Japan. Past consumption is summarized in Table 5-28, according to the area of application.

Total asbestos consumption, which was only 77,000 metric tons in 1960, increased to 263,700 metric tons in 1970, or by three and one-half times in the ten-year period. This tremendous growth is a direct reflection of the overall growth of the Japanese economy. It is of interest to note that the value of Japanese asbestos imports in 1970 was twice the value of imports of lead concentrates and almost half the value of zinc concentrate imports.

Detailed statistics of the Japanese asbestos industry are among the world's best. There are several industrial associations, each reporting their consumption for the following product areas: asbestos-cement sheet, asbestos products, asbestos-cement pipe and floor tile.

Asbestos-Cement Sheet

This is the most important sector of the Japanese asbestos industry and requires an increasing share of asbestos imports annually. In 1970, 68 percent of all Japanese imports of asbestos was consumed in this area.

TABLE 5-28

JAPAN - TREND OF ASBESTOS CONSUMPTION BY USE

Metric Tons

	1960	1965	1966	1967	1968	1969	1970*
ASBESTOS-CEMENT SHEET							
Sheet - Corrugated and Flat	50, 100	82, 200	89, 100	108, 500	130, 800	146, 300	164, 700
Coloured		3, 000	4, 000	7, 900	10, 500	14, 700	15, 300
Total	50, 100	85, 200	93, 100	116, 400	141, 300	161, 000	180, 000
Annual Growth Rate			8%	30%	21%	11%	1%
Ratio of Total Consumption		60%	61%	63%	64%	67%	68%
ASBESTOS-CEMENT PIPE							
High Pressure Pipe		22, 500	22, 200	22, 500	26, 600	24, 000	24, 700
Fume Pipe	5, 500	6, 000	5, 400	4, 800	4, 400	4, 300	3, 900
Total	5, 500	28, 500	27, 600	27, 300	31, 000	28, 300	28, 600
Annual Growth Rate			-3%	-1%	13%	-9%	1%
Ratio of Total Consumption		21%	19%	15%	14%	12%	11%
ASBESTOS PRODUCTS							
Textiles	3, 300	2, 000	2, 300	3, 200	3, 200	3, 000	3, 200
Joint Sheet	3, 000	3, 400	3, 600	4, 500	4, 900	4, 600	5, 200
Paper	3, 500	3, 400	3, 400	3, 800	3, 600	4, 400	4, 900
Brake Lining	4, 400	5, 000	6, 200	8, 200	9, 000	9, 600	11, 100
Floor Tile	6, 300	10, 200	12, 500	12, 800	17, 200	16, 700	18, 500
Undercoating	1, 200	900	2, 500	5, 100	5, 700	6, 500	7, 200
Lagging Material				3, 900	4, 500	5, 200	5, 200
Total	21, 700	24, 900	28, 000	41, 500	48, 100	50, 000	55, 100
Annual Growth Rate			12%	48%	16%	4%	10%
Ratio of Total Consumption		19%	20%	22%	20%	21%	21%
GRAND TOTAL	77, 400	138, 700	149, 500	185, 200	220, 500	239, 500	263, 700
Annual Growth Rate			7%	27%	19%	9%	10%
Ratio of Total Consumption		100%	100%	100%	100%	100%	100%

*1970 Estimated

TABLE 5-29

JAPAN - PROJECTED ASBESTOS CONSUMPTION

Metric Tons

Year	Textiles	Joint Sheet	Paper	Lining	Pipe	Vinyl Tile	Sheet	Cement Products	Con-struction Material	Insulation	Others	TOTAL
1965	2, 017	3, 433	3, 427	5, 027	22, 521	10, 211	82, 194	6, 012			940	135, 782
1966	2, 324	3, 620	3, 406	6, 168	22, 202	12, 451	89, 061	5, 433			880	145, 545
1967	3, 211	4, 549	3, 811	8, 195	22, 563	12, 800	108, 539	4, 805	7, 869	3, 900	5, 042	185, 284
1968	3, 248	4, 957	3, 621	9, 002	26, 614	17, 185	130, 765	4, 417	10, 544	4, 500	5, 650	220, 503
1969	3, 034	4, 644	4, 064	9, 639	24, 126	16, 719	146, 292	4, 315	14, 677	5, 200	6, 542	239, 252
1970	3, 185	5, 208	4, 850	11, 084	24, 651	18, 506	164, 681	3, 900	15, 277	5, 200	7, 195	263, 737
1971	3, 346	5, 833	5, 288	12, 751	25, 292	20, 914	184, 723	3, 500	17, 567	5, 720	7, 195	292, 129
1972	3, 512	6, 533	5, 779	14, 660	21, 950	23, 349	209, 143	3, 500	20, 202	6, 292	8, 706	323, 276
1973	3, 687	7, 317	5, 128	16, 838	26, 623	25, 706	236, 310	3, 500	22, 798	6, 921	9, 577	363, 775
1974	3, 872	8, 195	6, 944	19, 387	27, 305	27, 654	266, 298	3, 500	25, 721	7, 613	10, 535	406, 134
1975	4, 065	9, 178	7, 622	22, 293	28, 026	30, 419	298, 737	3, 500	29, 579	8, 374	11, 588	452, 341

Projected by Asbestos Raw Materials Committee of MITI.

September, 1970.

The Asbestos-Cement Sheet Manufacturers Association is projecting its requirements for 1980 as 2.8 times the 1969 level. Rapid growth, especially in the early 1970's, will be caused by Japan's increasing requirements for new housing. Most of the larger sheet producers are now planning production increases and the consensus is that total sheet production may be doubled by 1974 - although this could now be postponed somewhat owing to the current temporary pause in the Japanese economy.

The main manufacturers are listed in Table 5-30 which also shows their relative market position and number of plants. An example of the kind of expansion planned is Sumitomo Cement who currently produces about 3.5 million sheets annually and is planning to catch up with Asahi and Asano, who are currently producing about 16 million sheets each.

It is expected that asbestos consumption in this sector will increase from the 1969 level of 160,000 metric tons to about 300,000 metric tons by 1975. The source of this increased requirement is currently a real problem. The percentage of supply from Canada over the past three years has been decreasing, as shown in Table 5-31, even though actual tonnage has been increasing, and is currently about 50 percent. Increased requirements over the past several years have been met by higher imports from South Africa and Russia. It will be noted that the major consumption of fibre is in groups 5 and 6. It may be that Japan will be forced to increase their use of Russian group 4 fibre or Canadian group 7D, if present suppliers cannot increase their shipments of the preferred grades. An offsetting factor is the commencement of production by Chrysotile Corporation of Australia which is planned for early 1972. This new mine has contracted to supply Japan with 40,000 short tons of fibre annually, which will be concentrated in groups 5 and 6.

Future asbestos consumption as projected by the Asbestos-Cement Sheet Manufacturers Association is detailed in Table 5-32.

Asbestos-Cement High Pressure Pipe

The increase of asbestos consumption for use in high pressure pipe is not expected to be of the same order as the increase forecasted for the other sectors. The reason is that very severe competition is being offered by both cast iron pipe and plastic pipe.

TABLE 5-30

JAPAN - ASBESTOS-CEMENT SHEET MANUFACTURERS

Numbers of Standard Sheets

	1968 Production	1969 Production	1969 Market Share	Number of Factories
Asano Slate	14,796,992	16,375,811	20.7%	7
Asahi Asbestos	14,129,169	15,510,123	19.6%	4
Nozawa Asbestos	8,505,483	9,165,633	11.5%	5
Ube Slate	5,201,125	6,461,301	8.1%	2
Miyoshi Asbestos	2,721,141	4,416,187		
(Hokoku Slate)	(1,115,845)		5.6%	3
Kansai Slate	3,591,767	3,934,036	5.0%	1
Sumitomo Cement	3,407,215	3,583,910	4.5%	5
Toyo Slate	2,457,049	2,805,427	3.5%	1
Shikoku Asano	1,331,636	1,880,244	2.4%	1
Sanno Asbestos	1,377,569	1,857,024	2.3%	2
Ryosan Slate	1,612,502	1,776,041	2.2%	1
Hikari Slate	1,431,203	1,683,853	2.1%	1
Mie Concrete	1,097,340	1,291,578	1.6%	1
Nihon Slate	1,240,960	1,064,715	1.3%	1
Tokyo Slate	875,009	1,055,252	1.3%	1
Other Manufacturers	5,056,348	6,965,055	8.7%	13
Total	69,948,353	79,826,190	100.0%	49

TABLE 5-31

JAPAN - SOURCES OF ASBESTOS FOR CEMENT SHEETS

Metric Tons

Source	Grade	1965	1966	1967	1968	1969
Canada	Group 4	17	2	204	1,617	2,797
	Group 5	26,757	16,270	17,535	18,879	19,998
	Group 6	30,219	35,329	43,228	46,030	45,931
	Group 7	198	184	268	226	952
	Total	57,191 (71.7%)	51,785 (60.0%)	61,235 (58.5%)	66,752 (53.7%)	69,678 (51.2%)
South Africa	Group 5	5,518	9,460	15,569	21,181	23,024
	Group 6	1,792	9,356	9,793	14,062	12,125
	Group 7	307	575	820	245	613
	Amosite	1,309	1,030	281	737	675
	Blue	235	633	768	605	402
	Total	9,161 (11.7%)	21,054 (24.3%)	27,231 (26.0%)	36,730 (29.3%)	36,839 (27.2%)
Russia	Group 5	4,617	3,683	4,549	5,049	7,544
	Group 6	6,018	6,839	7,246	12,050	16,580
	Group 7	504	748	510	420	386
	Total	11,139 (14.0%)	11,271 (13.0%)	12,305 (11.7%)	17,519 (13.9%)	24,510 (17.8%)
Domestic and Reclaimed Asbestos		2,127 (2.6%)	2,171 (2.7%)	3,860 (3.8%)	3,943 (3.1%)	5,367 (3.8%)
GRAND TOTAL		79,618	86,281	104,631	124,944	136,394

TABLE 5-32

JAPAN - PROJECTED CONSUMPTION OF ASBESTOS

IN CEMENT SHEET INDUSTRY BY GRADE

Metric Tons

Year	Group 4	Group 5	Group 6	Group 7	Domestic	Amosite	Crocidolite	TOTAL
1969	3, 077	50, 286	84, 256	2, 229	5, 367	675	402	146, 292
1970	3, 412	55, 767	95, 791	2, 564	6, 405	742	0	164, 681
1971	3, 784	61, 846	108, 258	2, 909	7, 110	816	0	184, 723
1972	4, 197	68, 587	124, 199	3, 361	7, 901	898	0	209, 143
1973	4, 654	76, 063	141, 995	3, 851	8, 759	988	0	236, 310
1974	5, 162	84, 354	161, 600	4, 373	9, 722	1, 087	0	266, 298
1975	5, 724	93, 549	182, 447	5, 029	10, 792	1, 196	0	298, 737

In a study on the future for asbestos-cement high pressure pipe, only a ten percent increase for the period 1969-1980 was projected (164,000 tons in 1969; 180,000 tons in 1980). Crocidolite asbestos from South Africa is responsible for one-third of this consumption.

Table 5-33 contains the relevant statistics for this application.

Asbestos Products

This sector, which includes a variety of products such as joint material, paper, brake lining and insulation should experience substantial growth. The Japanese Ministry of International Trade and Industry (MITI) has projected a growth rate of 12 percent, which seems somewhat optimistic.

About 20 percent of Japanese imports of fibre are consumed by this industrial sector, as is shown in Table 5-28. Table 5-34 contains the fibre distribution by grade that is used in this area.

Floor Tile

The floor tile industry consumed about 25,000 metric tons of asbestos in 1969 which represents less than 10 percent of total consumption. The small production of asbestos in Japan (which is essentially group 7) finds one of its major markets in this area. It is apparent that the industry is now in a position of over capacity, as three tile manufacturers recently ceased production. Thus expansion will likely be slight. As consumption is almost solely group 7, as specifications are very tight, and as Canadian shipments have been traditionally made by Carey and National, this does not appear to be a very promising market area for Lac Roberge fibre.

Table 5-35 details data on the floor tile industry.

Growth Prospects

In September, 1970, a committee called "Asbestos Raw Materials Committee" was organized under the direction of the Ministry of International Trade and Industry (MITI) as a sub-committee of the Import Trend Study Council which is an advisory committee to the cabinet of the Japanese government.

TABLE 5-33

JAPAN - ASBESTOS CONSUMPTION IN ASBESTOS-CEMENT PIPE

Metric Tons

	1965	1966	1967	1968	1969
Crocidolite	11, 000	10, 000	10, 000	10, 000	10, 000
Chrysotile (mainly Group 5)	13, 500	12, 500	13, 500	17, 000	16, 500
TOTAL	24, 500	22, 500	23, 500	27, 000	26, 500

(Estimated by manufacturers on the basis of 160 kgs of asbestos per a ton of pipe)

TABLE 5-34

JAPAN - ASBESTOS CONSUMPTION
IN ASBESTOS PRODUCT INDUSTRIES

Metric Tons

Fibre Type	1968	1969
Crude	436	448
Group 3	1, 556	1, 444
Group 4	3, 317	3, 078
Group 5	4, 446	5, 307
Group 6	7, 915	8, 353
Group 7	2, 452	2, 575
Amosite	4, 650	5, 372
Crocidolite	1, 027	1, 638
Domestic	1, 383	1, 666
TOTAL	27, 182	29, 881

TABLE 5-35

JAPAN - PRODUCTION OF FLOOR TILE AND CONSUMPTION OF ASBESTOS IN THE INDUSTRY

Production of Floor Tile

	000's square meters	
	1968	1969
Asbestos Tile	30, 845	32, 550
Vinyl Tile	3, 987	3, 732
TOTAL	34, 832	36, 282

From the record of Floor Tile Association

Consumption of Asbestos in Floor Tile

	1968	1969
Imported Group 7	18, 600	19, 500 (k/t)
Domestic Asbestos	4, 600	4, 900
TOTAL	23, 200	24, 400

Estimated by Manufacturers on the basis of 7. 5 k/t of asbestos per 10, 000 square meters of tile

This committee carried out an extensive study and analysis of consumption trends of the past and future. The committee was organized by representatives of major asbestos consumers like Nippon, Asahi and Asano, plus three leading trading houses in the asbestos business - C. Itoh, Nissho-Iwai and Mitsubishi - under the chairmanship of MITI.

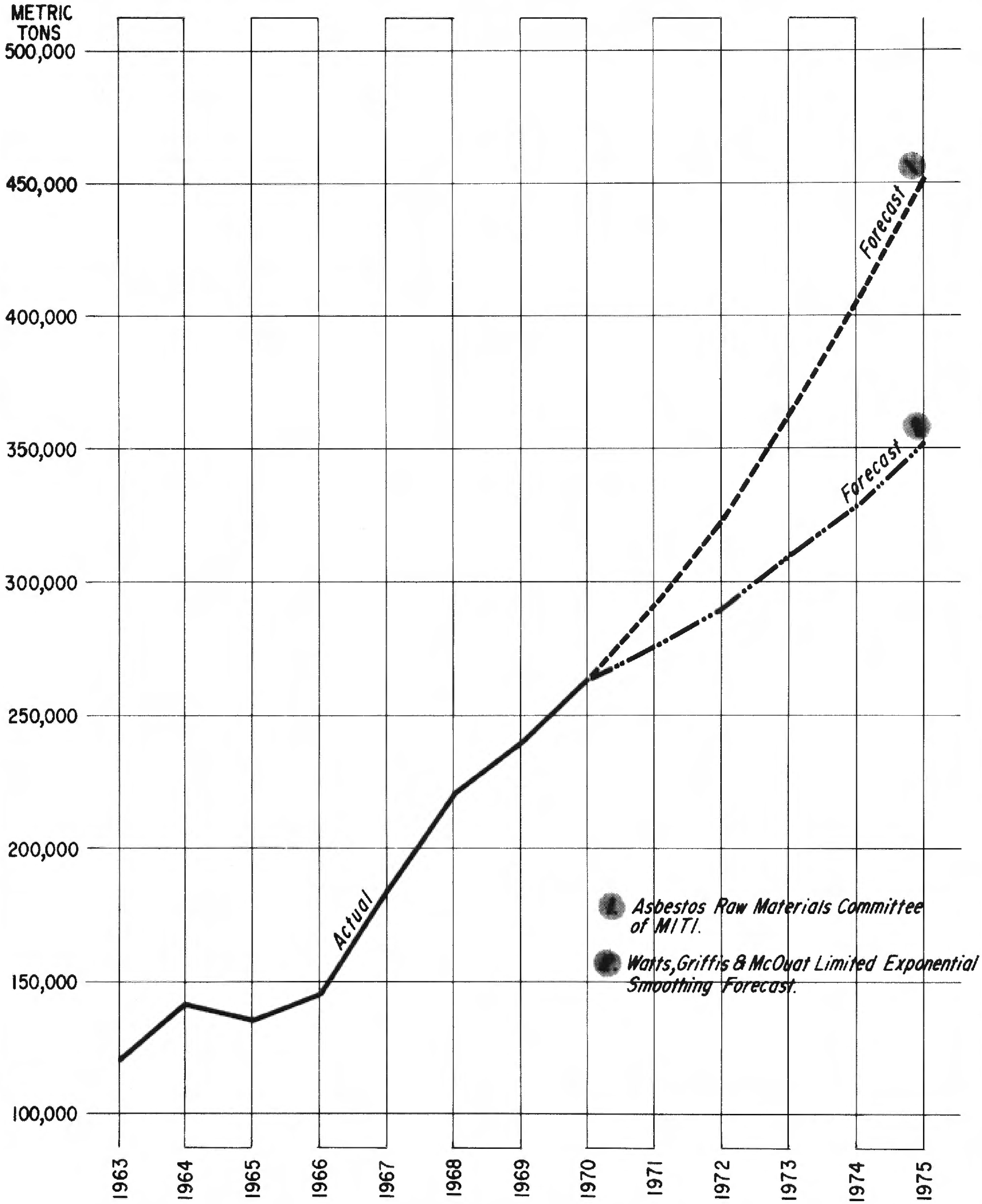
The following were the figures agreed to by the members of the committee as projected annual growth rates for each sector of the asbestos industry of Japan for the five-year period, 1971 to 1975.

	Projected Annual Rate of Demand Increase
Textiles	5%
Joint Sheet	12%
Paper	12%
Brake Lining	15%
Asbestos Pipe	2.6%
Vinyl Tile	10%
Cement Sheet	12%
Cement Pipe	0%
Construction Material	15%
Insulation	10%
Others	10%
Average	11.4%

Table 5-29 shows projected asbestos consumption by sector, 1971 onwards, based upon this hypothetical annual growth ratio. Total asbestos consumption reaches a high of 452,000 metric tons in 1975, according to this projection.

General Asbestos Importing

The market share of each major country supplying asbestos to Japan for the past several years is shown in Table 5-36. Canada's share of the market has dropped to 50 percent from the 75 percent share held in the late 1950's, even though actual tonnage has increased at a modest rate. South Africa, on the other hand, has increased its share of the market from 15 percent to 35 percent while Russia currently enjoys about 15 percent of the total market.



CONSUMPTION OF ASBESTOS-JAPAN

FIGURE 5-4

TABLE 5-36

JAPANESE ASBESTOS IMPORTS BY ORIGIN

Customs Clearance Basis, Metric Tons

	CANADA	U.S.S.R.	AFRICA	U.S.A.	AUSTRALIA	OTHERS	TOTAL
1961	83,135 (72.3%)	5,013 (4.4%)	20,527 (17.8%)	4,048 (3.6%)	1,698 (1.5%)	394 (0.3%)	114,815
1962	69,487 (71.9)	9,130 (9.4)	16,858 (17.2)	591 (0.6)	269 (0.3)	339 (0.4)	96,674
1963	69,113 (59.8)	11,901 (10.3)	29,812 (25.6)	3,987 (3.4)	548 (0.5)	131 (-)	115,492
1964	84,067 (58.4)	13,641 (9.5)	37,087 (25.8)	8,128 (5.6)	712 (0.5)	334 (0.2)	143,969
1965	71,767 (53.7)	15,032 (11.2)	35,731 (26.8)	10,031 (7.5)	890 (0.7)	71 (-)	135,522
1966	70,781 (48.4)	15,132 (10.3)	51,560 (35.2)	8,020 (5.5)	438 (0.4)	363 (0.2)	146,294
1967	90,761 (48.1)	20,454 (10.8)	67,896 (36.0)	8,754 (4.6)	27 (-)	849 (0.5)	188,741
1968	105,077 (52.7)	22,375 (11.2)	65,234 (32.7)	6,406 (3.2)	0	323 (-)	199,415
1969	117,635 (49.6)	36,036 (15.2)	79,754 (33.6)	3,617 (1.5)	130	131 (-)	237,173

It is expected that the current Canadian and South African suppliers will continue to enjoy modest sales increases. Australia will be capturing about 15 percent of the market in the near future, as the Woodsreef project comes into production. Some additional fibre will probably come from the new mine in Colombia and from California. Russia is not expected to increase its sales for two reasons: (i) Russia is not expected to have much increased export capacity for group 6 fibre, which is the chief growth area, and (ii) the Russian port of Vladivostok has inferior facilities. Many Japanese consumers have complained about their erratic deliveries, especially in the summer months when the port is busy with military traffic.

In Table 5-37, we have shown the major asbestos suppliers, the importing agent and the tonnages traded.

There seems to be a definite necessity to utilize large trading houses in marketing asbestos in Japan. Asbestos marketing is highly diversified and consumers themselves are not financially large enough to take the risk of purchasing large quantities individually.

There are two distinct characteristics of the asbestos business in Japan which differ from the situation in most minerals. One is that the large Zaibatsu trading houses like Mitsui or Sumitomo are not necessarily influential in this field. For instance, the agent for the largest Canadian producer, Canadian Johns-Manville, is a small company called Tokyo Kogyo. On the other hand, Mitsui and Company is importing only a small amount from a small Canadian producer and their position in the asbestos business in Japan is very weak compared to other companies. The other characteristic is that most of the influential trading houses have exclusive agency agreements with established suppliers. A few comments on each of the major trading houses and their position in the asbestos industry follows.

C. Itoh - This company was an agent for Nicolet years ago but later switched to Lake Asbestos. They have an agreement that they will not deal with other chrysotile suppliers. However, this company is also the largest importer of Russian chrysotile. They are managing to avoid affecting their agreement with Lake Asbestos by purchasing imported Russian fibre from a trading house called Shinten which is actually nothing but a dummy company of C.Itoh. They are also a major importer of South African fibre, but in this case most of the material is amosite and blue asbestos.

TABLE 5-37

JAPANESE ASBESTOS TRADING CHANNELS

Metric Tons - 1969

Exporter, Mine	Annual Production	Importer	Annual Import to Japan
CANADA			
Canadian Johns-Manville	600,000	Tokyo Kogyo	22,000
Asbestos Corporation Ltd.	250,000	Nissho-Iwai	30,000
Lake Asbestos of Quebec	130,000	C. Itoh	21,000
Carey-Canadian Corporation	140,000	Kakiuchi	22,000
Bell Asbestos Mine	50,000	Mitsubishi	4,000
Cassiar Asbestos	140,000	Mitsubishi	6,000
National Asbestos	60,000	Mitsui	8,000
Flintkote Mines	35,000	Ataka	3,000
Nicolet Asbestos (closed 1969)	35,000	Marubeni	1,700
TOTAL	1,440,000		117,700
AFRICA			
Cape Asbestos Co. - amosite	85,000	C. J. Petrow (Mitsui,	13,800
- blue	40,000	Nissho Iwai, Kyowa, etc.)	
Turner and Newall - amosite	10,000	Shintoa (Mitsubishi)	29,000
- blue	4,000		
- chrysotile	130,000		
Gefco	34,000	Central (Sanken, Kakiuchi, Furukawa)	13,000
Msauli Asbestos	30,000	Petrow	2,000
		Behag - C. Itoh	8,500
SAAT - KCB - blue	40,000	Behag - C. Itoh	7,000
- Oreti	35,000	Behag - C. Itoh	6,500
Others	17,000		
TOTAL	425,000		79,800
RUSSIA			
Sojuzproexport	2,200,000	Shintani - C. Itoh	11,500
		Chori	8,500
		Toyo Boeki	6,000
		Kanematsu	4,500
		International	2,500
		Marubeni, etc.	3,000
TOTAL	2,200,000		36,000
U.S.A.			
The Ruberoid Co.	40,000	Marubeni, Shinko	1,500
Pacific Asbestos	50,000	Sumitomo, Marubeni	1,500
Others	20,000	Mitsubishi, C. Itoh, etc.	600
TOTAL	110,000		3,600

It appears quite impossible for C. Itoh to become an agent for Lac Roberge fibre unless Lake Asbestos is also involved in the arrangement.

Nissho-Iwai - This is the only trading house which has a special asbestos section within the company. They are the largest importer of Canadian fibre and represent Asbestos Corporation Limited. They also handle part of the South African fibre supplied by Cape Asbestos. They are also not in a position to do business with new Canadian suppliers.

Mitsubishi - Mitsubishi has a world-wide tie with the Turner and Newall group. They currently represent the two Canadian mines which are members of the Turner group (Bell Asbestos and Cassiar). They are the largest importer of Turner and Newall's South African fibre. It is the understanding that Mitsubishi will not deal with any new Canadian supplier without the consent of the Turner and Newall group. (Although Mitsubishi have already submitted a letter expressing their interest in the Lac Roberge project).

The above three companies are the most influential asbestos trading houses in Japan and the trading division of the Asbestos Raw Materials Committee was organized by representatives from the three companies as mentioned before.

Mitsui - Mitsui currently imports about 8,000 tons of Canadian fibre from National Asbestos and imports a small quantity of South African fibre from Cape Asbestos. This company has no particular agreement with Canadian suppliers and is anxious to get new suppliers. Their share in the asbestos market is very small at the moment.

Ataka - This company presently imports about 5,000 tons from Flintkote Mines of Canada. Their position in the Japanese market is about the same as Mitsui.

Marubeni-Iida - Their relation with Canadian suppliers was terminated in 1969 when Nicolet closed their mine in Quebec. They currently import a portion of the fibre produced by Pacific Asbestos of California. Their share in the Japanese asbestos market will increase when the Woodsreef Mine starts operation in 1972.

Sumitomo - The company's present position in the asbestos business is very weak, currently handling only a small amount of fibre from Pacific Asbestos of California.

Pricing

A brief comment should be made on pricing to conclude this report on the Japanese market. It is a well known fact in Japan that most of the Canadian suppliers are giving fairly large price discounts to asbestos purchasers in Japan. It is said to be as large as five percent on some products, f.o.b. Canadian mine price as quoted by Johns-Manville or Asbestos Corporation. It is not definite if the price discount of five percent is fully passed on to consumers or absorbed by trading houses as profit but new suppliers should be prepared to give a better price discount to be competitive with existing suppliers. Russian suppliers are said to be quoting about 10 percent less than the published prices of Canadian producers on a metric ton basis, which actually results in a price discount of as large as 20 percent on c.i.f. Japan prices.

INDIA

India used 44,000 tons of asbestos in 1969. Some 3,000 tons of group 4 fibre was produced locally, and this mine is scheduled to produce 10,000 metric tons annually at some future date.

Purchases by India are highly dependent on the availability of aid funds. No purchases are made for cash. Thus Canada, Russia and the U.S.A. are the suppliers, while no southern African fibre is bought because of trade sanctions.

While Canadian fibre is preferred, Russian fibre will probably gain a greater share of the market for political and credit reasons.

Growth in demand for fibre will probably be slow for the foreseeable future, even though there is unused asbestos-cement capacity at present. During 1969, the government stipulated that the standard asbestos-cement sheets be made to a thinner standard which had the effect of reducing asbestos requirements by five percent.

Consumption is primarily confined to group 4 (about 50 percent), with the balance being group 5 and group 3.

KOREA

The Korean market appears to be very price sensitive. Our information indicates that there is little loyalty among consumers for their suppliers. Spot sales are prevalent.

Consumption is currently about 31,000 tons per year and is probably growing at a rate of about eight percent. The greatest requirement is for group 6, followed by group 5.

The major consumer is the Hankook Slate Co., who use at least 10,000 tons annually.

In 1969, Canada provided most of the Korean requirements, but in other years, South Africa has made significant sales. Consumption is almost entirely group 6 fibre with group 5 making up the balance.

ISRAEL

Israel used 9,514 short tons of asbestos in 1969. Details of this are difficult to determine. Direct enquiries have produced no positive response. Canadian export figures indicate that groups 4 and 5 probably account for at least 75 percent of the consumption. Growth in normal times would probably be more than 15 percent, but unsettled conditions have produced an erratic pattern in recent years.

THAILAND

The figures for 1969 for Thailand have been extrapolated from figures for the first quarter and the pattern of previous years. About 75 percent of the fibre used is group 6, reflecting a strong production of asbestos-cement sheet. Few details are available regarding the domestic companies.

OTHER ASIA

As shown in Table 5-38, Iran, Malaysia, Ceylon and Pakistan each used about 6,000 tons of asbestos in 1969. The bulk of this requirement, as well as that of the other smaller consumers in Asia, was primarily groups 4 and 5. In general, a growth rate of at least 10 percent can be expected for these areas.

TABLE 5-38

APPARENT ASBESTOS CONSUMPTION

ASIA - EXCLUDING CHINA AND RUSSIA - 1969

Short Tons

Country	Production	Imports					Apparent Consumption
		Canada	Russia	South Africa	Other	Total	
India	3, 300	17, 123	18, 112	--	5, 418	40, 653	43, 953
Korea	1, 620	24, 371	--	--	5, 009	29, 380	31, 000
Thailand	--	7, 500[e]	--	14, 000[e]	--	21, 500[e]	21, 500[e]
Israel	--	5, 975	--	1, 858	1, 681	9, 514	9, 514
Iran	--	5, 114	--	624	884	6, 622	6, 622
Ceylon	--	5, 778	--	--	--	5, 778	5, 778
Malaysia	--	6, 000[e]	--	500[e]	--	6, 500[e]	6, 500[e]
Pakistan	--	4, 095	1, 800	--	--	5, 895	5, 895
Other	--	15, 000[e]	--	--	8, 238	23, 238	23, 238
Total	4, 920	90, 956	19, 912	16, 982	21, 230	149, 080	154, 000

[e] Estimated.

NORTH AMERICA

We have included only the United States and Canada in the North American market. Mexico has been discussed in the section on Latin America.

Together the United States and Canada represent an asbestos market of approximately 850,000 tons with the United States accounting for over 90 percent of this amount.

UNITED STATES

The North American asbestos market has not grown at the same rate since the early 1960's as have markets in other industrialized areas of the world.

The majority of the asbestos requirements of the United States are supplied by Canada (94 percent), while South African fibre accounted for the balance. Most of the South African fibre was crocidolite asbestos or amosite.

Domestic production in the United States is approximately 125,000 tons per year. The bulk of this comes from California. There is 40,000 tons per year from the Ruberoid mine in Vermont and the balance is from small mining operations in Arizona and Carolina.

Trying to determine the exact breakdown of asbestos consumption, both by geographical location and by product group is extremely difficult. The industry is very secretive and nothing other than the most general statistics are usually available to the public. To properly evaluate the United States market, an extensive amount of personal contact with potential consumers is required.

Based on our preliminary survey and on the information supplied by United States customs districts and Canadian trade commissioners, it is estimated that 10 percent of the total fibre consumed in the United States is used on the west coast, 30 percent is consumed in the central area near Chicago and 60 percent in the eastern part of the country near the large industrial areas.

TABLE 5-39

APPARENT CONSUMPTION OF ASBESTOS-UNITED STATES-1969

Short Tons

Production		125,936
Imports:		
Canada	655,431	
South Africa	29,935	
Rhodesia	272	
Finland	6,235	
Others	2,685	
Total Imports		694,558
Exports:		36,173
Apparent Consumption		784,321

Our survey in New Jersey and Pennsylvania where 37 calls were made indicated the following distribution of the market for the major producers:

Johns-Manville	35.5%
Bell Asbestos	16.0%
Philip Carey	16.0%
Asbestos Corporation	13.0%
National Asbestos	6.5%
Turner and Newall	6.5%
Cassiar Asbestos	6.5%

Because of the prime importance of Canadian fibre in the United States market, it is useful to examine the character of the Canadian shipments. These are shown in Table 5-40. Despite many enquiries, it was impossible to find any better breakdown of total American consumption, either by fibre grade or company affiliation.

The grades shipped by the non-Quebec producers are not known with precision, but it can be expected that shipments from Advocate were primarily group 4; from Johns-Manville in Ontario groups 4, 5 and 7, and from Cassiar groups 3 and 4, with some 5.

TABLE 5-40

CANADIAN SHIPMENTS TO U.S.A. - 1969

		1&2	3	4	5	6	7D	7	8	Total
Quebec:	Asbestos Corporation	85	2,100	6,800	12,100	11,800	5,400	15,200	100	53,585
	Bell Asbestos	10	4,500	200	4,200	300	1,700	1,400	-	12,310
	Cdn. Johns-Manville	-	3,200	59,400	20,700	61,500	2,900	135,600	4,500	287,800
	Carey-Canadian Mines	-	-	1,000	5,400	4,500	1,500	119,800	-	132,200
	Flintkote Mines	-	-	5,500	600	200	300	12,700	2,000	21,300
	Lake Asbestos	-	600	7,900	3,100	1,300	13,000	11,500	600	38,000
	National Asbestos	-	800	2,400	3,400	3,200	100	10,300	-	20,200
	Sub-Total-Quebec	95	11,200	83,200	49,500	82,800	24,900	306, 500	7,200	565,395
Nfld:	Advocate Mines)									
	)									55,000e
Ontario:	Cdn. Johns-Manville)									
Yukon:	Cassiar Asbestos)									
	)									35,000e
B.C.:	Cassiar Asbestos)									
TOTAL										655,400

Statistics from the United States Department of Commerce and the Dominion Bureau of Statistics do not reveal the quantity or value of fibre produced by each company, as they are kept confidential. Erroneous results could be concluded by appraisal of these statistics. The dollar value of the company product may be very high, while the amount of asbestos consumed may be minimal. There is a paucity of information on each company's fibre consumption, which is due to the competitive nature of the industry. Sales dollar volumes are sometimes given by public corporations, but detailed product volume is hard to come by, especially among captive manufacturing plants.

Our preliminary survey indicates that about 50 percent of the total United States market is a captive one in that United States consumers own large manufacturing facilities who are forced to use their own fibre much like the iron and steel industry.

Asbestos-Cement Products

The largest growth rate in asbestos fibre consumption was in asbestos-cement products, which consumed an estimated 50 percent of the total asbestos fibre used in 1969. A slow-down in the general economy in Canada and the United States during 1969 prohibited any real growth in consumption, although late 1970 figures indicate increased consumption. Grades 4, 5 and 6 and a small amount of 7, are used in asbestos-cement products.

While Johns-Manville is the largest asbestos pipe and siding manufacturer in the United States, appreciable production comes from Certain-Teed, Flintkote and Atlas. They purchase fibre in the open market to meet their total fibre requirements when captive mines do not produce a particular grade or sufficient quantities of fibres.

Floor Tile

The floor tile industry is the second largest consumer of asbestos fibre, having an estimated 1969 consumption of over 200,000 tons chiefly in grade 7. The growth rate has been stagnant over the past year due to a slow-down in the construction industry in homes and office buildings. Indications are that by 1971 there will be an increase in this area of consumption.

Insulation

About five percent of the total fibre consumed has been used for acoustical and insulation purposes in manufacturing plants and office buildings. This rate is currently being drastically reduced by restrictions on sprayed insulation material due to a health hazard. In the near future almost no asbestos spraying will be permitted by municipal laws.

Fibre Specifications

Nearly all of the asbestos consumers use some of the Q.A.M.A. specifications. Some industries have oil absorption, strength and surface area tests on which they place most emphasis. There are no series of standard tests, even in different plants of one manufacturing company. The standard procedure for large consumers is to buy fibre on their own specifications, while the smaller consumer usually uses Q.A.M.A. specifications.

In some plants, clean fibre is mandatory while other concerns can use relatively dirty fibre, all at the same buying price. Consumers who demand a clean fibre, especially in group 7 and 8 shorts, will pay a premium. This is evident in ceiling and floor tile production where colour or "whiteness" is all important. Coalinga fibre from California commands a premium of $20 per ton with some consumers due to its colour and absence of grit.

Marketing of the Lac Roberge fibre will have to be done on each consumer's fibre specifications. Grades of potential fibre will have to be blended for each consumer after preliminary tests such as Quebec Standard, Bauer-McNett, surface area and filtration have been done. The preliminary market survey revealed that these tests are important to most consumers. Except for a few instances, all large fibre consumers want to see Lac Roberge fibre and fibre tests before sending their specifications. A representative five-pound sample of fibre would suffice in most cases.

The Distribution of Fibre to Markets

Nearly all United States asbestos fibre contracts, other than with captive clients or mines, are on an annual basis with a 90-day cancellation clause. Fibre is usually ordered on a monthly basis and depending on availability of the particular fibre, about two or three months' plant inventory is maintained.

Large consumers order in 40 to 50-ton carload lots. The fibre is pressure packed, generally in polyethylene 100-pound bags and palletized. The smaller asbestos consumers, who consume less than 300 tons per year, usually buy fibre in ton lots from asbestos fibre distributors.

Fibre distributors may represent a single producer with specific areas and their own consumers or they may not be allied to any one producer.

Large Canadian producers can and do market their fibre using all three possible methods:

- Direct from producer to consumer.
- Through an exclusive agent who markets nothing but the one brand of fibre.
- Through a fibre distributor who may distribute fibre for several producers.

About 50 percent of the 16 fibre distributors we contacted in our survey were exclusive distributors.

The Johns-Manville Corp. has a large sales organization, not only to handle the fibre that they have available for sale, but also to handle a wide range of fabricated products. As a consequence they are in direct contact with all sectors of the industry and make only limited use of fibre distributors.

Irrespective of whether a producer chooses to form his own marketing organization or to make use of independent agents, there is a cost incurred which will in most cases be the same for either method. This cost generally falls in the range of two percent to four percent of sales.

South African, Finnish and United States producers sell direct, but also have fibre distributors, although not on an exclusive basis.

Some distributors, such as Smith Chemical, would like to expand and are free to do so, but cannot obtain sufficient grade and tonnage of fibre through restrictions. Huxley Development Corporation in New York and North American Asbestos Corporation in Chicago would like to market Lac Roberge fibre providing details could be finalized. Most of these free or independent distributors would like an exclusive fibre sales agreement on a world-wide basis. If a world-wide sales contract could be negotiated, most of these distributors would not demand an exclusive agency for all countries. Mr. A. Novak, president of Huxley, has stated that he could market 100, 000 tons of Lac Roberge fibre in 1973. We are inclined to think that this is a bit optimistic.

Pricing

In our survey, this was the most difficult topic to discuss and the companies were reluctant to give even partial information. In most interviews, no idea of pricing was obtainable except to say that Q.A.M.A. published prices would serve as a basis for negotiations. One could not help but feel that some discounts were given. In one case, freight was credited after an allowance was made for Canadian funds discount. Indications are that large consumers are offered some discount for annual contracts and there is some price reduction for groups 7 and 8 fibre which are in ample supply.

Commissions for fibre distributors are about two to three percent of the selling price. Only one distributor said the rate of commission is negotiable.

Future Growth

There has been no significant growth in Canadian asbestos exports to the United States in recent years. In fact preliminary reports published by the United States Bureau of Mines state that Canadian exports to the United States dropped from a total of 695, 000 tons in 1969 to about 661, 000 tons in 1970.

This lack of growth reflects the general economic slowdown and the consequent lack of industrial and residential construction. Indications are that an improvement in economic conditions has started recently. There was an increase in housing starting in late 1970 and this should ensure that housing expenditures will rise during 1971 and be one of the major growth areas in the economy. This upturn resulted partially from an infusion of funds into low-cost housing on the part of federal governments, both in Canada and the United States and also because of easier credit conditions and the greater availability of mortgage funds.

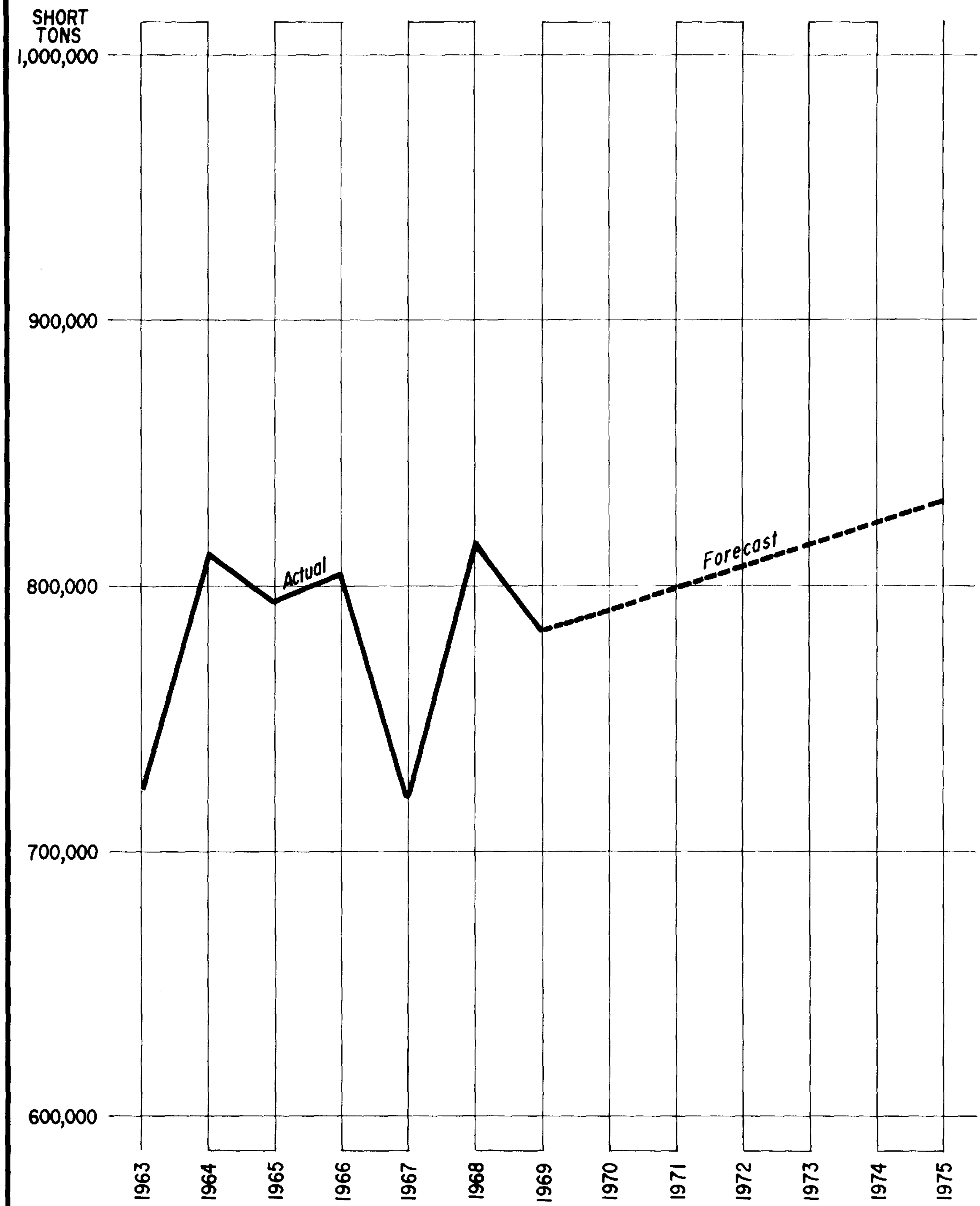
Many economists are predicting that a particularly strong rate of economic growth will commence in the latter part of 1971 and continue on through 1972 and 1973.

Manufacturers of asbestos consuming products are almost universal in their feeling that they will require more fibre in each successive year. Asbestos-cement pipe and siding will exhibit the greatest growth and these products use a high proportion of fibre in their manufacture. Shingles are not expected to grow as rapidly according to some consumers of asbestos.

The production of brake and clutch linings depends on the automotive industry, but this will almost certainly experience growth with the expected improvement in general economic conditions.

Our survey indicates that the spinning fibres of groups 1, 2 and 3 are in short supply. However, only a small number of tons is required to make up any deficiency in these groups. Group 4 fibre supply and demand are equal. Some slight excess is evident in group 5 and a shortage has developed in group 6. There is an excess of group 7 off-colour or gritty fibre, but no excess in the eastern United States of clean, white, group 7.

Warehouse stocks of fibre in the United States are currently at a minimum. This is because of the annual large shipments made by Quebec producers to foreign markets prior to the close of the St. Lawrence seaway. Philip Carey was recently forced to buy fibre to meet the requirements of their manufacturing plant. Asbestos Corporation is known to have recently purchased fibre to meet order commitments.



CONSUMPTION OF ASBESTOS—UNITED STATES

FIGURE 5-5

Asbestos paper production is on the increase, which partially accounts for the group 6 shortage. Increasing amounts of group 5 fibre are expected to replace some group 4 fibre in asbestos-cement products due to availability and price. All consumers visited have expressed unreservedly that they expect fibre consumption in their particular field to increase by 10 to 20 percent between now and 1975.

On the basis of all data that we have obtained in carrying out our survey we have prepared a forecast of future consumption, shown in Figure 5-5, that attains 830,000 short tons in 1975. This forecast did not take into account the preliminary estimate for actual consumption in 1970 of 750,000 tons, some 40,000 tons below that indicated on our long-term forecast line. Nevertheless, we feel that the estimate for 1975 is a reasonable objective. Certainly if the United States is not able to consume this quantity of asbestos by 1975, representing only a 1.0 percent growth rate from 1969 consumption, then the future prospects for the entire North American economy are not too encouraging as asbestos consumption reflects directly the status of our economy.

CANADA

Consumption figures shown in this report are "apparent consumption", i.e. production plus imports less exports. Generally this is an accurate representation of actual consumption. However, in the case of Canada, small percentage changes in producer's inventories result in large swings in Canadian apparent consumption. Canadian statistics do not recognize this situation. Therefore it is necessary to make estimates as shown in the following table.

TABLE 5-41

ESTIMATED CANADIAN CONSUMPTION OF ASBESTOS - 1969

Short Tons

Group	Consumption
1,2 & 3	1,900
4	13,600
5	3,630
6	12,700
7D	1,080
7's	40,700
8 & 9	1,620
TOTAL	75,230

The major consumers in Canada are Canadian Johns-Manville and Atlas Asbestos Ltd. (a member of the Turner and Newall group). Products produced include packings, brake and clutch linings, insulation, floor tiles, plastics, paint fillers and certain building products. Notable is the very limited production of asbestos-cement products.

Vertical integration in the Canadian asbestos industry presents a major obstacle to anyone wishing to enter the industry either as a supplier of fibre or as a manufacturer of finished products. The manufacturing sector is known to be very competitive and profit margins are minimal.

The one product area which is relatively more profitable is that of asbestos-cement pipe. This is related to the development and successful marketing of transite pipe by Johns-Manville. They consequently control an overwhelming share of this market.

BACM Industries Ltd. of Winnipeg, which is a pipe manufacturer has been considering the possibilities of manufacturing asbestos-cement pipe, but nothing has yet been decided.

In Canada, building products using asbestos fibre face a much greater variety of competition than perhaps any other country. The unlimited availability of other raw materials such as wood, aluminum, fibreglass and petroleum-based products all furnish asbestos with stiff competition.

Canadian consumption of asbestos is not markedly different from that of the United States on a per capita basis. However, the distribution by grade is different. Over fifty percent of the fibre consumed in Canada is in groups 7 and 8. This reflects the usage for floor tile, building papers and filler both by the paint and chemical industries.

The growth rate of asbestos consumption in Canada will probably parallel that of the United States. As a consequence, no unusual growth is anticipated. The possibilities of a housing boom are being mentioned quite frequently of late with the lowering of interest rates. This would undoubtedly give rise to an increase in asbestos consumption particularly in groups 4 to 6. However, even if the increased demand was ten percent, the actual additional tonnage involved would only be in the order of 3,000 to 4,000 tons.

Consequently the Canadian market outlook is not promising for Lac Roberge fibre. Sales arrangements might be made with some consumers for limited quantities of fibre once a production decision is made.

LATIN AMERICA

GENERAL

The countries of Latin America must rely heavily on imports for their supply of asbestos. Although production can be expected to increase in the next few years, the growing demand for asbestos will keep most of these countries dependent on imports.

Asbestos-cement products are ideally suited for construction purposes in developing countries, and increasing growth and development in the countries of Latin America together with the construction booms presently taking place in many of these countries can be expected to result in a corresponding increase in demand for asbestos products.

Mexico is the largest consumer of asbestos in Latin America and imported over 40,000 short tons of asbestos in 1969. Brazil, Colombia and Argentina are the next largest consumers, followed by Chile, Venezuela and Peru.

A large percentage of Latin American asbestos imports is supplied by Canada. Of the 115,075 tons imported in 1969, 85,645 tons or 74 percent was supplied by Canada.

A study of Canadian export statistics indicates that the greatest demand in each country is for grades 4 and 5. The increasing demand for these grades reflects the growth of the asbestos-cement industry in these countries, a growth which may be expected to continue as the construction and public utility sectors continue their rapid expansion. A certain proportion of the fibre required will continue to be crocidolite.

ARGENTINA

In 1969, Argentina imported 18,140 short tons of asbestos.

TABLE 5-42

APPARENT CONSUMPTION OF ASBESTOS LATIN AMERICA - 1969

Short Tons

	Domestic Production	Imports					Apparent Consumption
		Canada	South Africa	U.S.A.	Other	Total	
Argentina	------	11,040	6,410	66	474	17,990	17,990
Brazil	11,500	14,935	940	1,800	2,035	19,710	31,210
Chile	------	7,130	500	490	515	8,635	8,635
Columbia	50	10,025	2,550	780	80	13,435	13,485
Costa Rica*	------	415	------	-----	-----	415	415
Ecuador	------	995	------	-----	-----	995	995
El Salvador*	------	420	------	-----	-----	420	420
Guatemala*	------	850	------	-----	-----	850	850
Honduras*	------	310	------	-----	-----	310	310
Mexico	------	31,040	3,910	5,700	110	40,760	40,760
Nicaragua*	------	110	------	-----	-----	110	110
Panama*	------	200	------	-----	-----	200	200
Peru	------	2,840	------	-----	1,660	4,500 e	4,500 e
Uruguay*	------	745	------	-----	-----	745	745
Venezuela	------	4,590	------	-----	1,410	6,000 e	6,000 e
Total	11,550	85,645	14,310	8,836	6,284	115,075	126,625

* Canadian import figures only.

e Estimated

The asbestos-cement industry accounts for approximately 80 percent of the asbestos consumed. The remaining 20 percent of the market consists of the manufacture of friction products such as brake blocks, linings and clutch facings, as well as the production of electrical and thermal insulating tapes, gaskets, wicks and wick packings, acoustical insulation, etc. The market for friction products may be expected to grow considerably as the Argentine automotive industry continues its rapid expansion. Asbestos may also find a market as filtering material for industrial oil purifiers.

The main consumers of asbestos in Argentina are the following companies:

Eternit Argentina S.A.,
Esmeralda 15,
Buenos Aires.

Monofort S.A.I.C.
25 de Mayo 267,
Buenos Aires.

Cofic S.A.I.C.,
Iquazu 2493, Haedo,
Prov. de Buenos Aires.

Cefico S.A.,
4 de Febrero 240,
San Andres, Buenos Aires.

BRAZIL

Brazil is the second largest consumer of asbestos in Latin America and in 1969 imported 19,700 short tons of asbestos. Of the total quantity imported, 76 percent originated in Canada, five percent in South Africa and nine percent in the United States. Brazilian importers of asbestos are required to procure 35 percent of the quantity imported from local sources in order to qualify for import tax exemption. The quality of Brazilian fibre is lower than Canadian, though it is still widely used for asbestos-cement manufacture. However, textiles and friction products are made exclusively with imported asbestos.

The main manufacturer of asbestos-cement products in Brazil is S/A Mineracao de Amianto of Salvador.

The increase in imports and production in recent years is due mainly to the growing amount of civil construction underway in Brazil.

Brazil does not grant customs duty concessions on asbestos to members of the Latin American Free Trade Area. The present import tax levied on asbestos is 33 percent ad valorem, whether in ore, fibre or powder. An importer can import asbestos duty-free if he can prove to the authorities that he has purchased Brazilian-produced chrysotile and anthophyllite equivalent to 21 percent and 14 percent respectively of the foreign asbestos he intends to import.

CHILE

Chile imported 9,500 short tons of asbestos in 1968, 84 percent of which originated in Canada. As in other Latin American countries, manufacturers of asbestos-cement products are the major consumers of asbestos fibre. In Chile, asbestos is also widely used in packing, brake lining, woven goods and to a minor extent in automobile undercoatings.

COLOMBIA

There is a large market for asbestos in Colombia at present. However, by 1973, Colombia could supply all of her own chrysotile requirements and there will be a large scale reduction in imports. The following companies are the main consumers of asbestos in Colombia.

TABLE 5-43

COLOMBIAN CONSUMPTION-1969

Company	Short Tons
Eternit Colombiana S.A.	10,640
Pavco S.A.	660
Colombit S.A.	1,570
Repuestos Colombianos Ltda.	550
Rusco de Colombia S.A.	470
TOTAL	13,890

Eternit produces asbestos-cement products and is by far the largest user of asbestos in Colombia. They imported 9,500 tons of chrysotile of grades 3, 4, 5 and 6.

The major competitor to Eternit is Colombit S.A. The company manufactures cement products and used 1,424 tons of asbestos in 1969.

Colombian customs duties are five percent ad valorem, and subject to payment of 30 percent previous deposit (refundable). It is still included in the list of free import items.

ECUADOR

Ecuador has only one plant consuming asbestos fibre, that of Eternit Ecuatoriana S.A. This plant makes asbestos cement piping, tubing, roofing, wallsiding and other asbestos-cement products. In 1968, imports were 1,125 metric tons while in 1969 they were 900 tons. These were grades 4 and 5.

Ecuadorian customs duties are 20 percent ad valorem, plus 0.40 sucres per kilogram.

MEXICO

Mexico is the largest consumer of asbestos in Latin America using over 40,000 short tons per year, all of which is imported. The asbestos market is expected to increase at a rate of from 12 to 15 percent annually for the next five to ten years.

A mine coming into production in 1971 at 300 tons per day is expected to supply less than one-quarter of the total fibre needed in the country.

PERU

Peru imported 4,675 short tons of asbestos in 1967 and 4,375 tons in 1968. There are no comparative figures available for 1969.

VENEZUELA

In 1969, imports into Venezuela were 5,160 short tons of which 88 percent came from Canada and 11 percent from South Africa.

Consumption is about two-thirds of groups 4 and 5 and one-third of groups 6 to 9. About two-thirds of the market is tied up with Canadian suppliers and the remaining one-third is open to independents.

AUSTRALIA AND NEW ZEALAND

AUSTRALIA

The Australian asbestos-cement market is dominated by two major consumers producing a wide range of products. Since the producer of blue asbestos in Western Australia ceased production several years ago, virtually all asbestos is imported and most of the chrysotile requirements are imported from Canada. Table 5-44 shows asbestos consumption for 1969.

It is difficult to obtain details of the breakdown by grades of this fibre. Canadian export figures indicate that 78 percent of Canadian exports to Australia are groups 4 and 5, with the remainder being groups 6 to 9.

Discussions in Australia lead us to conclude that the major grade being purchased from Canada is 5R; perhaps as much as 50 percent of total requirements. The next major fibre group trade is in group 4 products followed by group 6. Most of the imports from South Africa are amosite.

Use of group 7 fibre has not been developed to nearly the same degree as in North America. This has resulted primarily because of the fact that no domestic production is available and the cost in Australia of group 7 fibre is approximately double the cost of the same fibre in the eastern United States. Thus, products such as vinyl asbestos tile have not become the widely-used consumer products that they have in North America.

The Australian market is about to enter a period of uncertainty with the Woodsreef mine scheduled to begin production in 1972. Logically, Woodsreef fibre should find a ready market in Australia, along with Canadian fibre which will continue to fill certain uses.

Over the past 16 years, growth in Australian asbestos consumption has been about four percent per year. However, during the present decade, Australian economic growth has been rapid and for the period 1962 through 1968, a 5.7 percent growth rate in Australian asbestos consumption has prevailed. We feel that a six percent rate can be expected for at least the next five years.

TABLE 5-44

APPARENT ASBESTOS CONSUMPTION

AUSTRALIA - 1969

		Short Tons
Production		822
Imports:		
Canada	48,113	
South Africa	10,757	
Other	198	
Total Imports		59,068
		59,890
Exports:		182
Apparent Consumption		59,708

NEW ZEALAND

Consumption of asbestos in New Zealand was 6,550 tons in 1968, somewhat lower than the average for the 1963-1968 period of 7,700 tons. Consumption is primarily by a subsidiary of James Hardie and Co. (the large Australian company).

The New Zealand market will probably parallel the Australian situation in that Australian and Canadian fibre will dominate.

AFRICA

We have not attempted to describe the African market in any detail. Obviously the requirements of southern Africa will be satisfied by the South African mines. Canadian exports to all of Africa are about 10,000 tons, the significant customers being the Congo (which took 2,000 tons), Nigeria (3,000 tons) and Tunisia (1,600 tons).

North and West Africa are the areas with greatest potential as asbestos consumers, but this will depend upon the installation of new plants. The Eternit group, for instance, has just established an asbestos-cement plant in Libya which should be a good growth area.

6. PRICES

Canadian prices are generally published by Canadian Johns-Manville and Asbestos Corporation, presumably following discussion by the Quebec Asbestos Mining Association. The remaining Canadian producers, with the exception of Cassiar, use approximately the same grade classifications and prices, which then become the Canadian List Price. Canadian list prices over the past 10 years are shown in Table 6-1.

Cassiar prices generally parallel the Quebec producers' prices both with respect to grade classification and price increases.

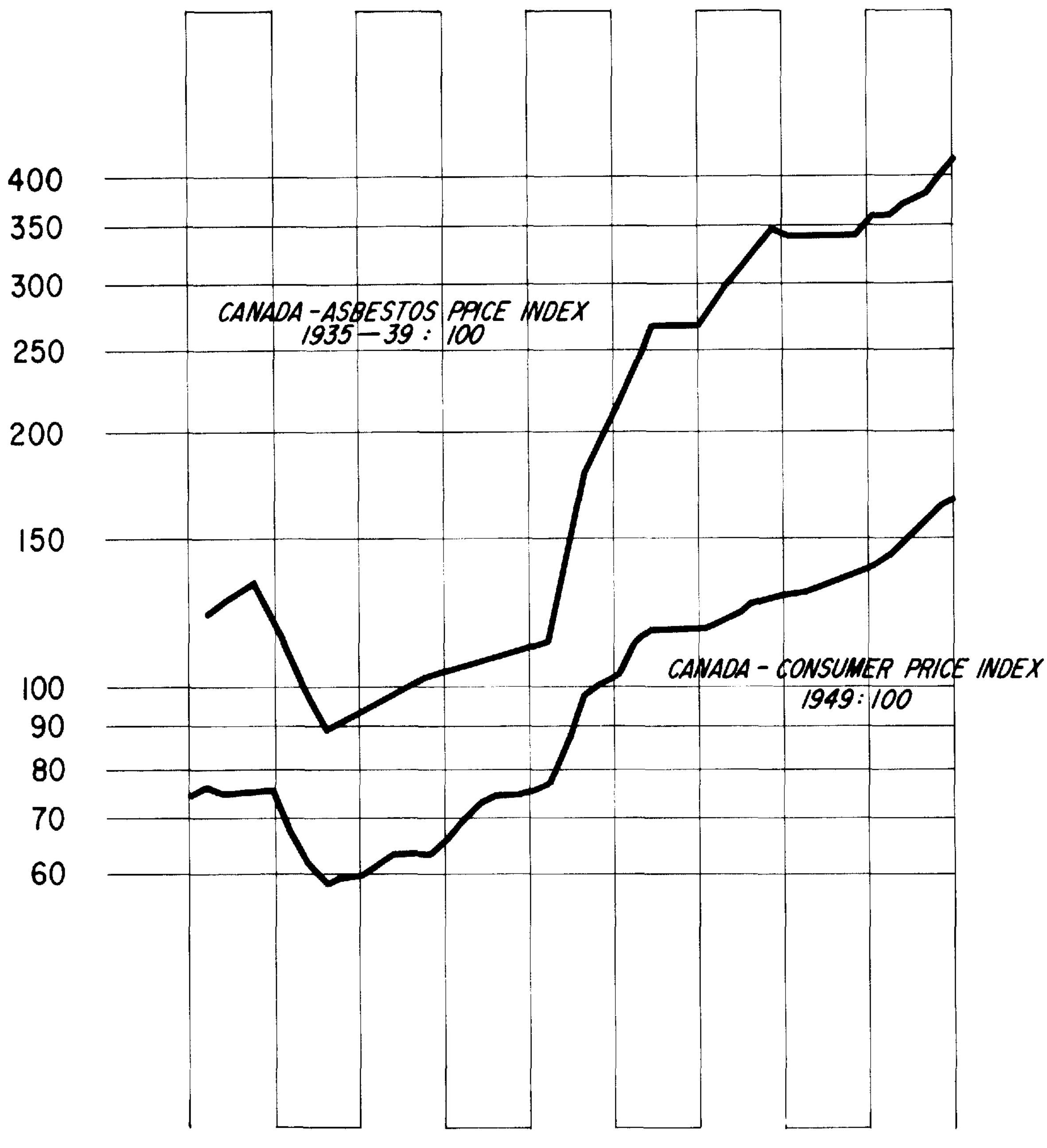
TABLE 6-1

CANADIAN PRODUCERS' PRICE LISTS, 1960-1971

Canadian Dollars per Short Ton
F.O.B. Mine

Grade	Jan. 1 1960	Jan. 1 1965	Apr. 1 1967	Apr. 1 1968	Jan. 1 1969	Jan. 1 1970	July 1 ? 1971
3Z	$345	$345	$360	$367	$385	$396	$412
4A	320	320	335	341	358	368	383
4T	181	190	198	201	211	218	227
5D	142	156	165	168	178	184	193
5R	120	132	140	143	152	156	164
6D	86	95	101	104	110	113	120
7D	75	82	85	87	91	94	100
7K	50	54	54	55	58	59	63
7T	41	44	44	44	47	48	51

The trend of these Canadian list prices, calculated as an index by the Dominion Bureau of Statistics, is shown in Figure 6-1, for the past 45 years. As a comparison, the Canadian consumer price index is also shown. It is apparent that asbestos prices have been increasing at a faster rate than the "cost of living". There is no reason to suspect that this relationship will be reversed. At worst, the two



COMPARISON OF ASBESTOS PRICES AND GENERAL PRICES IN CANADA

FIGURE 6-1

rates of growth might become parallel. This is important when considering projections of costs and revenues in the course of cash flow studies, because it means that current prices may be projected with the confidence that asbestos prices will probably continue to exhibit real growth.

Forecasts of future price increases are difficult to make with precision, but it is felt that producers will find themselves in a sufficiently strong position over the next five years to maintain the general pattern of annual price increases in line with expected inflationary trends. The most recent price increase was effected on January 1, 1970 and amounted to three percent. In December 1970 a further price increase was announced, which was to become effective January 1, 1971. This has since been withdrawn because of strong consumer reaction. Consumers argued, with some justification, that they had to absorb a five percent increase in the last half of 1970 due to the freeing of the Canadian dollar. The producers have not announced their plans for instituting a new price increase, but one is expected to take effect on July 1, 1971.

Since 1960, the price for group 4 fibre has risen 20 percent while groups 5 and 6 have increased 30 percent and 35 percent. Expansion in the asbestos-cement industry has resulted in heavy consumption of groups 4, 5 and 6 fibres thus allowing major price increases. Shorts and float grades of 7 and 8 show an increase in price of approximately 15 percent.

Discounting in Europe is widely practised, although some sizable consumers contacted during this study claimed they received no discount. While specific figures were rarely mentioned, discounts amounting to five percent are probably fairly common at this time. These amounts may not appear as discounts from list price, but rather as freight adjustments of some kind.

Another type of adjustment is exemplified by a small, northern Italian consumer. This company is accustomed to importing from Canada C.I.F. Venice. During the winter, Asbestos Corporation is apparently shipping fibre in containers to Antwerp and thence by rail to the company's plant at no extra cost to the consumer.

TABLE 6-2

CASSIAR ASBESTOS PRICE LIST

F.O.B. North Vancouver, B.C.
(effective January 1, 1970)

Grade	Mine	Price
AAA	Cassiar	$845
AA	Cassiar	673
A	Cassiar	508
AC	Cassiar	363
AK	Cassiar	249
CP	Clinton	234
AS	Cassiar	217
CT	Clinton	211
AX	Cassiar	193
CY	Clinton	136
AY	Cassiar	136
AZ	Clinton	90*

* estimated

There is some evidence that partial freight allowances may be given to some consumers in the United States. We also suspect that quantity discounts are negotiated for large consumers. In all sales contracts, the Q.A.M.A. list prices serve as a basis. Fibre distributors offer fibre at the same price as the fibre producer who usually offers fibre to the distributor at about a three percent discount. The fibre distributor is usually restricted to a particular territory from which house accounts are reserved for direct sales from the mine.

In Japan, discounts seem to be quite common at present. We have been told that these are as large as five percent on the F.O.B. Canadian mine price. Whether these discounts are passed on to the ultimate consumer or absorbed by the trading houses as profit is less well known. Russian fibre is said to be quoted at a price per metric ton which is 10 percent lower than the Canadian price per short ton or in effect a 20 percent discount.

The pricing situation on Russian fibre in Europe is more confused. Some consumers are quite obviously paying 10 percent or 15 percent less for Russian fibre than they would have to pay for Canadian fibre. On the other hand, there is evidence that the Russian prices are trending closer to parity with Canadian prices, and one consumer stated that there is now a price-fixing agreement between the Q.A.M.A. and the Russian exporters. This is difficult to believe, but probably represents strong evidence of a firming in Russian prices, particularly now that the quality of the fibre has achieved such wide acceptance in Europe.

South African chrysotile fibre has in past years been somewhat cheaper than Canadian fibre, but with shortages beginning to appear it is unlikely that this will continue in any significant way.

TARIFFS

The major asbestos consuming countries have no tariffs on the import of unmanufactured asbestos. Some of the less developed nations, particularly in South America, do have tariffs, but these are usually uniformly applied to all imports, regardless of origin.

Portugal, however, imposes a tariff of 50 escudos (EFTA countries) or 100 escudos (most favoured nation) plus seven percent on the C.I.F. value.

Brazil levies on duty of 33 percent ad valorem, but allows the importer a rebate if he can prove that he has purchased Brazilian chrysotile and anthophyllite equivalent to 21 percent and 14 percent respectively of the foreign asbestos he intends to import. No special concessions are granted to other members of the Latin American Free Trade Area.

Colombia imposes a customs duty of five percent ad valorem, which is subject to prepayment of 30 percent.

Ecuador levies a tariff of 20 percent ad valorem, plus 0.4 sucres per kilogram.

These are the only tariffs of which we have knowledge. It is obvious that their effect on world asbestos trade is infintesimal.

7. TRANSPORTATION

Canadian list prices are F.O.B. Quebec mine (Quebec Producers), or F.O.B. Vancouver (Cassiar). Exports shipped overseas from Quebec require approximately 100 miles of rail haulage from Thetford Mines to Quebec. The costs for the rail haulage are as shown in Table 7-1.

TABLE 7-1

RAIL RATES FROM THETFORD MINES

(Rate per Short Ton, Minimum 40 Tons)

	Fibre Group					
To	3,4 & 5		6			7 & 8
Montreal, Quebec	59	$12.63	40	$ 8.56	44	$ 9.42
Quebec, Quebec	57	12.20	37	7.92	41	8.77
Saint John, N.B.	81	18.55	73	16.71	73	16.71
Halifax, N.S.	81	18.55	73	16.71	73	16.71

With the advent of containerization, this traditional pattern is changing. Quebec port is closed during the winter months except for the services offered by the Danish, Yugoslav and Russian shipping lines, which command a premium of about 10 percent. Consumers have heretofor been faced with building up a large inventory to carry them over the winter months, or paying a freight premium for winter shipments through Quebec, or one of the Atlantic ports. Now that container systems are becoming more common, shipments through Atlantic ports can be made to Antwerp for about the same cost as summer shipments through Quebec by traditional methods.

Some problems must yet be solved. The normal 20-ton container is difficult to load and unload with palletized bags of fibre unless one has the correct equipment. Most consumers do not have such equipment and yet they must use pallets. Bag dimensions are also very important. We understand that most current bags are not sized for efficient packing into containers. This means that the producers must change their packing machines (an expensive business) or use spacers in the containers.

The Eternit group is giving consideration to receiving all their European requirements by container through one port (probably Antwerp) and distributing to their various European plants by barge or rail. This will be done to points as far as Genoa, Italy. Inland freight from Antwerp to Genoa in containers is $10 per ton. Even though Genoa is a sea port, the conference rates to Genoa from Canada are $7.50 per ton higher than to channel ports, so that the slight additional freight cost to Italy is acceptable.

As mentioned above, palletized shipments are universally desired. Even the smallest factories need substantial warehousing for their asbestos requirements and handling pallets by fork-lift truck is a definite requirement.

Fibre is normally pressure-packed in 100-pound bags. A typical bag size is 24 inches by 16 inches by 9 inches. These are then piled on pallets and shipped as is, or strapped. Sometimes a plastic cover is placed over the pallet prior to strapping.

Bags have traditionally been jute (hessian) or multi-wall paper. The former is most common for export shipments. In recent years, polyethylene liners have become common. The recent introduction of woven polypropylene bags has found wide acceptance and this bag will probably become standard in the near future.

A study of the costs of shipping fibre from Chibougamau, for export orders, reveals a freight differential of $8.40 per ton in favour of the Eastern Townships.

Canadian National Railways have quoted the following rates for containerized shipments from Chibougamau.

TABLE 7-2

C.N.R. QUOTATIONS, CONTAINERS BY RAIL FROM CHIBOUGAMAU

To	A	B	C	D
Montreal, Quebec	$210	$140	$0.35	$ 70
Quebec, Quebec	195	130	0.33	65
Saint John, N.B.	345	230	0.58	115
Halifax, N.S.	345	230	0.58	115

A - charge per 20-foot container
B - charge per container, minimum of two containers
C - rate per 100 pounds in excess of 20,000 pounds per container
D - charge per empty container

These are preliminary quotations and could be expected to be adjusted downwards once all conditions are negotiated.

A substantial fraction of Quebec asbestos (at least 150,000 tons in 1970) is now moving in containers by truck to Montreal. The rate to Montreal is $5.60 per ton. This rate can be compared with the C.N.R. rate for containers from Chibougamau by using a large hypothetical shipment. This rate works out to $14 per ton. The freight differential is therefore $8.40 per ton.

Current conference rates on asbestos fibre from the St. Lawrence to Rotterdam/Antwerp are $19 per ton for groups 4 and 5, and $17 per ton on groups 6 and 7.

On container shipments, C.P. Steamships out of Quebec charges $40 per container for handling. Clarke Traffic, in Montreal, charges only $15 per container.

Cast Containers, who claim to have handled 150,000 tons of asbestos in 1970, gives a rate of $17.35 per ton in containers, all inclusive.

Conference rates to Japan are as follows:

Crude and Fibre	less than 60 cubic feet per ton	US$32.70/ton
	more than 60 cubic feet per ton	37.70
Refuse and Shorts	less than 60 cubic feet per ton	31.60
	more than 60 cubic feet per ton	36.60
Grade 7		31.60

Wharfage charges in Canada are 35 cents per ton in all National Harbours Board Ports for non-containerized shipments.

To conclude, freight costs to Europe and Japan will likely be in the order of $5 to $10 per ton higher from Chibougamau as compared with Thetford Mines. The actual figure can only be defined following negotiations.

8. HEALTH REQUIREMENTS AND THEIR IMPLICATIONS

There has been considerable mention in the public press concerning the alleged dangers of the use of asbestos. This print has only appeared since words like "pollution", "ecology" and "environment" have become common terminology.

In recent years serious investigations have been made into the medical implications of contact with asbestos fibre. These studies have shown the necessity of controlling asbestos dust and have resulted in greater attention being paid to this in asbestos mills.

Consumers in the United Kingdom have reacted the most vigorously. British dockers have caused the greatest problem. London and Liverpool dockworkers will not handle asbestos. It may be shipped through Southampton if it is palletized and covered with a polyethylene "tea cozy". On the other hand there is no problem in the ports of Manchester or Avonport (near Bristol).

The United Kingdom Factories Act which came into effect in May, 1970, imposes very heavy restrictions on all users of asbestos or asbestos-bearing products. It has been found, for instance, that cutting asbestos insulation in the confined space of a hold of a ship under construction is very bad. This important use of asbestos has now been virtually eliminated in Britain.

Denmark, Sweden and the Netherlands are now introducing new regulations modelled on the British pattern, although somewhat less restrictive in effect. Germany will probably be the next to follow.

The Latin countries show no inclination to follow this trend for the present. For instance, we were told that there are only 100 men in France who are receiving social compensation for asbestosis problems and at least half of these are old men who worked in the industry for many years.

Asbestosis is a lung disease caused by breathing dust-laden air containing asbestos. Mechanical lung damage and chemical action damage are two postulated theories. The questions of total dust, relatively long or short fibres and exposure time have never been defined.

The threshold limit value (TLV) as defined by the American Conference of Governmental Industrial Hygienists (A.C.G.I.H.) in 1968 was 12 fibres per millilitre for asbestos fibres greater than 5 microns in length. The British now use a standard of 4 fibres per millilitre. The A.C.G.I.H. proposed a standard of 5 fibres per millilitre for 1970.

Dust control methods used in combating asbestosis are:

1. Segregation of dusty areas and operations in milling and manufacturing plants.

2. Suppression of the dust by proper design and control of ventilation systems.

3. Protection of personnel by respirators and education of personnel in preventative measures.

4. Medical examinations on a periodic and compulsory basis.

Although companies advise and request asbestos workers to use respiratory dust masks, there are no Canadian or United States regulations making their use mandatory. Provincial officials make periodic surveys of asbestos operations in Ontario and Quebec. United States asbestos consumers come under municipal, state and federal health enforcement agencies. Except for United States federal regulations, there are no sets of standard dust limits.

Some of the programmes that are in effect or soon will be to assess and restrict the problem of asbestos pollution should be mentioned.

Certain-Teed in the United States has spent $2.5 million in capital investments to control air and water pollution at manufacturing plants. An additional two million dollars has been allocated.

The Illinois Institute of Technology has been awarded a contract by National Air Pollution Control Administration to assess emissions of asbestos dust and what controls are being used. The National Insulation Contractors Association, in co-operation with the Asbestos Workers Union approved the establishment of a National Health and Safety Fund.

Extensive programmes for reducing insulation dust exposure to workers have been put into operation at Royal Noval Shipyard, Plymouth, England. Cape Asbestos in England has a new programme to minimize exposure of workers to insulation dust.

A new disposable dust mist respirator has been marketed by American Optical Corporation.

In 1969, Johns-Manville completed work on 17 air pollution controls and water purification projects at 15 locations at a cost of $1.3 million. Johns-Manville researchers have developed a new and more efficient filter media for disposable face masks.

Mr. H. Levine, president of Asbestospray Inc. in Newark and president of the Sprayed Mineral Fibre Manufacturing Association said that New York City and Philadelphia have banned the use of asbestos in sprayed-on fireproof and insulation materials. Mr. Levine believes that the asbestos producers have a responsibility here, but to-date they have not taken any action.

The point has been made that we must pay attention to any potential asbestosis problem. Research is now being carried out and this will continue. Applications for asbestos will undoubtedly be found that are dangerous. Equally likely is that research will indicate how to control the problem areas. It is felt that the long-term implications are not serious and that this factor should not be a deterent to the industry, or cause for any undue concern.

9. OUTLOOK FOR LAC ROBERGE FIBRE

GENERAL

In order to discuss the outlook for marketing Lac Roberge fibre, we must assume that it will prove to be commercially feasible to meet the specifications required by asbestos consumers.

The supply-demand statistics indicate a very rosy future if one assumes that Russia will not significantly increase its exports. The question of Russian intentions is the Sword of Damocles hanging over any market forecasts. Not one person contacted in the course of our study has been able to comment meaningfully on Russian intentions. The most recent data available suggests that Russian exports will remain relatively stable. This has to be the basis upon which the situation is analysed.

WORLD

We have presented, in Table 9-1, three projections of world consumption. The first is a summation of the various growth patterns calculated for each country by forecasting methods, adjusted in a few cases. The projections are listed in Table 9-2.

The second projection is the same as the first, except for Japan. In the case of Japan, we have used the projections published by the Asbestos Committee of the Japanese Ministry of International Trade and Industry. This projection is more optimistic, but we are inclined to think it is more realistic than the growth calculated mathematically. The third projection is a forecast using published world consumption figures for the past seven years as the base. Projections two and three are in very close agreement.

Future production, as shown in Table 9-1, was determined by listing all known expansion plans by existing producers, modified by our knowledge of the current status of these expansion programmes. In addition, we have included the production that will be forthcoming from new properties where a production decision has been made or where such a decision is imminent.

TABLE 9-1

PROJECTED WORLD CONSUMPTION AND PRODUCTION OF ASBESTOS

1970-1975

Short Tons

		1969	1970	1971	1972	1973	1974	1975
Projected Consumption	(1)	4,765,200	5,004,700	5,234,000	5,469,200	5,673,600	5,909,200	6,150,500
	(2)	4,765,200	5,004,700	5,249,700	5,501,800	5,726,900	5,986,400	6,250,400
	(3)	4,732,000	5,024,400	5,246,000	5,458,000	5,786,000	6,066,000	6,330,000
Projected Production		4,776,000	4,952,000	5,249,000	5,525,000	5,832,000	6,015,000	6,145,000

(1) Based on summation of statistical forecast for each country presently consuming fibre.

(2) Same as (1) but modified by detailed study of Japanese market by Japanese Ministry of International Trade and Industry.

(3) Based on statistical forecast for world using world consumption data for period 1963-1969.

TABLE 9-2

PROJECTED ASBESTOS CONSUMPTION

1970-1975

Short Tons

Country	1969	1970	1971	1972	1973	1974	1975
NORTH AND CENTRAL AMERICA							
United States	784,000	791,800	799,800	807,800	815,800	824,000	832,200
Canada	70,000	71,400	72,800	74,300	75,800	77,300	78,800
Guatemala	850	740	900	910	910	860	830
Jamaica	940	1,060	1,220	1,300	1,440	1,640	1,700
Mexico	40,800	43,500	45,700	48,300	51,600	55,000	58,500
Salvador	450	250	130	170	60	Nil	Nil
TOTAL	897,000	908,800	920,600	932,800	945,600	958,800	972,000
EUROPE							
Austria	37,800	36,700	40,100	43,600	41,900	44,100	46,600
Belgium	70,900	71,400	74,800	75,100	76,100	78,200	80,700
Denmark	27,000	29,200	31,800	32,300	33,400	34,600	35,400
Finland	27,200	27,200	27,100	26,800	26,500	25,900	25,400
Eastern Europe	180,000	198,200	218,200	240,200	264,500	291,200	320,600
France	148,000	167,300	176,200	187,700	197,100	204,800	211,800
Germany	181,600	189,100	198,900	205,700	199,000	210,100	212,600
Greece	12,800	12,400	13,500	14,300	15,300	16,900	18,900
Ireland	7,200	6,800	7,500	8,300	8,600	8,600	9,200
Italy	119,000	121,200	125,600	131,000	136,200	142,600	148,900

TABLE 9-2

PROJECTED ASBESTOS CONSUMPTION

1970-1975

Short Tons

Country	1969	1970	1971	1972	1973	1974	1975
EUROPE (continued)							
Netherlands	25,000	26,100	26,300	26,100	26,100	27,500	28,500
Norway	7,600	7,500	7,800	8,200	8,500	8,400	8,900
Portugal	3,800	5,100	5,700	6,200	6,600	6,900	6,900
Russia	1,900,000	2,000,000	2,100,000	2,200,000	2,300,000	2,400,000	2,500,000
Spain	94,000	90,600	95,500	106,300	107,100	111,400	120,700
Sweden	17,700	18,600	19,100	19,100	17,400	17,500	16,800
Switzerland	17,200	17,800	18,800	19,800	19,800	20,400	21,000
United Kingdom	198,600	201,300	204,900	213,400	215,000	216,800	221,800
TOTAL	3,075,400	3,226,500	3,391,800	3,564,100	3,699,100	3,865,900	4,034,700
ASIA							
Ceylon	5,800	4,300	5,000	5,300	6,000	6,300	7,700
China	165,000	175,000	185,000	195,000	205,100	215,000	225,000
India	40,600	32,800	32,700	30,500	28,700	26,500	27,500
Iran	6,600	8,400	9,300	10,400	11,600	12,500	13,200
Japan	264,000	292,900	309,500	325,200	348,000	368,300	394,400
Korea	29,400	32,600	36,700	41,200	47,400	51,200	56,200
Malaysia	6,500	12,600	15,200	17,600	20,000	21,700	21,700
Israel	9,500	7,400	7,500	6,800	5,800	6,200	6,500

TABLE 9-2

PROJECTED ASBESTOS CONSUMPTION

1970-1975

Short Tons

Country	1969	1970	1971	1972	1973	1974	1975
ASIA (continued)							
Thailand	21,500	26,100	27,900	31,500	35,300	37,800	39,800
Other Asia	33,100	33,400	33,800	34,100	34,400	34,800	35,100
TOTAL	582,000	625,500	662,600	697,600	742,200	780,300	827,100
AUSTRALIA AND NEW ZEALAND							
Australia	59,000	68,400	73,500	78,300	81,300	87,000	89,400
New Zealand	6,600	7,700	8,000	8,300	8,600	8,300	8,500
TOTAL	65,600	76,100	81,500	86,600	89,900	95,300	97,900
SOUTH AMERICA							
Argentina	18,000	20,100	21,800	22,600	23,300	24,500	25,300
Brazil	30,200	33,800	34,200	35,400	36,000	39,200	39,700
Chile	8,600	5,300	5,000	3,100	2,000	2,600	3,300
Colombia	13,400	15,000	14,900	16,800	17,700	18,500	18,500
Ecuador	1,000	1,200	1,400	1,400	1,400	1,600	1,600
Peru	4,500	4,900	5,500	5,700	6,000	6,100	6,300

TABLE 9-2

PROJECTED ASBESTOS CONSUMPTION

1970-1975

Short Tons

Country	1969	1970	1971	1972	1973	1974	1975
SOUTH AMERICA (continued)							
Venezuela	6,000	7,100	7,500	8,100	8,400	8,900	9,100
Other	3,500	3,700	3,900	4,200	4,400	4,700	5,000
TOTAL	85,200	91,100	94,200	97,300	99,200	106,100	108,800
AFRICA							
All	60,000	76,700	83,300	90,800	97,600	102,800	110,000

TABLE 9-3

CURRENT AND ANTICIPATED WORLD ASBESTOS PRODUCTION CAPACITY

Country and Mine		1969	1970	1971	1972	1973	1974	1975
CANADA								
Cdn. Johns-Manville	Asbestos, Quebec	600,000	600,000	625,000	650,000	700,000	700,000	700,000
Cdn. Johns-Manville	Timmins, Ontario	35,000	35,000	35,000	35,000	35,000	35,000	35,000
Advocate Mines	Baie Verte, Nfld.	65,000	65,000	100,000	100,000	100,000	100,000	100,000
Asbestos Corp.	Thetford Mines, P.Q.	300,000	320,000	375,000	375,000	375,000	375,000	375,000
Asbestos Corp.	Asbestos Hill, P.Q.	-	-	-	20,000	75,000	100,000	100,000
Carey Canadian	Thetford Mines, P.Q.	200,000	200,000	200,000	200,000	200,000	200,000	200,000
Bell Asbestos	Thetford Mines, P.Q.	50,000	55,000	55,000	60,000	60,000	60,000	60,000
Flintkote	Thetford Mines, P.Q.	35,000	35,000	35,000	35,000	35,000	35,000	35,000
Lake Asbestos	Thetford Mines, P.Q.	140,000	140,000	145,000	150,000	150,000	150,000	150,000
National Asbestos	Thetford Mines, P.Q.	60,000	60,000	60,000	60,000	60,000	60,000	60,000
Cassiar Asbestos	Cassiar, B.C.	88,000	90,000	100,000	115,000	130,000	130,000	130,000
Cassiar Asbestos	Clinton Creek, Y.T.	80,000	85,000	95,000	110,000	120,000	120,000	120,000
U.S.A.								
Ruberoid Asbestos	Vermont	40,000	40,000	40,000	40,000	40,000	40,000	40,000
Pacific Asbestos	Copperopolis, Cal.	45,000	45,000	50,000	50,000	50,000	50,000	50,000
Coalinga Asbestos	Coalinga, Cal.)							
Atlas Asbestos	Coalinga, Cal.)	40,000	40,000	42,000	45,000	47,000	50,000	55,000
Union Carbide	Coalinga, Cal.)							
LATIN AMERICA								
Amianto de Salvador	Goias, Brazil	10,500	15,000	25,000	25,000	25,000	25,000	25,000
Asbestos Colombianos	Antioquia, Colombia	-	-	-	-	40,000	60,000	60,000
National	Novillo Aroyo, Mexico	-	-	-	5,000	10,000	10,000	10,000

TABLE 9-3

CURRENT AND ANTICIPATED WORLD ASBESTOS PRODUCTION CAPACITY

Country and Mine		1969	1970	1971	1972	1973	1974	1975
SOUTH AFRICA								
Chrysotile-Msauli		42,000	42,000	42,000	45,000	45,000	45,000	45,000
Crocidolite		120,000	125,000	130,000	135,000	140,000	145,000	150,000
Amosite		100,000	100,000	110,000	110,000	110,000	115,000	115,000
SWAZILAND								
Havelock		40,000	40,000	40,000	40,000	40,000	40,000	40,000
ITALY								
Balangero	Turin,Italy	100,000	110,000	110,000	110,000	110,000	120,000	120,000
FINLAND								
Anthophyllite		35,000	35,000	35,000	35,000	35,000	35,000	35,000
RHODESIA		150,000	150,000	155,000	155,000	160,000	160,000	165,000
CYPRUS								
Amiandos	Cyprus	21,000	25,000	25,000	25,000	25,000	25,000	25,000
CHINA		150,000	160,000	170,000	180,000	190,000	200,000	210,000
JAPAN		20,000	20,000	20,000	20,000	20,000	20,000	20,000

TABLE 9-3

CURRENT AND ANTICIPATED WORLD ASBESTOS PRODUCTION CAPACITY

Country and Mine		1969	1970	1971	1972	1973	1974	1975
RUSSIA		2,200,000	2,300,000	2,400,000	2,500,000	2,600,000	2,700,000	2,800,000
AUSTRALIA								
Chrysotile Corp.	Woodsreef, NSW	-	-	-	55,000	65,000	70,000	75,000
YUGOSLAVIA		10,000	20,000	30,000	40,000	40,000	40,000	40,000
TOTAL		4,776,000	4,952,000	5,249,000	5,525,000	5,832,000	6,015,000	6,145,000

Several points should be noted. We have little evidence on which to project Russian or Chinese intentions. We have chosen to show Russia as producing an additional 100,000 tons each year. But we have also shown internal consumption increasing by the same amount. Thus, exports to the west are shown as a stable 300,000 tons. We have followed the same reasoning in the case of China.

The result of these projections is that supply and demand appear capable of remaining in relative balance through 1973. Thereafter supply of asbestos would appear to fall short of demand and a widening gap is indicated. (Figure 9-1)

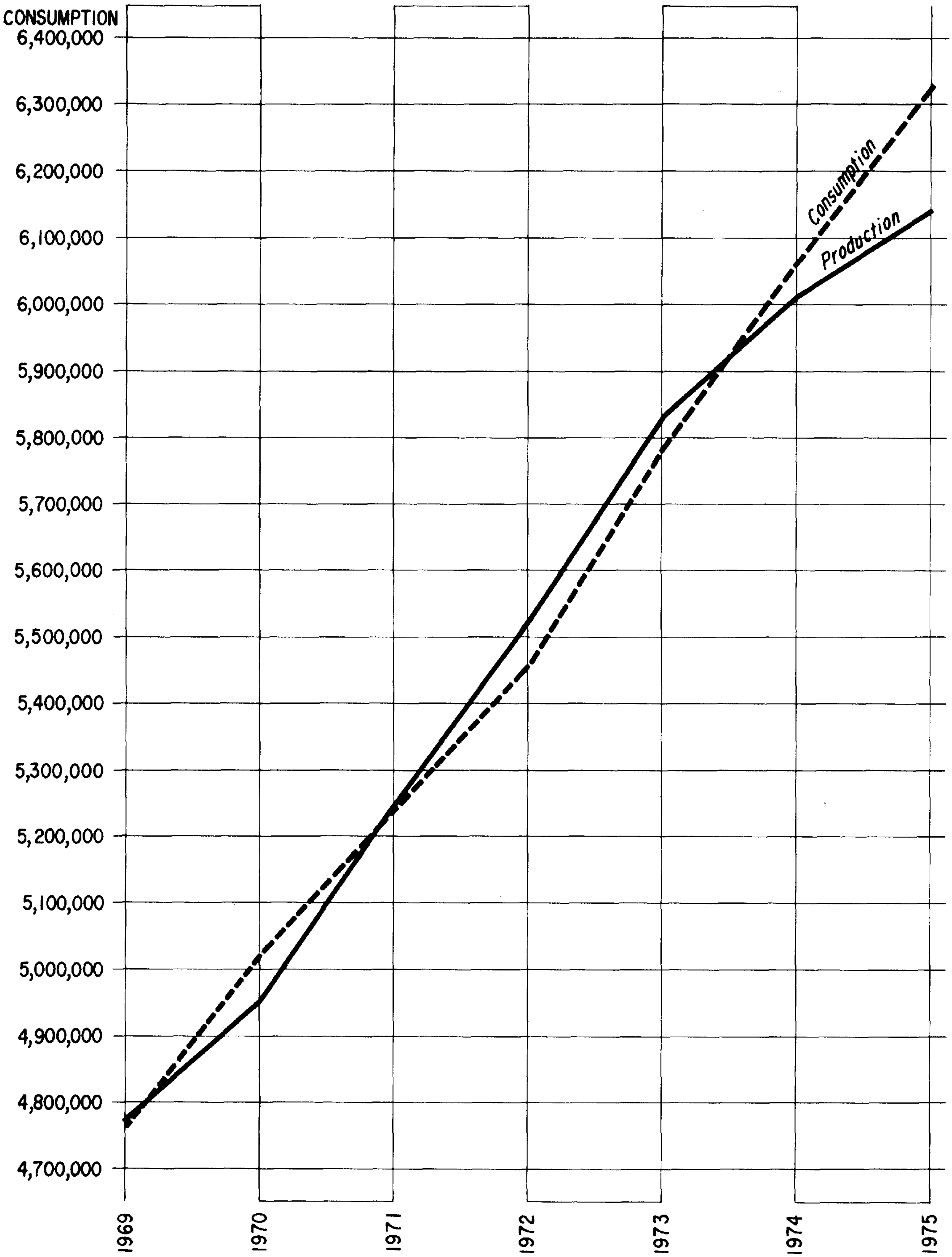
Adequate supplies through 1973 are probably assured with the expansion of Johns-Manville output by 100,000 tons, expansion by Asbestos Corporation in Thetford and Ungava/Germany and start-up of new mines in Colombia and Australia.

There are several properties currently receiving attention which could conceivably be brought into production in the mid-1970's. These include the Zidani deposit in northern Greece (Cerro Corporation), the Abitibi Asbestos project in northern Quebec, the new discovery in New Zealand by Kennecott, the two properties of Cassiar Asbestos in the Yukon and Alaska, as well as several exploration projects in such areas as Argentina, Australia and Mexico. In our opinion, none of these are at a more advanced stage than the Lac Roberge project, with the possible exception of the Greek project.

We believe that the Lac Roberge project, once fibre quality has been established, will be able to attain production prior to any of these projects.

EUROPE

Growth in Europe is closely tied to the asbestos-cement industry and demand will be strong for groups 4, 5 and 6 fibre. With the advent of the new Asbestos Corporation mill at Nordenham, Germany, the European requirements for group 4 fibre will be largely satisfied for some years ahead. Thus, particularly in northern Europe, the markets for groups 5 and 6 should receive the most attention.



PROJECTED WORLD SUPPLY AND DEMAND
FIGURE 9-1

European consumers are ideally situated to be very demanding in their fibre specifications. They are equi-distant from the major supplying nations, so that no country has a particular freight advantage. Price, quality and service are expected and a new producer must be prepared to compete in each of these areas.

Discounts are common, but not universal. Large consumers are more likely to be able to demand price concessions than small consumers.

European manufacturers have developed their production techniques over a long period of years and are accustomed to receive their fibre in a crudey form. This allows them to blend fibres and then carry out some treatment before making the asbestos-cement slurry. It is claimed that this allows much tighter control of the production process. For instance by using low-dust, fast draining fibre, productive capacity can be significantly increased with no sacrifice of quality. One manufacturer told us that production had been doubled over a period of ten years solely by improving the quality of the fibre used and by refining his techniques.

In the area of service, manufacturers do not seem to want any interference in their factories by technical representatives of mines. But deliveries are very important. The trend toward containerization is also an example of the kind of improved service which is sought.

Long-term contracts in Europe are practically unknown. At the same time, the continuity of buyer-seller relationships is, in many cases, better than that which would exist if formal contracts were in existence. Mutual trust has built up over a long period of years, which will present some difficulties to a new supplier. Nevertheless, it should be possible for a company of the stature of Rio Algom to present themselves in such a way, that this will not be a major problem.

The major European consumers are accustomed to preparing their estimates of annual requirements in the fall of the year. These needs are then the subject of negotiations leading to an understanding between supplier and consumer for the following year.

Despite this traditional pattern, there are some manufacturers who indicated a willingness to consider long-term contracts. Some price concession would, no doubt, be expected, otherwise there is no particular advantage to the consumer to enter such an arrangement; at least in today's market. However, if the market tightens up, as is indicated, then more and more consumers might see the advantage of an assured supply of asbestos over a period of years.

NORTH AMERICA

We have noted on several occasions, in this report, the slow growth rate in asbestos consumption in North America. This is not expected to change drastically in the forecast period covered by this report.

Economic conditions at present in North America are improving and a continued improvement is being predicted for 1972 and 1973. However, this is still not expected to match the economic growth being experienced in the other two major industrial areas of the world, western Europe and Japan.

The United States market, simply because of its size, and its proximity, must be considered when evaluating potential markets for Lac Roberge fibre. Even penetration to the extent of one percent of total market consumption represents fibre sales of 8,000 tons.

Gaining entry into the United States market will not be easy for Lac Roberge fibre, partially because of the slow growth rate that is forecasted and partially because of the large captive market that exists. It would be unwise,for example, to contemplate at this point in time the marketing of 50,000 to 75,000 tons in the United States in 1975, particularly when markets exhibiting more spectacular growth rates are to be found elsewhere in the world.

However, the possibilities for marketing lesser quantities in small lots must be considered as good. It will take some time to fully develop the American market and especially for Lac Roberge fibre which has unfortunately received some bad publicity and thus there will be some scepticism to be overcome. This can be done, once acceptable fibre quality is established and thereafter the United States market should become more attractive.

One further factor deserves mention when considering the possibilities of marketing fibre in the United States. The asbestos community has a well-known reputation of being an extremely tight-knit group. Because of this cohesive character, they are able to make it much more difficult for a prospective producer to gain access to the market. This particularly applies when the new mine is located in eastern Canada and close to the traditional large market of the eastern United States.

The adverse publicity which Lac Roberge fibre has received in the past has in no small measure been due to the comments made by the existing asbestos community. As the Lac Roberge project advances further to the realization stage, one can be sure that such "authoritative" opinions will not diminish in either quantity or conviction.

Once fibre quality has been proved to be of acceptable commercial quality, then it will be possible to establish prices. It is probable that market entry will have to be facilitated by price discounting. At this time, it is difficult to say precisely how much but the present projected supply-demand position for 1975 suggests that discounting should be minimal.

JAPAN

Growth in consumption of all fibre grades will be substantial in Japan. However, the shortage of group 6 fibre is most in evidence and with the current projections for cement sheet consumption, this shortage will accentuate.

Japan has contracted to take large quantities of fibre from Australia and there is the possibility of lesser amounts being supplied from Colombia in the near future. Nevertheless, this will still be insufficient to meet the projected increase in demand. The Japanese are presently looking for additional suppliers. The established Canadian producers have not been able to meet the demands of their Japanese customers, particularly for group 6 fibre. The exclusive representation of a single producer by a Japanese trading house that has been the pattern to-date could well undergo some changes in the future. The means by which C. Itoh has arranged to obtain Russian fibre in spite of their exclusive agreement with Lake Asbestos is an example.

The interest being shown by several Japanese trading companies is encouraging. Contact should be maintained with these companies and they should be kept informed of developments in the Lac Roberge project. It is extremely important that the best possible selection be made for a distributor of fibre in Japan. Knowledge of asbestos fibre is requisite in order to ensure proper servicing of the eventual consumers of the fibre.

Long-term contracts are a distinct possibility for the Japanese market. Japanese trading houses have established a precedent in the marketing of asbestos by entering into such agreements. It is likely that they will wish to continue this pattern.

Price discounting will in all probability be necessary to penetrate the market. This should be tempered somewhat by the dramatic increase in growth that is forecasted for Japanese asbestos consumption. However, as the trading house in Japan eventually selected to handle Lac Roberge fibre will probably have limited experience in the marketing of asbestos, they will undoubtedly need some additional inducement to gain initial sales. A discount of five percent off Canadian F.O.B. mine prices should be anticipated.

In summary, Japan undoubtedly represents a prime potential market for Lac Roberge fibre and continuous contact with it is to be recommended.

CONCLUSION

To conclude, we must view the future asbestos market with great optimism. An annual short fall of close to 200,000 tons of fibre is indicated by 1975. This will undoubtedly be met in part by expanded production by some present mines, but there is certainly room for several new mines by that time. The only major disturbing factor on the horizon is the general lack of knowledge concerning Russian intentions. However, no one is in a position to determine these intentions, and therefore one can only assume that Russian exports will not be drastically increased, and plan ahead with confidence.

It should be emphasized that the gap which is indicated between supply and demand for 1975 will be accentuated in subsequent years unless further deposits are discovered, evaluated and brought into production. It is this gap which provides Lac Roberge with the assurance of a market opportunity and emphasizes the necessity of proceeding with the continued evaluation of the project so that Lac Roberge will be in a position to take advance of this market opportunity.

10. RECOMMENDATIONS FOR PHASE B

1. The next step which must be taken is to prepare representative samples of typical fibre grades which might be produced from the Lac Roberge deposit. Each sample of each grade should be about one to two kilograms but this is variable from consumer to consumer.

2. Samples should be prepared in such a way as to meet the normal specifications of consumers. In Japan, a relatively well opened fibre is desirable, as treatment following receipt is nominal. In Europe a crudey fibre is traditional, because of the more complex blending and treatment that is carried out in that area.

3. Samples should be forwarded to those consumers who have shown the most interest and who are indicated to be the best prospects for increasing needs. The following is a preliminary list:

Japan

Samples of two kilograms each should be sent to the following companies:

Kubota Ltd.	- group 4 and 6
Nihon Asbestos Co. Ltd.	- group 4
Asahi Asbestos Co. Ltd.	- group 5 and 6
The Asano Slate Co. Ltd.	- group 5 and 6
Sumitomo Cement Co. Ltd.	- group 4, 5 and 6
Nozawa Asbestos and Cement Co. Ltd.	- group 4, 5 and 6
Ube Slate Co. Ltd.	- group 5 and 6

We recommend that good relations be maintained with all of the trading houses who might become agents for Lac Roberge fibre. At present these include Mitsui, Sumitomo and Ataka, etc. At the same time, in submitting samples to the list of consumers above, it is desirable to use an agent. Therefore, rather than having to choose one of the trading houses for this function, we recommend that an independent Japanese agent be used, and we are prepared to make recommendations in this regard. This agent can assist with distribution of samples, and obtaining marketing information.

Europe

1. Eternit group - six sets of samples should be sent to allow testing at several different works. Each set of samples should each be two kilograms of groups 4, 5 and 6.

2. Belgium - Coverit - samples of 4T and 6D - one kilogram each
- Manufacture Belge d'Amiante - one kilogram sample of 7M-4

3. France - Everitube - one kilogram samples of 4T, 5R and 6D

4. Germany - Toschi - one two-kilogram sample of 4T.

5. Italy - Fibronit - one kilogram samples of 4T, 5R and 6D.
- Sacelit - two kilogram samples of 4T, 5R and 6D.

6. Spain - Uralita - 5 kilogram samples of 4T, 5R and 6D.

7. United Kingdom - Turner and Newall - 7-pound samples of 4T, 5R, 6D and 7M
- Cape Asbestos - 5-pound samples of 5R, 6D and 7M.

United States

Samples of about three pounds should be prepared for the American market and should be distributed as follows:

Certain-Teed Company	-	groups 4, 5 and 6
National Gypsum Company	-	groups 4, 5 and 6
Maremont Corporation	-	groups 4, 5, 6 and 7
Kentile Floors, Inc.	-	group 7
Supradur Corporation	-	groups 4, 5 and 6
G.A.F. Corporation	-	groups 4, 5, 6 and 7
Huxley Development Corp.	-	groups 4, 5, 6 and 7

4. Consumers to whom samples are sent should be advised that a full report is expected and that a tentative evaluation would be appreciated. The urgency of receiving results should also be emphasized.

5. Once test results are received, it is most probable that follow-up visits should be made. Whether this should be done immediately will depend upon the kind of reaction received. If new samples with different specifications are indicated, personal visits should perhaps be delayed.

6. The question of using agents in Europe and North America should be explored and some decision made. In these areas, it is difficult to reach the many small consumers without the assistance of an agent. In Japan, it is probable that one of the large trading companies will ultimately be chosen. We recommend that no decision be made at this time.