A REPORT ON

THE CURRENT SUPPLY AND DEMAND

FOR PARTICLEBOARD IN CANADA

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INTRODUCTION

This report has been prepared primarily as a source of information on the current supply and demand for particleboard in Canada and is for companies considering the establishment of a new plant or those giving consideration to expanding existing facilities. As a basis for assessing the effects of current mill expansions in North America a forecast has been made of Canadian consumption and production capacity for the next five to ten years. To assist in this, an estimate has been made of the size of the present end-use markets for particleboard in Canada, and their growth potential. Precise knowledge of end-use markets for Canadian particleboards is still somewhat limited and a more detailed survey is required.

In forecasting Canadian demand for particleboard (see section on "Consumption"), emphasis has been placed on (1) the past growth rate of per capita consumption in Canada, the U.S.A. and Europe, (2) the large per capita consumption of particleboard in Europe, (3) the growth of certain end-uses in the United States which are not yet well developed in Canada and (4) the probability of increasing pressure by particleboard on the materials market as a result of the large capacity expansion underway -- pressure in the form of product development, promotion, and market development.

Much discussion has taken place on whether Europe can be used as a guideline in forecasting the Canadian market. This report has assumed that it can and that (1) particleboard demand will continue in Canada for the medium term, mainly through the growth of present markets such as furniture, cabinets, etc., and (2) that it will later replace softwood and poplar plywood in certain

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non-structural uses such as floor underlay by virtue of price or superior surface. It is also believed that particleboard will eventually occupy an important position in exterior uses and structural applications due to the development of specific end-use information and more specialized products (waterproof boards, etc.). These new products, however, have been given little weight in forecasting Canadian demand since they lie in the future.

This report does not discuss the various manufacturing processes available except to point out the different end-uses and growth markets for what might be called "specialty boards". The assistance of specialists in the Wood Products Branch is available to any company requiring information and advice on raw materials, production processes and marketing. Information on processes is also available from equipment manufacturers representatives, industry consultants, and resin manufacturers. The Forest Products Laboratory in Ottawa is an excellent source of data on research and on production problems, as are the periodic particleboard seminars held in the United States under the auspices of the National Particleboard Association or the Washington State University.

The information in this report has been obtained from discussions with manufacturers, users, and researchers in Canada; from the Dominion Bureau of Statistics; the FAO and its affiliates; the United States Department of Agriculture; various recent progress papers on particleboard in Europe and the United States; and from a preliminary examination of several of the major European markets.

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SUMMARY

In the past years the high rate of growth in the particleboard industry has caught the attention of the wood products industry, investment organizations, and government agencies alike. Recently, announcements of larger expansions in production capacity that will give the industry an even higher rate of growth, has been met with some skepticism.

From forecasts of consumption, it is expected that sales can keep pace with production growth in the long term but that, for the coming three to four years, the Canadian market will be over-supplied unless new volume markets are developed either in Canada or abroad.

Forecasts of production capacity and consumption to 1975 in Tables 3 and 4 indicate that given the poorest conditions, the industry could have an operating ratio (1) of only 56% by 1975. Given annual exports of 80 million feet, a continuation of the present growth rate of per capita consumption and aggressive development of new products and end-uses, this ratio could be increased to 87% or more.

It is anticipated that with product development and promotion, operating ratios should increase yearly from a 1970 low of around 70%. However, additional exports and domestic markets will be required if capacity is to be utilized at an efficient, high level of 85% or more during that period.

Although consumption has been forecasted to 1980, it is impossible to estimate the volume of capacity that will be in operation in Canada at that time. Similarly, it is expected that export markets could be developed

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(1) i.e. the percentage of production capacity that is utilized.

in the coming two to three years but it is impossible to forecast the size of these. American imports will likely be a factor in our market for the next three to five years but following that period, Canada could be a net exporter to the United States.

A. REVIEW OF PRODUCTION

Appendix "A" lists the production and shipments of particleboard in Canada from 1962 to 1968. Shipments increased three times to a level of 141 million square feet during this six year period. Production figures to date for 1969 indicate that a level of 170 million feet will be reached; an increase of 20% over 1968.

Since 1962, Canadian particleboard production has increased at an average annual rate of 20% (Table 1), however, this growth rate has decreased steadily from 34% in 1965 to 8% in 1968. In volume, the annual increase has dropped from 25 million feet in 1965 to 10.7 million feet in 1968. This rapid drop in 1967 and 1968 can be attributed to the temporary reduction in market demand and the temporary closing of one plant during part of 1967.

Table 1

ANNUAL GROWTH OF PARTICLEBOARD PRODUCTION

1962 - 1968

Year	Actual Volume Increase Over Preceding Year	% Growth Over Preceding Year	
		Canada	U.S.A.
1963	11,862(1)	25%	22%
1964	15,401	25%	30%
1965	25,172	34%	25%
1966	17,705	17%	24%
1967	12,768	11%	12%
1968	10,718	8%	27%
1969 (est'd)	26,765	20%	20%

Note:- (1) In millions of square feet, 5/8" basis; based on shipments for years 1963 - 1965; based on production for years 1965 - 1968.

Source: Dominion Bureau of Statistics (based on)

By comparison, the United States particleboard industry, which is very similar to that in Canada, has maintained an average growth rate over the past seven years of 23% and has only twice been below 22%. The success of the U.S. particleboard industry has apparently been due to the rapid growth of its consuming industries, i.e. furniture, construction and mobile homes. Production and consumption figures on the American market however do not show the extremely competitive nature of this market over the past few years. Widely fluctuating prices have caused some plants to close temporarily and have led the American industry to take increasing interest in the more stable Canadian market. American and Canadian particleboard prices are expected to equalize with the lowering of tariffs between the two countries which will permit a larger volume of two way trade.

The trends in number of Canadian plants and average plant size is shown in Table 2. Since the early 1960's the capacity of the average Canadian particleboard plant has doubled to 22 million feet per year, increasing to about 32 million feet by 1970, compared to the present U.S. average of 48 million feet increasing to 60 million feet by 1970.

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Table 2

NUMBER OF CANADIAN PLANTS AND AVERAGE CAPACITY

1956 - 1970

Mid-Year	(1) No. of Manufacturing Plants	Average Production Capacity per plant (5/8" basis - million ft.)
1958	1	
1959	1	
1960	1	
1961	3	12
1962	8	13
1963	6	13
1964	7	15
1965	8	16
1966	8	21
1967	8	21
1968	7	22
1969	7	22
1970 (proj'd.)	10	32
1971 "	11	34

Note:- (1) At mid-year; not including one private plant owned by furniture manufacturer; not including extruded boards.

The capacity of the average new Canadian plant is now approximately 45 million feet. In comparison, in the period from 1964 to 1966 new plant capacity averaged 48 million feet, and is now about 75 million feet. With the recent growth of American exports to Canada, the size and efficiency of our plants could be a critical factor in the next few years in meeting American competition. One Canadian consulting firm has suggested that a plant with capacity production below 4 million feet per month could have difficulty in meeting U.S. competition, although local wood costs, degree of specialization, etc., would be a factor.

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Degree of Integration

With the closing of the Abitibi plant in 1969, four plants or 53% of Canadian capacity is owned by companies manufacturing other types of wood products. Two of these are owned by one company. However, only one of these four plants uses a substantial amount of raw material from subsidiary operations thus one of the main advantages of integration -- control of a low priced raw material supply -- is almost negligible in the industry. Without a controlled supply of residues which are in short supply in Canada, the alternative is more expensive roundwoods. While some Canadian mills have not found this to be a problem in the past, the supply of reasonably priced raw material in the future will be a major factor in successfully competing with United States production. The major part of the production in the United States is controlled by integrated companies and integration has often occurred solely to secure a raw material supply. Integrated mills are expected to suffer least in periods of over-capacity and rising costs.

Vertical integration into further manufacturing (specialty products) has been gaining momentum. In the past two and a half years, four new companies have installed equipment for overlaying boards. One company has overlaid a percentage of its product for a number of years, and at least one other company is considering purchasing equipment for this. Therefore, although in 1968 only an estimated 6% of the particleboard production was overlaid at the plant, it is expected that this type of further manufacturing

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will increase substantially in 1969 and 1970. Cut-to-size items, on the other hand, have been produced by many manufacturers for a number of years, and this practice will probably continue to grow.

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B. PRODUCTION CAPACITY

The first particleboard plant was installed in Canada in 1948 in South Nelson, New Brunswick, by Trafalgar Mills Limited, who pioneered the sale of particleboard in Canada and sols substantial quantities to the growing United States market. Between 1947 and 1962, eight new plants were installed, some of which subsequently closed or burned down. Between 1963 and 1965 another three plants came on stream, two of which were small, specialty mills. Following 1965, new industry capacity came primarily from small expansions of existing plants.

At present in Canada, the largest capacity increase in the industry's history is now underway. Between 1968 and 1971, capacity is expected to double to 392 million feet (5/8")basis) with four new plants in various stages of construction. Of the eight producing manufacturers, two have recently increased production and three are undergoing plant expansion. A number of other companies and industry-development organizations are currently investigating plant feasibility and market prospects.

Table 3 lists the estimated capacity of the Canadian particleboard industry from 1957, and forecasts capacity to 1975. It will be noted that a marked increase in new capacity occurred between 1960 and 1964, following a number of years of stable production. The present surge in capacity has taken place under similar circumstances.

Table 3

PRODUCTION CAPACITY AND OPERATING RATIO
FOR CANADIAN PARTICLEBOARD INDUSTRY, 1957 - 1975

Year	Estimated[1] Annual Capacity	Daily Tonnage	Operating[2] Ratio	
			Canada	U.S.A.
1957	18			
1958	18			
1959	18			
1960	18			
1961	42		73	51
1962	80		60	60
1963	80		73	69
1964	128		67	76
1965	154		74	65
1966	159		84	77
1967	175		84	64
1968	183		86	84
1969	185	890	103(e)	
1970(p)	327	1,440		
1971(p)	392	1,740		
1975(p)	690[3]	3,000		

Average Annual Growth Rate:		
	1960 - 1965	150%
	1965 - 1970	22%
	1970 - 1975	72%

Note:- (1) Millions sq. ft., 5/8" basis, at mid-year; including all operating particleboard plants; for capacity of mat-formed boards only, see Appendix "E".

(2) Operating ratio is the percentage plant capacity utilized in production; extruded boards have not been included in operating ratio up to 1969.

(3) Of which possibly 60 million will not come in until after 1975.

(e) estimated
(p) projected

Source: Wood Products Branch,
Department of Industry, Trade & Commerce.

Forecasted capacity figures for 1970 reflect the full increased capacity of three mill expansions, (including Phenolic board), the full capacity of two small new plants and half of the capacity of one large new plant. It is anticipated that the latter plant will reach full capacity in 1971. The 1971 figure also includes about half of the capacity of another large new plant now under construction in New Brunswick. It is expected that this plant will reach full capacity in 1972/73. All of the new plants in 1970 and 1971 will be mat/urea type.

The anticipated capacity increase shown between 1972 and 1975 is an estimate only and is based on the expansions that might be expected from present plants and the estimated number of new plants which might be expected as a result of pressure to utilize raw material resources or increase product mix. The increases do not take account of possible closure of old or inefficient mills which will probably not be a factor until after 1975.

This capacity forecast for 1972 to 1975 includes three medium-sized "specialty" board plants such as extruded boards or exterior-grade particleboard plants, producing an average of 30 million feet annually. In addition, it is projected that two additional interior-grade particleboard plants, each producing approximately 60 million feet annually, can be expected. Since it is unlikely that these plants would reach full capacity during their early stages of operation, possibly one-quarter of their production might not come into the market until after 1975.

Of the estimated increase of 298 million feet which might take place between 1971 and 1975, it is expected that 218 million feet will be from new plants and 80 million feet from plant expansions. By 1975 the production

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capacity of the Canadian industry could be as high as 690 million feet -- an increase over 1968 capacity of almost 400%. This represents an annual increase of over 20% (compounded) between 1968 and 1975.

A number of factors will affect the rate of expansion of the industry. Since most of the capital for plant expansion up to 1971 has now been committed, it is unlikely that market factors will affect the installation of the new plants. They can however affect the amount of potential capacity which is brought into operation. No firm plant expansions or new plants have been officially announced for the period after 1971 and over-capacity would certainly influence the commitment of capital during this time. Of considerable importance is the factor of profitability of particleboard. It is apparent that prices will be affected to some extent by the increased capacity coming on the market, and by the new, large particleboard plants being installed in both Canada and the U.S.A. In general, raw material supply is not expected to limit the growth of plants using roundwood, although the supply situation will vary from one region to the other. Low-priced residue supply on the other hand, will be tight. Availability of capital is also not expected to be a limiting factor assuming a reasonable opportunity for profit. The market situation for particleboard is discussed under "Consumption", "Imports" and "Exports".

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C. CONSUMPTION OF PARTICLEBOARD IN CANADA - 1963 to 1980

In Table 4, the growth of per capita consumption and total consumption for Canada is given from 1963 and forecasted to 1980. Up to 1965 the growth rate was strong for both per capita consumption and total consumption. Between 1966 and 1968 the growth rate of per capita consumption slowed to less than 10% and the annual growth rate of total consumption dropped from 19% to 35% reaching a level of 13%, due to poor market conditions and fluctuations in capacity. A higher consumption growth rate has been noted in 1969, due to a stronger market during most of the year ans readily available supply from both imports and domestic production.

Columns (a) and (b) in Table 4-B provide a forecast of total consumption in Canada up to 1980. In column (a), a rate of growth in per capita consumption of 10% per year has been used -- this is equal to the rate of growth prevailing between 1965 and 1968. It is expected that this is the minimum growth rate that the industry will achieve and even under adverse economic conditions. At this growth rate, by 1975 Canada will have a total consumption of almost 400 million feet (5/8" basis) and by 1980 it will have reached almost 705 million feet assuming the medium level of population growth.

A growth rate of 15% for the next five years, possibly dropping to 12% per year after 1975, is more likely however. It is anticipated that a combination of extra promotion within the industry and development of new particleboard products could maintain this growth rate quite easily. Increased production of floor underlay and the more wide-spread development of waterproof particleboard would affect this appreciably. An economical fire retardant treating system could also be a factor leading to other new uses for the product.

Table 4

A. CONSUMPTION OF PARTICLEBOARD IN CANADA

1963 to 1969

Year	Population	Per Capita Consumption (Sq.Ft. 5/8" basis)	Total Consumption (Thousand Sq.Ft. 5/8" basis)
1963	18,931	3.1	58,658
1964	19,290	3.9	74,400
1965	19,644	5.1	100,365
1966	20,015	6.2	123,567
1967	20,405	7.1	145,685
1968	20,744	7.6	156,931
1969(e)	21,061	9.5	200,000

B. FORECASTED CONSUMPTION OF PARTICLEBOARD IN CANADA

1969 to 1980

Year	Population Forecast (1)	Forecasted Per Capita Consumption (Sq.Ft. 5/8" basis)		Forecasted Total Consumption (Thousand Sq.Ft. 5/8" basis)	
		(a) At 10% Growth Rate	(b) At 15% & 12% (2) Growth Rate	(a) At 10%	(b) At 15% & 12% (2)
1969(e)	21,061	9.5	9.5	200,000	200,000
1970	21,500	10.5	10.9	225,700	234,300
1975	23,764	16.8	22.0	399,240	522,800
1980	26,027	27.1	38.7	705,300	1,007,200

Note:- (1) Source of Population; Economic Council of Canada; Study 19, September 1967; population is forecasted at low, medium and high growth rate; for this forecast the medium level is used.

(2) Per Capita Consumption to increase at a 15% rate until 1975, then fall to 12% up to 1980.

(3) Extruded and exterior boards included.

(e) estimated

The results of this growth rate are listed in column (b). By 1975, total consumption could be over 520 million feet and by 1980, 1 billion feet (at the medium population growth rate).

There is reason to expect that the per capita growth rate of 15% per year (column (b)) will be achieved by the industry as a result of the pressures of over-supply, the expected increase in market and product promotion, and the development of new products.

In comparing this projected consumption in Canada with capacity forecasts to 1975 it is evident that the industry will be seriously over-supplied unless (a) export markets materialize between 1971 and 1975, (b) the high rate of consumption experienced in 1969 is maintained, and (c) American competition can be met. The following table (Table 5) illustrates the influence of the first two factors on the operating ratio between 1970 and 1975. It can be seen that the development of export markets, as anticipated by at least one new plant, will raise the operating ratios by 8% per year in 1971 and 13% per year in 1975. If the industry can maintain the higher per capita consumption growth rate of 15% per year, it will progressively regain a higher operating level; at the lower level (10% per year) it will actually lose ground each year being unable to keep up with the increase in capacity.

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Table 5

INFLUENCE OF CONSUMPTION GROWTH RATE AND VOLUME OF EXPORTS, ON THE OPERATING LEVEL OF CANADIAN PARTICLEBOARD INDUSTRY

1970 - 1975

	A Assuming no Exports & a Growth Rate of:		B Assuming Exports at a Reasonable Level(2) & a Growth Rate of:	
	10%(3)	15%	10%	15%
1970	69%	71%	69%	71%
1971	64%	70%	72%	78%
1973	60%	72%	70%	82%
1975	56%	75%	69%	87%

Note:- (1) Forecasted operating levels are based on the forecasted consumption (Table 4) and forecasted capacity (Table 3).

(2) Exports or large, new markets assumed to reach a level of 30 million feet in 1971, 55 million feet in 1973, and 80 million feet in 1975.

(3) Growth Rate -- i.e. of per capita consumption.

(4) Extruded and exterior boards included.

Source: Wood Products Branch, Department of Industry, Trade & Commerce, January 1970.

The most optimistic combination provides an operating level of 71% in 1970, increasing to 78% in 1971, 82% in 1973 and 87% in 1975. This level requires (1) that exports will reach at least 80 million feet by 1975 or that other large new end-uses will develop (such as 50% takeover of the floor underlay market), (2) that a 15% growth rate in per capita consumption will be maintained, (3) that Canada's population growth will be maintained, (4) that particleboard imports will be negligible. If all of these conditions are not met, the operating ratio by 1975 could be as low as 56%.

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D. PARTICLEBOARD IMPORTS

As noted in Appendix "A", import figures for particleboard are of value only after 1963 as prior to that year a number of miscellaneous products were included in the same import class.

Between 1963 and 1969 only dollar values are given for import statistics. To obtain volumes, the average selling price prevailing during each year has been estimated and it is possible that volumes could be up to 20% higher due to price and discount variation. Since 1963 the volume of imports has increased at a much faster rate than the growth of the Canadian industry, reflecting a continuing over-capacity position and a low average selling price in the United States.

It is evident that a major portion of the imports from the U.S.A. enter Canada when the U.S. market price is low or decreasing. During late 1969 a declining U.S. market, coupled with a temporary shortage in Canada, caused U.S. imports to increase substantially. In recent months, however, new Canadian capacity has come on the market only to find it well covered by low-priced American particleboards.

The presence of American particleboard in Canada has caused increasing concern in the industry, aggravated by the knowledge that the American industry has begun a large scale expansion, second only to the Canadian rate of growth. Between 1969 and the end of 1973, U.S. particleboard capacity will almost double from 2.0 billion feet to 3.8 billion feet (5/8" basis).(1) It is expected that the U.S. market will be able to absorb this expansion, based on

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(1) Mat formed board only -- see Appendix "B".

the growth of population and on the more rapid growth of per capita consumption of particleboard in the U.S. since 1967. By 1972 when capacity will have reached 3.2 billion feet, the per capita consumption should increase to 13 square feet (5/8") compared to 9 square feet in 1969, and the population to 212 million[1] compared to about 200 million in 1969. This would give a total consumption of over 2.7 billion feet (including extruded boards, etc.). By 1973 the capacity will be 3.8 billion feet versus a consumption of 3.2 billion feet (based on 215 million people and a per capita consumption of 15 feet). By 1975 the total consumption should reach 4.4 billion feet if the population reaches 220 million and per capita consumption reaches 20 feet.

While the above figures indicate that the U.S. market is capable of absorbing enough of the capacity on an annual basis to maintain a reasonable operating level, they do not take into account short term set-backs in the U.S. market due to economic conditions. Undoubtedly, U.S. board will continue to enter Canada whenever the U.S. market is depressed, just as they have done for the past four or five years, but it appears that this will be on an irregular and seasonal basis. The volume of imports relative to our consumption in the coming three years might, therefore, be the same as during the past several years.

It must also be noted, however, that forecasts of U.S. capacity do not take into account the closing of smaller or inefficient particleboard mills. There is also the possibility that the growth rate of per capita consumption of particleboard in the United States could accelerate if the industry develops new products, a factor that has been lacking in recent years.

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(1) Based on Economic Report of the President, U.S.A., 1968.

Since Canadian industry is expanding at an even higher rate than that expected in the U.S., the next five years will prove the ability of our industry to compete. The Canadian import duty on particleboard is now 15% (see tariffs in Appendix "C"). It cannot be expected that tariff rates will be increased since these have just been reduced under the GATT -- Kennedy Round Agreements, and the U.S. rate is lower, dropping to 10%, effective January 1, 1972.

The difference in manufacturing costs between some areas of the U.S. and Canada could be sufficient to make competition difficult. As noted in the section on "Production", the average capacity of Canadian mills is half that of those in the U.S. and Canadian mills are not closing the gap. Two particleboard plants of the average size now being built in the U.S. could almost supply the present Canadian market. With the vast difference in the size of the U.S. market it appears that only exports will provide sufficient demand to support Canadian mills of a size equivalent to those in the U.S.

A comparison of manufacturing costs between Canada and the U.S. has not been investigated in detail. However, it has been reported that costs for some U.S. producing areas are far enough below the average Canadian costs to put some of our mills at a disadvantage. It also appears that the cost of some machinery and resins are slightly higher in Canada. Moreover, roundwood is still the most expensive raw material for particleboard and in Canada it is estimated that it constitutes 50% of the raw material for the industry and this percentage is increasing. In the United States the use

of roundwood has actually decreased from 30% in 1964 to 17% in 1967 reflecting the trend toward integration of particleboard plants with plywood plants and/or sawmills. In the cost of raw materials, therefore, Canadian mills could be at a disadvantage compared to American mills.

Other Exporters

Exports to Canada from other producing areas such as Europe have been growing but are still of minor importance. All of these suppliers (West Germany, Russia, Finland, Israel, Belgium, Luxembourg, Guatemala) have increased their sales substantially during the 1969 period of high demand and high prices in Canada but it is expected that these countries will not be a factor in the market when the Canadian and U.S. industries have completed present expansion programs. Moreover, since it is anticipated that Europe will be short of woodfibre after 1980, Canada could be in a position to ship increasing quantities to various European markets.

E. PARTICLEBOARD EXPORTS

Since 1964 the exports of particleboard from Canada have generally declined from 2.1 million feet (surface measure) to an insignificant 293 thousand feet in 1968. Virtually, all of these sales have been to the United States in the form of standard products. It is expected that during the 1970's exports will increase due to pressure from an over-supply position in Canada. Long term export markets could be developed for cut-to-size and overlaid board in the United States and for standard boards in Europe. The West Indies could also develop into a small, short term market.

American Markets

United States particleboard tariffs are now decreasing, following a number of years of fairly high rates. The original tariff ruling (c.a. 1948) placed particleboard at only 5% ad valorem and export opportunities appeared promising. Around 1958, a tariff revision placed particleboard with articles using synthetic binders, effectively increasing the rate to 17% plus 21¢ per pound. This prohibited any degree of sales to the U.S. until September 1963, when the seventh supplementary tariff schedule of the U.S. created a separate particleboard class (245.50) and the rate became 12%. This lower tariff assisted in a rapid increase in our exports to the U.S. during 1964 and 1965. However, in December 1965, the rate was increased to 20%. A separate class within Tariff #245.50 allowed particleboard of certain non-Canadian hardwoods to enter at 12%. This rate held until January 1, 1968 when the Kennedy Round revisions provided for a staged decrease of 2% per annum to a level of 10% on January 1, 1972.

It appears that the United States market most readily available to

Canadian exporters is in cut-to-size and overlaid boards. These are used primarily in the manufacture of furniture which now absorbs at least 650 million feet or about 45% of the total U.S. production. This market is also the fastest growing of the industrial particleboard markets in the United States. The Canadian furniture industry has nothing to match the high volume assembly plants of the Northeastern U.S. and it is volume such as this, that can justify large, efficient particleboard plants. The requirements of the market are specialized however. The particleboard manufacturer requires low-pressure laminating or pre-finishing equipment and large-volume custom-cutting or remanufacturing facilities together with cheap, efficient transportation to the Northern United States. A good quality, competitively priced board is a prime requisite. Facilities able to serve this market have been installed to a limited degree in Canada during the past two years but the demand is still in excess of Canadian supply. This market could be the fastest growing and largest single market for Canadian particleboard if a solution can be found to the past problems of high prices and limited supply.

The new American production expansion includes mills capable of supplying specific industries such as the mobile home industry (long lengths in multiples of 12') and the industrial markets (large press size, and cut-to-size overlaying facilities). The Canadian particleboard industry must also specialize to meet the requirements of specific industries not only to retain the Canadian market but to find an export market in the United States. Further information on the American markets is given in Table 8.

Europe

Exports of Canadian particleboard to the U.K. also appeared very

promising in the earlier years of the industry. Around 1950, one mill obtained acceptance for their board in the United Kingdom market only to have their plant destroyed by fire. During reconstruction, competition from domestic U.K. and from other exporting countries effectively prohibited re-entry.

In the long term, Europe is expected to be a net importer of particleboard. The Food and Agriculture Organization of the United Nations has recently forecasted that consumption will exceed the available raw material supply in Europe after 1980. Germany, the second largest producing country in the world, is still a net importer of particleboard, despite a doubling of production capacity between 1963 and 1967. One company has recently announced construction of a plant in Canada, with ocean shipping facilities, to sell the bulk of their production in Britain. The amount of our particleboard which Britain and Continental Europe can absorb -- or how soon a large market might be developed -- is impossible to forecast until more Canadian production capacity becomes available and the market tested. It appears however, that Europe could become an important customer over the long term.

West Indies

Due to the growth potential of the West Indies it appears that a small market could be developed for Canadian particleboard. However, this could be limited due to the attempts of local government to promote their own construction material industries, and to the proximity of the Southern pine region and the developing forests of Central and South America.

F. END-USE MARKETS FOR PARTICLEBOARD

In the area of end-uses, the objective of this report is to document the information that is readily available on the subject, and to make general estimates of the size of the markets, as in Table 6.

Table 6

END-USE MARKETS FOR PARTICLEBOARD IN CANADA
(based on 1968 consumption)(1)

Description	Percentage	Volume (Million Sq.Ft. 5/8" basis)
Furniture	44	69.1
Hardwood plywood	25	39.0
Exterior Uses (hoarding, cladding, fencing, etc.)	12	19.0
Interior partitions, doors, panelling	10	15.7
Counter-tops	4	6.3
Floor underlayment	3	4.7
Miscellaneous (manufactured toys, etc.)	2	3.1
	100	156.9

Note:- (1) including extruded boards and phenolic boards.

It is apparent from this that furniture and hardwood plywood consumption are so high that other uses can only consist of specialties. Because of this and the lack of detailed information on these markets, further investigation of the usage within these two large groups is recommended.

Furniture

The "furniture" category, estimated to absorb about 44% of the particleboard consumption, is the most difficult market to assess. This category includes only the standard particleboard used in furniture and does not include substantial quantities of veneer overlaid particleboard discussed in the next section.

In Appendix "F", D.B.S. statistics are listed for consumption of particleboard in the furniture and millwork industries from 1963 to 1967. It is estimated that the 1968 figures will be very close to those for 1967. The volume of consumption, however, is lower than that which the furniture market could be expected to absorb -- only 32.1 million feet, compared to Table 6 which estimates that the market absorbs a minimum of 69 million feet.

Household, office and "special" or miscellaneous furniture are the major categories within the furniture industry. On the basis of Appendix "F", Section A, household furniture consumes 67% of the particleboard used in furniture, office furniture consumes 11%, and "special" furniture, 22%. The chrome furniture market falls within the household furniture group and could absorb between 25% to 35% of the particleboard in this group.

Statistics on particleboard consumption of the U.S. furniture industry are slightly more complete than those available in Canada. It was estimated in 1965(1) that wood household furniture (excluding upholstered) absorbed 72%, metal household 13%, public building furniture 6%, office furniture 4%, and all other furniture 5%. The total U.S. household furniture consumption is therefore about 18% higher than in Canada and office furniture is estimated to be much lower.

Hardwood plywood

The quantity of particleboard combined with hardwood plywood may be estimated reasonably closely through D.B.S. Catalogue #35-206 and discussions

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(1) by the U.S. Department of Agriculture, Washington.

with the plywood plants using it. In 1966, D.B.S. lists this quantity to be 25.3 million square feet (5/8" basis). However, when other smaller mills are included it is estimated that 30 million feet are involved. In 1967, D.B.S. Catalogue #35-206 shows a decline to 20 million feet -- yielding a total of approximately 25 million feet while in 1968 it is estimated that 39 million feet will be combined with hardwood plywood. The recent Hardwood Plywood Study published by this Department indicates that a low-priced core is one of the major factors in the development of a viable Canadian hardwood plywood industry. If particleboard is able to meet this requirement in the full range of thicknesses, this could appreciably expand the domestic market. Most of the 14 million feet of American imports in 1968 was sold to this end-use and a growing percentage of the American board is apparently underlay grade.

In Appendix "F", Section B, are listed D.B.S. statistics for consumption of "veneer overlaid particleboard" in the furniture and millwork industries up to 1967. It will be noted that particleboard core plywood is not separated from ordinary plywood for the millwork group and is included under Section C. Further, it appears that the volume of particleboard core listed in the furniture group in Section B is too low and that some of the particleboard core plywood which should be in Section B is possibly included in Section C. The relative volumes used in the various furniture classes are of interest however. Household furniture consumption exceeds office and "special" furniture by two to one for Section A, B and C. The relative importance of the millwork trade to the hardwood plywood manufacturer is seen

in comparing Sections A and B; in Section A, millwork accounts for less than 1/4 of the particleboard that is used in the furniture trade. In Section B (1966), the millwork sector absorbs half again as much hardwood plywood as does furniture.

Exterior Uses

The consumption of particleboard for exterior uses is relatively simple to estimate since only one plant manufactures it. A portion of this plant's production is, however, used in interior panelling and interior sheathing. This type of Phenolic particleboard has proved successful in most exterior applications and is sold as temporary hoarding, as cottage and garage cladding, fencing, etc. In Western Canada it has been well accepted as sheathing in the mobile home industry.

Interior Partitions, etc.

This group comprises boards used as interior partitioning, doors, or panelling. The product of one extruded board plant would represent about one-half of this group and is used as cores in office partitions and doors. Standard particleboards used as panellings, either finished or unfinished, would represent the other half of the group.

Miscellaneous

Counter tops, floor underlayment and miscellaneous manufacturing account for an estimated 9% of consumption. Counter tops include residential units and to a smaller extent those used in commercial buildings, hotels, etc.

The small floor underlay market will be discussed later. Miscellaneous manufacturing includes such items as toys and packaging.

Construction Uses

One of the major weaknesses of the particleboard industry has been its heavy reliance on sales to the furniture substrate market and it is felt that diversification of end-uses is badly needed at this time. New construction markets are opening for particleboard in both Europe and North America for floor underlay, for partitions and for sheathings. Aside from floor underlay, Canada has made progress in the volume of board consumed in construction applications. In Canada it is estimated that 25% of the particleboard is consumed in construction or semi-structural uses, including 12% in exterior applications, 10% in interior partitioning, doors (and panelling), and 3% in underlay. The greatest in-roads in the construction industry have been made by the two plants specializing in (a) extruded board and (b) waterproof (Phenolic) board. Both of these products are totally different in end-use from mat-formed particleboard -- the first is used entirely in moveable office partitions and doors and the second in areas where a waterproof or a combination of waterproof and appearance board are required (i.e. cottage cladding, fencing, hoarding, panelling and sheathing). Although these boards are radically different from the standard particleboard, it is generally felt that the industry will move closer to this type of material (i.e. waterproof or specialized end-use) in the future.

Retail Consumption

The retail trade has not been included in Table 6 since it is a means of distribution rather than an end-use. It has been estimated that retail sales of particleboard account for about 10% of consumption. At least two-thirds of this must be purchased by small millwork companies, furniture shops and builders -- leaving an estimated 5 million feet for the do-it-yourself trade. The do-it-yourself trade has been small in the past due to lack of knowledge of the product. It will not be a large market for the near future but should become one of the fastest growing.

Overlays

It is estimated that 78% of the board consumed is overlaid with plastics or veneers. No statistics are available showing only the percentage of particleboard overlaid with plastic laminates. While it appears that the market for veneers and counter top laminates will continue to be a strong one, the newest plastic laminates such as vinyl, pvc and melamine are well established now and are growing rapidly. This is probably one of the best future markets for particleboard. These products can be overlaid and cut-to-size in the particleboard plant, giving the manufacture more control of the market and a wider profit margin than was possible in the past.

As previously stated, particleboard manufacturers overlaid about 6% of the total particleboard production in 1968, at their plants or 9 million feet. Particleboard cut-to-size in the plant could be an even higher percentage. It is anticipated that an increasingly larger share of the board sold for

furniture will be either reworked this way in the factory or at custom-cutting operations. As yet there are few of these in Canada.

Thicknesses

The growing market for particleboards thinner than 1/2" and thicker than 3/4" is apparent from examination of Appendix "E", Section 2. In 1965, 35% (or 35.5 million feet, 5/8" basis) of the particleboard production was in thicknesses other than 1/2" to 3/4"; in 1968, this had increased to 44% (62 million feet). The percentage at the end of September 1969 dropped to 39% while the volume consumed has actually remained about equal to the same period in 1968. Of these figures, it is estimated that thin boards (less than 1/2") constitute about 70%. These boards are now sold to the exterior construction field, interior panelling and small manufacturing markets. The boards comprising the remainder are over 3/4" in thickness and are used in specialty fixtures, doors and partitions.

Both of these non-standard sizes are expected to increase in volume in the coming five years -- the thin boards for panelling substrates and the thicker for construction uses such as structural floor underlay and partitioning. etc.

End-Uses in Europe

In Europe, it is estimated that almost 50% is used directly in buildings (Table 7) although of this, at least 20% would be for millwork (i.e. cabinets and counters).

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Table 7

END-USE MARKETS FOR GERMAN PARTICLEBOARD

1968

	Percentage
Furniture	50
New homes	29
Older homes	8
Farm consumption	5
Exterior application	3
Miscellaneous (including shipbuilding)	4 & 1
Do-it-yourself	1
Manufacturing industries	2

While exterior application is still very small in Germany, a rapid expansion could take place in the next two or three years, since research institutes in that country are working on developing a more water-resistant board. European manufacturers have also been actively promoting the use of particleboard for wall and roof sheathing for a number of years and it is now a competitor to our softwood plywoods in some countries. Aside from price, particleboard has proved to have competitive strength characteristics when used for roof sheathing or sub-flooring.

End-Use in the United States

In the American market, customer industries are much larger and further developed. They are, therefore, capable of contracting for large quantities of specialized products (e.g. overlaid, large size, cut-to-size, etc.). Table 8 lists manufacturing as absorbing 68% of the particleboard produced in the U.S. in 1965, of which 62% goes into furniture. Construction is estimated at 22% and miscellaneous uses at 10%. The household furniture market, which absorbed 34% of the total used in manufacturing in 1965, is

both the largest market and the fastest growing. The share of the market held by partitions and fixtures, metal household furniture and miscellaneous industries has apparently decreased although their individual volumes have increased.

Table 8

ESTIMATED END-USE MARKETS FOR PARTICLEBOARD
IN THE UNITED STATES - 1965

A. Manufacturing -- 68%

1.	furniture	- 62%
2.	partitions and fixtures	- 14%
3.	millwork	- 8%
4.	trailers, mobile homes	- 4%
5.	others	- 12%

B. Construction -- 22%
Primarily floor underlay and on-site millwork.

C. Miscellaneous Uses -- 10%

Source: Division of Forest Economics and Marketing Research; United States Department of Agriculture.

Surprisingly, trailer and mobile homes had a decreased share of the market in 1965 compared to 1960. This trend has apparently reversed recently since the mobile home industry has become one of the major American housing industries. It now accounts for 90% of the low-priced home market in the United States (i.e. under $15,000), equal to 400,000 units in 1969; 317,000 in 1968; and 240,000 in 1967. This industry is expected to be one of the fastest growing markets for American particleboard, primarily in underlay, cupboards and possibly to a small extent, in sheathings. In Canada, the mobile home and sectional home industries purchase a negligible amount of particleboard for sheathing and, since the trend is towards single skin

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claddings, such as prefinished hardboard or aluminum, this application does not offer too much long term growth. While most of the floor underlay is now plywood, manufacturers have indicated interest in 12' particleboard if it becomes available in Canada. At 20,000 units per year the production of mobile homes in Canada is one-twentieth of that in the United States and it is reasonable to assume that this ratio will improve in the near future, opening up an exceptionally large new market for underlay if Canadian particleboard manufacturers want it. A study of the Canadian mobile home industry now under way in this Branch is expected to determine future trends and the types of materials used. This study could prove especially interesting to Canadian panel products manufacturers.

The general category of "construction" absorbed 22% of the U.S. particleboard production in 1965. This has undoubtedly grown. In 1968 floor underlay alone represented 40% of the production. Even allowing for a large part of this used as furniture core stock, it is apparent that floor underlay has gained wide acceptance in the U.S. In Canada, where only 3% of the total production is estimated to be floor underlay, a large market remains to be exploited.

Other construction uses showing promise for the future in both the U.S. and Canada are exterior cladding, including overlaid horizontal siding and roof decking.

General Acceptance of Particleboard

In 1968 a much needed specification for mat-formed particleboard (CSA-0188-1968) was completed by the Canadian Standards Association and

Canadian manufacturers. This specification provides for resin type, general end-use categories and testing procedures for size, density, moisture and strength tolerances. This specification is a major step for particleboard towards achieving its potential in the manufacturing and construction industry. To obtain wider acceptance of the product's qualities, especially in the construction industry, a grade stamping program would be valuable. The underlay grade stamp instituted in 1969 by the National Particleboard Association in the United States should improve particleboard's position in the U.S. underlay market. In Canada, where particleboard underlay has been less successful to date, the industry has even more to gain.

Although the amount of particleboard promotion has increased greatly in the past two years it is still not known as a separate type of panel product. Particleboard has been considered no more than a substitute product in the past, except in the furniture industry where its superior surface is an advantage. Where it has been used the results have often been unsatisfactory due to a lack of knowledge of its properties. This has been especially true in the construction industry. Wider dissemination of information on its application, its advantages and on its limitations could speed up acceptance in this field, especially in underlay and sheathing as well as in manufacturing, pallets and packaging.

EXPORTS OF PARTICLEBOARD

	[1] 1958		[1] 1959		[2] 1960		[3] 1961		[3] 1962		[3] 1963		[4] 1964		[4] 1965		[4] 1966		[4] 1967		[4] 1968	
	CWT QTY	$000 VALUE	CWT QTY	$000 VALUE	CWT QTY	$000 VALUE	CWT QTY	$000 VALUE	CWT QTY	$000 VALUE	CWT QTY	$000 VALUE	M QTY	$000 VALUE	M QTY	$000 VALUE	M QTY	$000 VALUE	M QTY	$000 VALUE	M QTY	$000 VALUE
U.K.	74,102	303.5	117,874	359.5	1,293	6.7	-	-	4	.2	-	-	-	-	38.9	5.7	-	-	-	-	-	-
South Africa	1,423	8.7	379	2.7	519	3.3	700	4.5	1,286	7.7	1,089	6.8	-	-	-	-	-	-	-	-	-	-
Bermuda	126	.6	1,062	7.0	188	1.3	-	-	-	-	245	1.6	-	-	-	-	-	-	-	-	-	-
Guyana	60	.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.5	-
Trinidad	,306	5.3	1,006	5.1	-	-	261	1.2	-	-	24	.2	42.5	5.8	-	-	110.8	15	28.6	4	-	-
Lee/Wind	445	2.0	397	2.5	-	-	-	-	-	-	44	.3	-	-	-	-	-	-	-	-	-	-
Chile	251	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Costa Rica	31	.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cuba	6,152	30.1	3,188	13.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
El Salvador	148	.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fr. Oceania	2,619	9.4	3,053	11.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
St. Pierre	150	.7	-	-	32	.2	-	-	-	-	22	.3	-	-	-	-	-	-	-	-	4.3	-
Neth. Ant.	914	2.9	204	1.0	15	.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nicaragua	3,321	9.2	696	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Panama	726	4.1	272	1.3	113	.8	90	.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Peru	105	.3	140	.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Virgin Islands	17	.1	-	-	-	-	17	.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Puerto Rico	607	3.9	575	3.1	581	4.6	280	2.1	-	-	308	2.2	28.8	.8	-	-	-	-	-	-	-	-
U.S. Ocea	25	.1	26	.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Venezuela	33,196	101.3	7,442	20.6	2,644	10.6	151	1.2	-	-	1,161	5.2	-	-	-	-	-	-	-	-	-	-
U.S.A.	404,643	2,140.4	601,535	3,162.5	24,113	127.4	713	4.2	1,823	13.6	16,497	80.5	2,148.3	131.8	5,040.7	365.1	1,171.0	101	203.0	18	293.3	19
Australia	-	-	-	-	451	2.8	661	5.0	93	.6	189	1.3	-	-	-	-	-	-	-	-	-	-
Jamaica	-	-	410	3.1	4	.1	14	.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Korea	-	-	1,100	11.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hawaii	-	-	93	.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ireland	-	-	93	1.8	-	-	63	2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thailand	-	-	-	-	-	-	-	-	23	.9	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	539,457	2,625.5	739,545	3,609.8	29,953	157.9	3,078	22.7	3,229	23.0	19,579	98.4	2,219.6	138.4	5,079.6	370.8	1,281.8	116	231.6	22	304.1	20

[1] Class 4790 - Building and Insulating Board

[2] Class 4799 - Building Board NOP - In 1960, Class 4790 was broken down into three classes:
Rigid Insulating Board, Hard Board and Building Board NOP.
- Building Board NOP includes "Building Board and Wall Board", i.e. particleboard and some miscellaneous wood panels are included.
- In 1960, values of Rigid Insulating Board and Hard Board were $1,364,850 and $736,198, respectively.

[3] Class 35779 - Building Board NES - A new export commodity classification system became effective in 1961; in 1964 this Class was divided into Class 33599 plus "Wall Board coated with granuals", plus "Wall Board imitation brick siding".

[4] Class 33599 - Wood Building Boards NES
- Main components of class: Aspenite building panels, Aspenite waferboard, particle board, cedarwood and waferboard.
- Quantity - 1000 sq. ft., Surface Measure (i.e. of varying thicknesses).

(5) In 1970 particleboard will again be grouped with some miscellaneous wood products in Class 33999, "Wood Fabricated Materials NES", due to small volumes.

APPENDIX "A"

PRODUCTION, IMPORTS & EXPORTS OF PARTICLEBOARD IN CANADA — 1958 - 1968

IMPORTS OF PARTICLEBOARD

	[1] 1958		[1] 1959		[1] 1960		[1] 1961		[1] 1962		[2] 1963		[3] 1964		[3] 1965		[3] 1966		[3] 1967		[3] 1968	
	Qty	$000 Value	Qty	$000 Value	Qty	$000 Value	Qty	$000 Value	Qty	$000 Value	Qty	$000 Value	Qty	$000 Value	Qty	$000 Value	Qty	$000 Value	Qty	$000 Value	Qty	$000 Value
Austria	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	1	-	-
Belg.-Lux.	-	-	-	-	-	-	-	-	-	-	4,376	1.5	-	-	-	-	-	-	-	-	-	-
Czechoslovakia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Finland	-	-	-	-	-	-	-	-	-	-	93,052	4.2	-	-	-	-	-	-	-	-	-	1
Norway	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.9	-	-	-	-	-	-
Surinam	-	-	-	-	-	-	-	-	-	-	82,688	3.4	-	3.6	-	7.3	-	-	-	7	-	4
Malaysia-Sing.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-	-
U.S.S.R.	-	-	-	-	-	-	-	-	-	-	-	-	-	34.4	-	122.0	-	141	-	170	-	105
Rep. South Africa	-	-	-	-	-	-	-	-	-	-	-	-	-	.6	-	-	-	-	-	-	-	-
Germany W.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	38
Portugal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	-	-
U.S.A.	-	-	-	-	-	-	-	-	-	-	2,158,555	136.1	-	166.8	-	230.5	-	311	-	834	-	1,531
Romania	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	57	-	-
Israel	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	11	-	1
TOTAL	-	5,121.6	-	6,075.7	-	5,541.0	-	6,551.4	-	6,537.2	2,338,671	145.3	1.9(4)	206.4	3.4(4)	363.7	5.1(4)	461	13.4(4)	1,096	14.0(4)	1,681
Production (M sq. ft. 5/8" basis)	N/A		N/A		N/A		N/A		N/A		N/A		N/A		102,044		119,749		132,517		143,235	
Shipments (M sq. ft. 5/8" basis & value in $000)	N/A		N/A		N/A		N/A		47,457	5,745	59,319	6,826	74,720	8,465	99,992	10,907	118,389	13,425	125,853	14,044	140,971	16,323

[1] Class 4157 - Manufacturers of wood NDP - main components of Class are particleboard, wooden applicators, prefabricated beams, wood crossarms, doors, dowels, kegs, wallboard, pallets, prefab. building, etc.

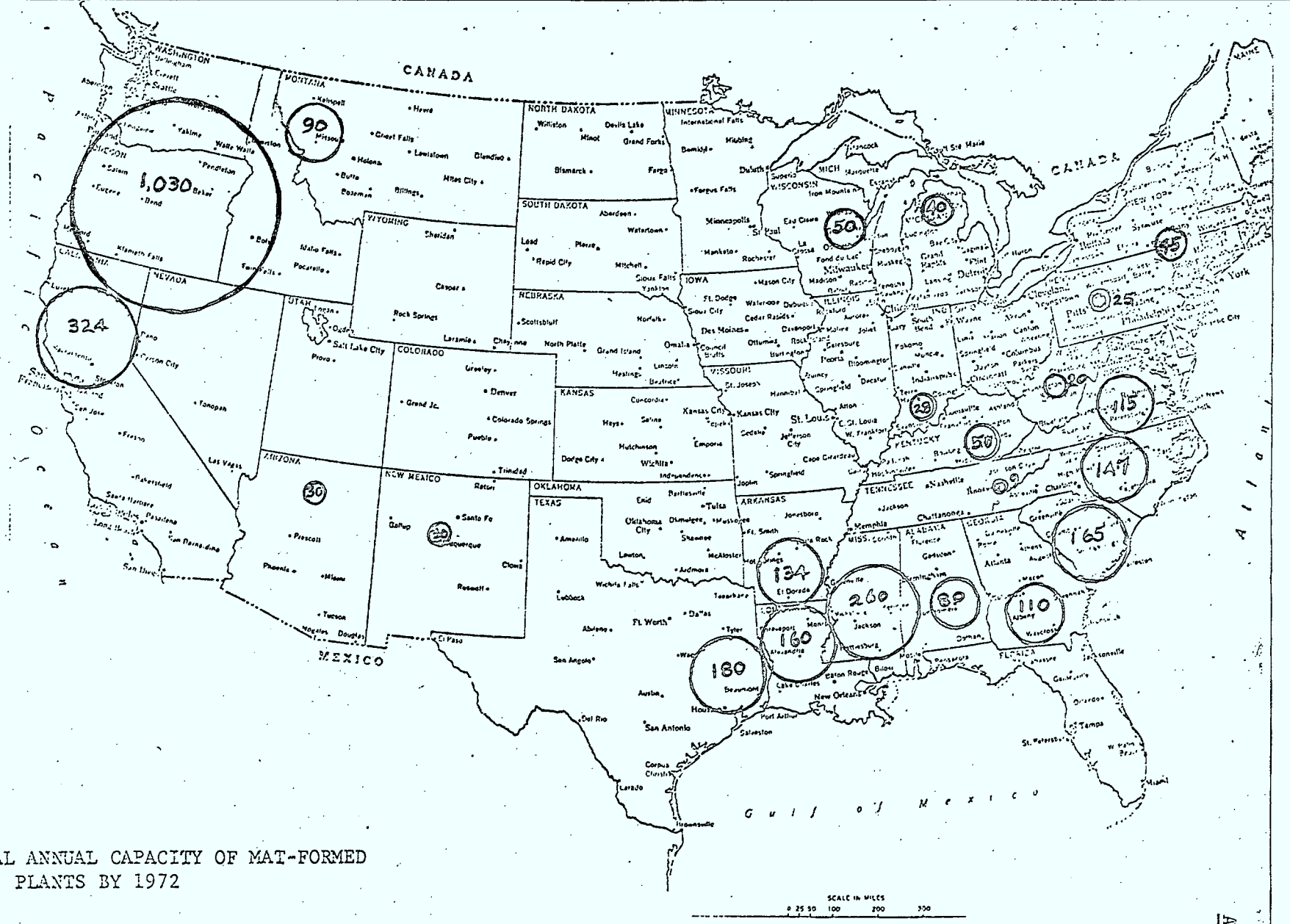
[2] Class 4150 - Reconstituted Wood Board - (no list of contents is included)

[3] Class 33595 - Particleboard/Reconstituted Wood - Main components of Class are particleboard, reconstituted wood board, ceda-wood/flakeboard panels, lebanite/particleboard, waferboard/particleboard (also included "tenex" and "bipan" board - cancelled in 1970 due to lack of imports since 1960).

(4) Volume of imports estimated from value using assumed average import selling price of $120.00 in 1968; $82.00 in 1967; $90.00 in 1966; $108.00 in 1965; $110.00 in 1964, at border not including duty or tax. In millions of square feet, 5/8" eqiv.

(5) Note production and shipment figures do not include extruded boards.

Source: Dominion Bureau of Statistics;
Prepared by Wood Products Branch,
Dept. of Industry, Trade & Commerce.



APPENDIX B

ESTIMATED TOTAL ANNUAL CAPACITY OF MAT-FORMED PARTICLEBOARD PLANTS BY 1972

(Figures in circles are millions of square feet per annum 3/4" basis -- multiply by 1.2 to obtain 5/8")

TOTALS BY REGION	1969	1970	1972	1973
WESTERN REGION	854	1,059	1,334	1,600
SOUTHERN REGION	625	855	1,155	1,660
NORTHEAST & NORTH CENTRAL REGION	163	188	188	188
TOTAL - U.S.	1,642	2,102	2,677	3,448

Source: Columbia Engineering International Ltd., Vancouver

REVISED
29/JUL/69
18/SEP/69

APPENDIX "B"

PARTICLEBOARD TARIFFS

				JAN. 1st. 1970	1971	1972
A. UNITED STATES						
245.45	00		Wood particleboard, whether or not face finished: if 90% or more by weight of the wood components consist of one, or any combination, of the following hardwoods: *Pterocarpus* spp., *Triplaris* spp., or *Virola* spp. ..... Sq.ft.	8%	7%	6%
245.50	00	*	Other ..... Sq.ft.	14%	12%	10%
B. BRITAIN						
44.18			Reconstituted wood, being wood shavings, wood chips, sawdust, wood flour or other lignous waste agglomerated with natural or artificial resins or other organic binding substance, in sheets, blocks or the like:			
			(a) Flaxboard	10%		
			C'wealth & E.F.T.A.	Free		
		*	(b) Other: (wood chipboard, etc.).....	18%		
			C'wealth & E.F.T.A.	Free		
C. EUROPEAN COMMON MARKET						
44.18		*	Reconstituted wood being wood shavings, wood chips, sawdust, wood flour, or other lignous waste agglomerated with natural or artificial resins or other organic finding substances in sheets, blocks or the like .	12.4%	12.2%	12.0%

(E.C.M. Countries include Belgium, France, Germany, Italy, Luxembourg, Netherlands -- between these countries there is no particleboard tariff).

D. CANADA						
50600-1			Manufactures of wood, n.o.p.			
			British Preferential Tariff	15%	15%	15%
			Most Favoured Nation Tariff	17%	16%	15%
			General Tariff	25%	25%	25%

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D. CANADA -- Cont'd.....		1970	JAN. 1st. 1971	1972
50645-1	Particleboard made of ground wood particles and phenolic type synthetic resin, weighing not less than 70 lbs. per cubic foot, for use in the manufacture of moulded laminated sheet impregnated with synthetic resin			
	British Preferential Tariff	10%		
	Most Favoured Nation Tariff	15%		
	General Tariff	30%		
93901-81	Plates, sheets, film, sheeting, strip; lay-flat or other tubing, blocks, bars, rods, sticks, non-textile monofilament and other profile shapes imported in lengths, all produced in uniform cross-section (includes plastic overlaid particleboard, i.e. vinyls, melamines, pvc, etc.)			
	British Preferential Tariff	17½%		
	Most Favoured Nation Tariff	17½%		
	General Tariff	25 %		

Note: 50600-1 includes all particleboards
50645-1 includes specialty, high-density boards -- this special tariff will be dropped June, 1970
93901-81 includes plastic overlaid particleboards

* - Tariffs applying to standard Canadian particleboard

APPENDIX "D"

Value of Particle Board Imports by Province by Month
(dollars)

From:	United States							U.S.S.R.	West Germany	Other	
To:	B.C.	Alta.	Sask.	Man.	Ont.	Que.	Maritimes	Que.	Ont.	Que.	Ont.
1965	80,079	14,786	-	-	109,219	26,409	-	121,981	-	10,677	531
1966	129,179	28,887	-	-	120,342	32,343	-	140,993	-	3,106	6,647
1967											
Jan.	31,334	15,610	-	-	8,441	214	-	18,271	-	5,756	-
Feb.	7,544	5,347	-	-	14,556	3,338	-	-	-	4,297	-
Mar.	16,802	10,962	-	2,011	16,115	15,015	-	-	1,926	-	-
Apr.	16,271	2,695	-	-	12,182	2,398	-	10,097	-	3,274	-
May	48,120	33,627	-	1,664	9,686	-	-	34,996	-	5,372	-
June	23,468	10,804	-	-	12,051	24,868	-	-	-	-	-
July	28,668	15,047	-	-	12,405	14,631	5,643	29,610	-	3,239	42,826
Aug.	41,174	24,561	-	1,895	13,346	8,136	4,399	-	271	14,346	4,820
Sept.	35,708	2,130	-	-	14,258	15,806	-	23,604	-	3,083	-
Oct.	33,299	7,895	-	1,950	22,878	18,976	-	-	-	-	-
Nov.	30,680	27,159	-	-	5,951	5,272	-	11,200	-	3,833	-
Dec.	23,797	12,903	622	1,829	40,467	9,435	7,860	-	-	42,110	-
Total	336,865	168,737	622	9,349	183,336	118,089	17,902	127,778	2,197	85,310	47,646
1968											
Jan.	56,300	2,168	1,558	5,709	27,434	29,913	-	-	3,310	-	-
Feb.	47,277	10,620	-	14,849	24,912	13,480	-	12,048	-	-	1,955
Mar.	55,040	5,165	2,753	4,077	25,634	4,148	2,528	13,485	10,318	-	-
Apr.	39,231	21,982	3,983	7,592	39,420	28,732	-	-	-	-	-
May	53,805	26,786	443	10,495	2,110	16,563	-	19,066	-	-	-
June	33,231	17,156	132	5,756	17,564	3,535	-	-	22,719	4,372	-
July	53,123	25,644	-	-	26,641	1,158	970	6,410	-	905	-
Aug.	50,784	24,475	1,255	8,960	46,706	3,848	-	24,248	-	-	586
Sept.	77,575	1,600	258	3,110	13,593	8,624	-	-	-	-	-
Oct.	98,558	18,968	1,368	-	25,403	4,333	-	16,287	-	-	-
Nov.	107,810	10,018	3,995	4,574	22,511	-	-	-	-	-	-
Dec.	141,518	22,720	2,597	4,168	30,851	2,696	199	13,599	-	-	-
Total	814,252	187,302	17,942	69,290	321,779	117,036	3,697	105,543	36,347	5,277	2,541
1969											
Jan.	88,078	18,122	458	1,509	43,375	-	-	4,601	-	4,240	-
Feb.	23,609	11,698	-	4,012	11,890	-	-	41,608	-	-	-

Source: D.B.S., Trade of Canada

APPENDIX "D"

CANADIAN PARTICLEBOARD PRODUCTION BY TYPE OF PRODUCT

(Million sq. ft., 5/8" basis)

(1) PRODUCTION PROCESS (based on mill capacities)

Year	Urea bonded, Mat-formed mills	%	"Specialty"* board mills	%	Total	%
1964	79	62	49	38	128	100
1965	105	68	49	32	154	100
1966	110	69	49	31	159	100
1967	126	72	49	28	175	100
1968	134	73	49	27	183	100
1969	136	73	49	27	185	100
1970 (proj'd)	230	70	97	30	327	100
1971 "	295	75	97	25	392	100
1975 "	493	71	197	29	690	100

* - Including extruded boards and waterproof waferboards

Source: Wood Products Branch - (estimated from individual plant capacities)

(2) THICKNESS (based on actual shipments)

Year	½" to ¾" Volume	%	Other thicknesses Volume	%	Total Volume	%
1965	66.6	65	35.5	35	102.0	100
1966	75.7	64	44.1	36	119.8	100
1967	81.3	62	51.2	38	132.5	100
1968	80.8	56	62.4	44	143.2	100
1969 (to Sept.)	78.7	61	49.3	39	128.1	100

Source: Dominion Bureau of Statistics

- not including extruded boards.

PANEL PRODUCTS CONSUMED IN THE FURNITURE INDUSTRY

A. PARTICLEBOARD (Volume - '000 sq.ft., 5/8")

Year	Household Furniture (Cat.#35-211)	Office Furniture (Cat.#35-212)	Special Purpose Furniture (Cat.#35-213)	Total Furniture	Millwork Plants (Cat.#35-205)	Total Furniture & Millwork
1963	7,743	414	1,614	9,771	3,843	13,614
1964	10,188	1,796	1,729	13,713	3,901	17,614
1965(1)	14,004	2,594	2,620	19,218	7,565	26,783
1966	22,431	3,047	4,373	29,851	7,726	37,577
1967	21,620	3,466	7,039	32,125	7,230	39,355

B. PLYWOOD OF PARTICLEBOARD CORE (Volume - '000 sq.ft., surface measure)

1963	10,560	731	3,419	14,710	--	--
1964	14,382	898	4,039	19,319	--	--
1965(1)	4,189	613	1,113	5,915	--	--
1966	4,689	349	1,468	6,506	--	--
1967	5,060	768	1,538	7,366	--	--

C. PLYWOOD (of which a portion could be particleboard core)
(Volume - '000 sq.ft. surface measure; softwood on 3/8" basis, hardwood on 1/4" basis)

1963	30,068	1,801	10,943	42,812	101,022	143,834
1964	31,915	1,933	12,730	46,578	129,563	176,141
1965(1)	42,736 soft.-14,965 hard.-27,771	2,105	16,827 soft.-6,983 hard.-9,844	61,668	125,195 soft.-58,682 hard.-66,573	186,863
1966	47,857 soft.-17,994 hard.-29,863	3,344	18,314 soft.-9,564 hard.-8,750	69,515	162,484 soft.-98,220 hard.-64,264	231,999
1967	37,627 soft.-15,092 hard.-22,535	3,629				

(1) Note: In 1965 plywoods were broken into particle core and veneer core.

Source: Dominion Bureau of Statistics, from
Cat.#35-205 (sash, door, millwork plants)
Cat.#35-211 (household furniture of wood, metal or upholstered)
Cat.#35-212 (office furniture of wood or metal)
Cat.#35-213 (special purpose furniture for hospitals, hotels, churches, restaurants, etc.)

APPENDIX "F"

APPENDIX "G"

PARTICLEBOARD PRODUCTION, EXPORTS, IMPORTS AND PER CAPITA CONSUMPTION FOR WEST GERMANY & UNITED STATES

	WEST GERMANY					UNITED STATES				
Year	Production(1)	Export	Import	Total Consumption	Per Capita Sq. Ft.	Production	Export	Import	Total Consumption	Per Capita Sq. Ft.
1963	754	44	88	798	13.8	595	-	-	-	-
1964	945	55	104	995	17.1	766	-	1.9	767	4.0
1965	1,109	66	210	1,254	21.2	964	N	5.3	969	4.9
1966	1,238	79	214	1,373	23.0	1,193	N	1.9	1,195	5.3
1967	1,396	117	159	1,437	24.1	1,343	2.3	1.4	1,344	6.2
1968	1,752	139	135	1,748	29.1	1,620	N	.5	1,620	7.5
1969(est.)						1,900	N	.5	1,900	9.5
1973(proj'd)						-	-	-	3,200	15.0
1975 "						-	-	-	4,400	20.0

(1) In millions of sq.ft. - 5/8" basis.

N -- negligible

Source:
1. F.A.O., Geneva, "Timber Bulletin for Europe"
2. U.S. Department of Agriculture
3. Projections by U.S. Particleboard Association and Department of Industry, Trade and Commerce.

APPENDIX "G"