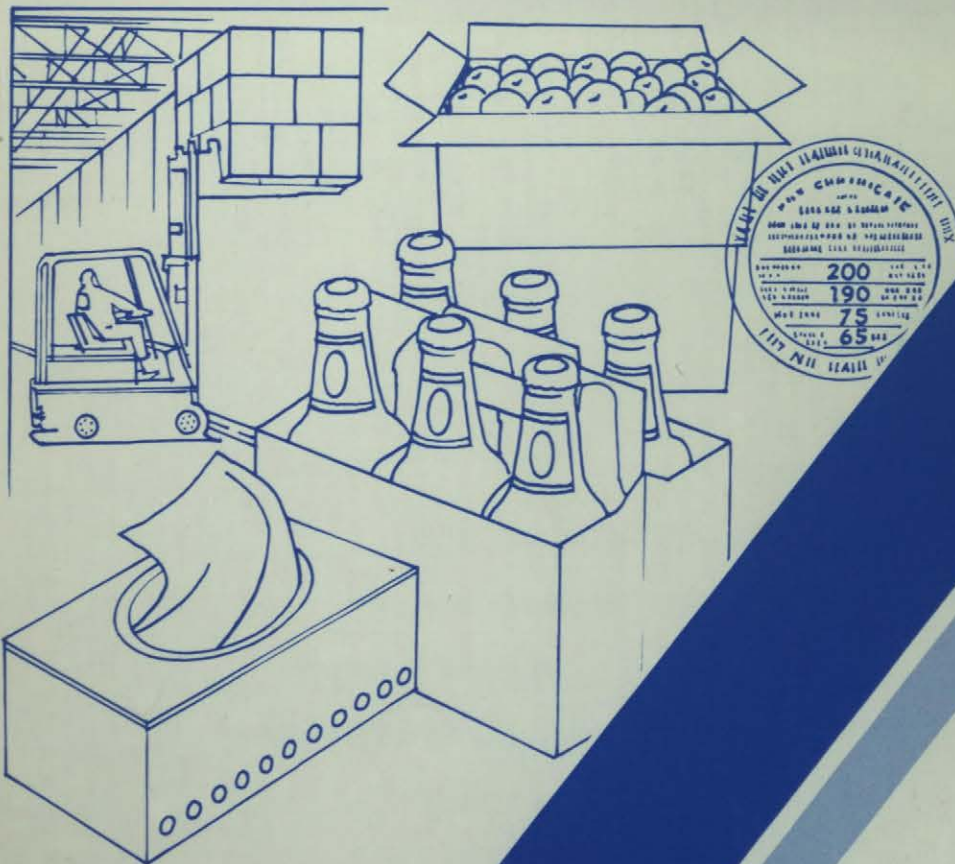
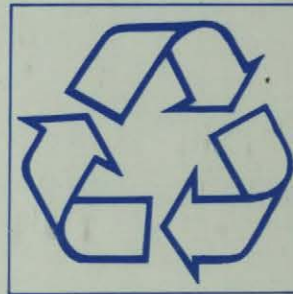
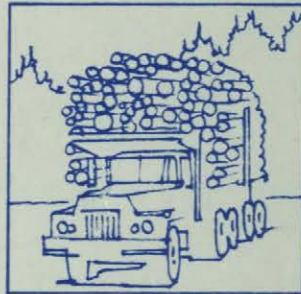
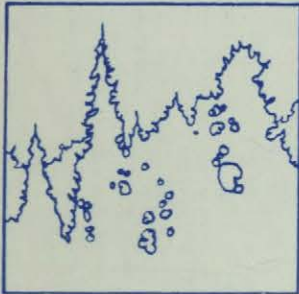


Review of Canada's Paperboard Packaging Industry



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REVIEW OF CANADA'S PAPERBOARD PACKAGING INDUSTRY

Pulp and Paper Division
Forest Products Directorate
Resource Processing Industries Branch
Department of Regional Industrial Expansion
Published September 1986

FOREWORD

I am pleased to be able to provide this review of Canada's paperboard packaging industry to members of the industry. It is one of several reports which have been prepared on the major sectors of the converted wood and paper products industry in Canada. The others include kitchen cabinets, wood windows and doors, manufactured housing, and converted papers. These reports were prepared by the Converted Wood and Paper Products and the Pulp and Paper Divisions of the Department of Regional Industrial Expansion.

The Subcommittee on Converted Wood and Paper Products, under the aegis of the Forest Sector Advisory Council (FSAC), has reviewed and advised on the reports. The FSAC, comprising executives of forest industry companies and labour unions along with some university representation, was established to provide the Minister of State for Forestry and myself with advice on the full range of resource, industrial and trade issues affecting Canada's forest industry.

These reviews are, I believe, the most comprehensive descriptions and analyses of the sectors published to date. In addition to providing a detailed examination of the characteristics of each sector, they also identify a number of key issues currently affecting their well-being, as well as a number that are looming on the horizon. As wood fibre resources become increasingly scarce on both the domestic and international fronts and unemployment continues as a major concern, the potential contribution of these value-added sectors to regional development and employment will become more significant.

The primary intent of the reviews is to encourage companies and industry associations to focus on the pertinent issues, be they company-specific or industry-wide. It is my hope that the reviews will stimulate companies to assess their performance and future opportunities and focus their attention on continuing improvement to productivity and marketing. The key objective, one that has been emphasized by the advisory Subcommittee, is the improvement in international cost competitiveness which is required not only to maintain domestic market share, but also to expand exports. The competitive position of the Canadian industry will be particularly important if further trade liberalization takes place.

The Department would be pleased to hear the views of the industries and associations concerned. I believe it is essential that we have strong communication links between management, labour and government to address industrial issues whether they be productivity improvement, adjustment to changing economic forces, export market development or questions of trade access.

In summary, I welcome an open dialogue on all matters affecting the future performance and viability of the paperboard packaging sector.

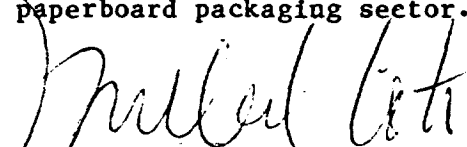

Minister of Regional Industrial Expansion

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SUMMARY AND CONCLUSIONS

CORRUGATED SHIPPING CONTAINERS*

Summary

Both vertical integration and concentration of ownership are strongly evident in the segment, with three companies accounting for almost 65 per cent of the national capacity and more than 65 per cent of segment sales on a national basis. For many of the non-integrated producers the hegemony aspect is a matter of expressed concern.

High real growth in container demand in the 1950s and 1960s has caused substantial overcapacity, particularly in Ontario and Quebec. Real growth in the near future is forecast at sharply lower rates and will do little to relieve the overcapacity problem. This now-chronic structural problem has given rise to a fiercely competitive market in Ontario and Quebec where, in particular, profit margins have been squeezed by rising costs against a competition-constrained price ceiling. Thus, in recent years, the profit performance of much of the segment has not been satisfactory.

Less than successful in controlling variable cost and in matching the labour productivity gains of their U.S. counterparts, Canadian producers have lost their competitive advantage, on a landed-price basis, in the major domestic market of Ontario and, to some extent, in Quebec. As a result, Canadian container pricing in these substantial regional markets is influenced by price levels in nearby states of the U.S.

Raw material and labour supply, in general, are expected to remain reasonably secure over the long term. Although no greenfield mill construction is contemplated for the principal raw material used, kraft linerboard, the demand/capacity ratio is expected to remain less than 1:1 until 1995. Because of the low-value nature of kraft liner and high capital and production costs, a Canadian greenfield mill in that grade is unlikely, and future supply shortfall will likely be met from U.S. mills.

Located in urban centers, container plants historically have not suffered shortages of labour, despite the seasonal pattern of operations. While there is likely to be greater demand for skills in future, urban labour pools are expected to be able to fill the need.

Conclusions

Production overcapacity is a chronic condition in the segment and is likely to remain so if the industry takes no action to rationalize production facilities.

The continuing inability of Canadian producers, particularly in Ontario and Quebec, to match the labour and material usage efficiencies of U.S. producers

*See Glossary.

renders the former increasingly vulnerable to loss of domestic market to imports from adjoining U.S. states.

SUMMARY AND CONCLUSIONS

FOLDING CARTONS AND SET-UP BOXES*

Summary

While vertical integration is present in this segment, it is lower, at approximately 35 per cent, than the level in corrugated containers, and much of it is accounted for by one Canadian-owned company. Concentration of ownership approximates 70 per cent of capacity and is shared by the integrated company and three other independent, non-integrated firms. In combination, these four account for 65 to 70 per cent of national segment sales, of which almost 92 per cent originated in Ontario and Quebec in 1983.

Buoyant demand growth in the 1950s, when annual real growth greater than 10 per cent was not unusual, caused the substantial and chronic overcapacity condition in the segment in Ontario and Quebec. As with corrugated containers, this overcapacity has created a highly competitive, price-sensitive market. The relatively low demand/capacity condition has been further aggravated in recent years by the increasing use of alternative packaging forms. This situation and the mature nature of the folding carton market are at the root of the marginal real growth Canadian producers will continue to experience in the near future. Profit performance in recent years has been poor and future prospects are not encouraging.

The only significant competition for Canadian container producers, particularly in Ontario and, to a lesser degree, Quebec, is provided by their U.S. counterparts. Canadian exports are not generally competitive in the U.S. market on a delivered-price basis, even under present currency relationships. Nor, on the face of it, are U.S. producers competitive in the Ontario-Quebec market. The reality, however, is that from time to time and at any time, integrated U.S. producers can and do use transfer-pricing arrangements for boxboard material to improve their competitive position in the Canadian market. Their 1982-83 foray into the Ontario market on dairy liquid-product containers clearly showed their ability to penetrate the domestic market to a considerable degree.

Given the slightly divergent growth of mill capacity over demand, and the present demand/capacity ratio of 0.8, future domestic boxboard supply is reasonably assured for Canadian container producers, and no greenfield mill project is contemplated in the medium term, i.e. to 1990. Despite relatively strong seasonal activity in production, labour supply in general has not been a problem, nor is it expected to be in the future. The labour/cost ratio, despite some real output productivity gains, has increased steadily and is now of concern in the industry.

* See Glossary.

Conclusions

Overcapacity plagues this segment in Ontario and Quebec. This now chronic condition will persist unless the industry acts to eliminate some production capacity. As presently forecast, it will take approximately 25 years for the real demand growth to absorb the excess capacity.

Marginally competitive at best in its major domestic market region, the industry there will become increasingly vulnerable to substantial loss of market if the present inefficiencies in labour and material usage are not substantially reduced. As with the companion segment of corrugated containers, currency exchange provides the principal protection against the efficient, low-cost production exportable from the U.S. Any substantial reduction of the currency premium is likely to cause irreparable harm to the domestic industry if the key variable cost ratios referred to above do not improve. In this event, the primary mills, being almost entirely dependent on the domestic demand from the container producers, would not go unscathed.

INTRODUCTION

The forest products industry is one of Canada's leading industrial sectors and one that, within its primary operations, engages in a strong export activity. By contrast, the converted paper and paperboard subsector, a secondary manufacturing operation, is essentially oriented to the domestic market, and export activity is minimal.

The subsector, nevertheless, contributes significantly to the overall health of the Canadian forest products industry and is important in its own right in terms of size, geographic dispersion, product line diversity and employment. The total value of shipments of the subsector in 1983 approximated \$4.2 billion, some 17 per cent of all forest product shipments and some 30 per cent of paper-based products shipped.

The subsector comprises four main product classifications -- corrugated shipping containers, folding cartons and set-up boxes, miscellaneous converted papers, and paper bags and sacks -- and contains approximately 260 firms that operate approximately 500 manufacturing establishments employing some 34 000 to 35 000 persons.

The subsector is present, to varying degree, in all provinces except Prince Edward Island. For each of the main product classifications, however, most national manufacturing in the subsector takes place in Quebec and Ontario. The regional concentration has been relatively stable over recent years and is currently greater than 85 per cent, although in certain products the share of activity between these two provinces has been changing.

Taken as a whole, the demand for converted paper and paperboard products in Canada is tied to the growth of the overall economy. With the notable exception of paper bags and multi-wall sacks, and to some extent folding cartons, which are experiencing a long-term decline in demand because of plastics substitution, the remaining product classifications display

underlying rates of growth at or near that of real GNP. Based on a consensus forecast of growth for the Canadian economy averaging about three per cent annually to 1990, the overall demand-trend growth rate for the subsector is estimated to be from three to 3.5 per cent.

SIGNIFICANCE OF THE CONVERTING SUBSECTOR

The paper converting subsector is a secondary manufacturing operation within the forest products industry. For its major raw material input, the subsector uses papers and paperboards produced by Canadian primary or mill operations. Included under "other paper and paperboard" in the table below, the paper and paperboard consumed by the subsector in 1983 is estimated to have been 2.2 million tonnes, about 10.4 per cent of total production.

TABLE I

PULP AND PAPER PAPERBOARD PRODUCTS - FOREST PRODUCTS INDUSTRY

PRODUCTION AND EXPORTS, 1983

	<u>Production</u>		<u>Exports</u>	
	<u>(000 000 tonnes)</u>	<u>z</u>	<u>(000 000 tonnes)</u>	<u>z</u>
Market wood pulp	7.6	35.0	6.8	42.0
Wood pulp consumed in Canadian mills to produce:				
Newsprint	8.5	39.2	7.5	46.3
Other paper and paperboard	5.1	23.5	1.7	10.5
Building paper and board	0.5	2.3	0.2	1.2
Total:	21.7	100.0	16.2	100.0

Source: Canadian Pulp and Paper Association.

As can be seen, the product classification referred to accounts for a significant share of mill production, and within that share the subsector consumption is substantial.

SEGMENT PROFILES

(a) CORRUGATED SHIPPING CONTAINERS

Background

The corrugated shipping container segment is the largest converter of the industry's paperboard products and the largest segment of Canada's packaging industry.

The food and beverage industry is the largest single market for these containers, and the chemicals and chemical products industry a distant second. Thereafter the list of user industries is virtually endless, and no other group accounts for more than a few percentage points of the total container shipments. This end-user pattern has not changed significantly in the last eight to 10 years and reflects the pervasive use of the container in the manufacturing sector.

Containers are manufactured in all provinces except Prince Edward Island. Two types of production facility exist. The more important is the corrugator or combiner plant, which contains one or more corrugating machines together with boxmaking equipment and represents a relatively high level of capital investment. The sheet plant contains only boxmaking equipment, is supplied with corrugated board or sheets by a combiner plant, and represents a relatively low level of capital investment.

Vertical integration is a prominent feature of this segment of the industry. Approximately 90 per cent of installed corrugator capacity is integrated with primary mill production, and of this some 67 percentage points are shared by three companies. These companies are also substantial suppliers of the sheet plants, and the hegemony aspect is a matter of considerable and growing concern to the latter.

Segment Structure

In 1982, 111 establishments were classified to this industry segment. This total consisted of 60 combiner or corrugator plants and 51 sheet plants. In the 10-year period since 1973, this total plant population has increased steadily from the 77 classified to the industry in that year. Of the 34 additions, only two were combiner plants, the remaining 32 being sheet plants. While the combiner plants accounted for 54 per cent of the plant population, their value of shipments of finished containers represented 90 to 92 per cent of total container shipments in 1982.

Combiner plants operate in all of the provinces except Prince Edward Island. On a national capacity basis, Ontario holds the major proportion at almost 50 per cent, followed by Quebec at 28 per cent. Of the remaining 22 per cent, the Atlantic region has seven per cent and Western Canada 15 per cent. In the case of sheet plants, the central tendency remains: almost 90 per cent of national sheet capacity is located in the central region, the remainder in Western Canada.

It is estimated that, on average, a combiner plant employs more than 100 persons, whereas the average sheet plant employs fewer than 40. Combiner plants are thus the major employer in the segment, and labour distribution by region largely reflects that of combiner capacity. The central region dominates, and the sheet plant element of employment serves only to reinforce the central dominance.

In 1982, total production and related workers numbered 7202, compared to 8243 in 1973. From that latter year, this element of the total employed

moved somewhat erratically to a peak of 8787 in 1980, before declining to a low that reflects, in part, the extended labour conflict that affected most of the combiner plants in Central Canada in 1982. The salaried element of total employment has followed a similar pattern of change, and its absolute level of employment also represents a low in the 10-year period.

Table II summarizes national manufacturing and total activity for the period 1973-1981 inclusive and provides by-region data for 1982.

TABLE II
CORRUGATED SHIPPING CONTAINERS (SIC 2732)
PRINCIPAL STATISTICS 1973 - 1982

	Number of Estab.	Manufacturing Activity					Total Activity		
		Production and Related Workers			Cost of Materials and Supplies (\$ 000)	Valued Shipments (own mfr) (\$ 000)	Value Added (\$ 000)	Employees	
		Number	Person-Hours Paid (\$ 000)	Wages (\$ 000)				Number	Salaries and Wages (\$ 000)
<u>Canada</u>									
1973	77	8 243	17 585	68 682	244 854	416 832	168 325	11 005	97 804
1974	84	8 675	17 550	80 213	317 496	527 788	207 855	11 535	113 990
1975	87	7 800	15 921	81 693	312 133	511 395	193 496	10 634	119 369
1976	88	7 833	15 564	92 884	348 842	578 489	222 471	10 537	132 147
1977	90	7 515	15 465	101 982	365 071	598 848	223 848	10 196	146 456
1978	93	7 808	16 188	111 651	399 405	657 129	249 335	10 424	158 589
1979	105	8 630	17 919	132 862	486 686	796 992	298 033	11 336	185 003
1980	108	8 787	17 670	142 417	557 536	897 684	329 756	11 504	199 758
1981	101	8 313	17 189	162 078	670 838	1 050 251	363 708	11 062	229 106
<u>1982</u>									
NFLD	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PEI	-	-	-	-	-	-	-	-	-
NS	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NB	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Quebec	25	2 078	4 123	41 083	161 572	248 095	21 047	2 879	63 467
Ontario	62	3 545	7 048	69 146	306 986	485 604	171 223	4 782	102 035
Manitoba	3	269	583	5 941	24 854	40 356	15 000	342	7 759
Sask	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Alberta	9	339	666	7 335	32 354	54 312	20 926	442	10 087
BC	6	586	1 179	15 812	68 847	110 912	41 144	794	22 870
CANADA	111	7 202	14 371	146 902	630 506	1 001 301	354 279	9 749	216 998

Source: Statistics Canada.

Capacity

Production capacity in this segment is determined by the output of the corrugator units (i.e., immediately prior to the boxmaking process) and is measured in square feet or square metres of corrugated sheet production capability, based on a daily three-shift operation, or 15 shifts per week. It is argued that this traditional approach to capacity measurement simplifies capacity evaluation and related data calculations. This is undoubtedly true, but the capacity values thus developed tend to be conservative when the boxmaking facilities are considered. Container plant boxmaking capability generally exceeds the associated corrugator rated capacity by some 10 to 15 per cent on average, or approximately three to four billion square feet nationally.

Sheet plant capability, while not definitely known, is estimated to approximate three to four billion square feet on an annual basis, and the boxmaking capacity in total is estimated at some 34 to 36 billion square feet annually. This compares with total shipments of 18 billion square feet in 1982. Thus, whichever capacity or yardstick is used the demand/capacity ratio is undesirably low.

In 1982, 61 corrugator units were in service in Canada with a reported aggregate annual capacity of 27 billion square feet. Since then, upgrading, withdrawals and additions have resulted in a net annual additional capacity of approximately one billion square feet and a present total annual capacity of about 28 billion square feet per year. Rumours in the industry indicate a further net annual capacity increase of approximately one billion square feet is in the offing as the result of upgrading, provided the old equipment is not scrapped or sold into export.

TABLE III

CANADIAN CORRUGATOR CAPACITY BY PROVINCE, AS OF 31 DECEMBER 1982

(Annual capacity rating in billions of square feet)

<u>Province</u>	<u>Units</u>	<u>Capacity</u>	<u>% of Capacity</u>
British Columbia	4	2.3	8.6
Alberta	4	1.4	5.2
Saskatchewan	1	0.3	1.1
Manitoba	3	1.1	4.1
Ontario	28	12.15	46.6
Quebec	16	7.6	28.4
New Brunswick	2	0.6	2.2
Nova Scotia	1	0.6	2.2
Prince Edward Island	-	-	-
Newfoundland	2	0.4	1.5
CANADA	<u>61</u>	<u>26.8</u>	<u>100.0</u>

Note: Percentage numbers may not add due to rounding.

Source: Pulp and Paper Division, Resources Processing Industries Branch, DRIE.

Table III illustrates the concentration of capacity in Ontario and Quebec. The boxmaking capability directly associated with the corrugators in the combined plants follows the same pattern. In the case of sheet plants, this concentration of capacity is even more pronounced, Ontario being the major focus of that activity, with the largest sheet plants located in this province.

Little of the corrugator capacity in place can be described as new. In fact, of the number of corrugators listed in Table III, only two were installed in the decade ending in 1982. Most of the capacity ranges in age from approximately 14 to 30 years. For a considerable number of these units currently operating, modernization or rebuilding is not a feasible solution. The modern corrugator, while demonstrably continuing to make corrugated sheet in the same way that it has been made for more than 70 years, is nevertheless a highly sophisticated machine and much larger and faster than all but the recent "conventional" corrugators. In effect, the new generation of corrugated equipment has rendered obsolete a substantial proportion of existing production capacity, particularly in the highly competitive central region of Ontario and Quebec. At the same time, because of the escalation of equipment and construction costs since 1973, even for conventional corrugators, the new breed with its sophisticated controls and operating features represents a level of investment that makes a greenfield combiner plant relatively capital-intensive. The oldest plants will probably continue to operate for some years, but they will become increasingly vulnerable, especially in the very competitive central region, with the passage of time and the occurrence of any extended economic recession.

On the other hand, boxmaking equipment facilities generally are not considered to be capital-intensive. Indeed, this feature is claimed to have given rise to the proliferation of sheet plants in the past, and the resultant compounding of the chronic overcapacity problem plaguing the combiner plants.

Markets

As with much of converted paper manufacturing, the corrugated container segment is domestically oriented, and its markets have developed, until the Multi-lateral Trade Negotiations in 1979, behind the protection of a relatively high tariff wall. The heavy domestic orientation is demonstrated by levels of exports that have never been more than nominal (i.e., less than two per cent of shipments) in any year.

In physical terms, the Canadian market area is extremely long and narrow, and along its length the user population generally is dispersed (save in Ontario and Quebec) in widely separate urban consumption centres. The dispersion of industry capacity follows the same pattern in servicing these local markets. The comparatively high cost of transportation in any extended movement of corrugated containers -- whatever the mode of transport -- works effectively to maintain the insularity of these market areas which, by and large, conform to provincial boundaries.

The very real nature of these submarkets, their compartmentalized character and the general absence of interprovincial shipments are shown by regional price comparisons given in Table IV.

TABLE IV
CORRUGATED CONTAINER REGIONAL PRICE COMPARISON

(12-month average, 1983)

<u>Region</u>	<u>Quantity shipped</u> (000 sq. ft.)	<u>Value</u> (\$ 000)	<u>Value</u> (per 000 sq. ft.)	<u>Rank</u>
Atlantic	974 759	53 204	54.58	5
Quebec	4 922 942	249 768	50.73	6
Ontario	9 909 602	471 844	47.61	7
Manitoba	657 044	37 123	56.50	4
Saskatchewan	190 599	11 936	62.62	1
Alberta	995 325	58 809	59.09	2
British Columbia	1 398 297	80 882	57.84	3
CANADA	19 048 568	963 566	50.59	
Exports	14 241	721	50.63	
Total	<u>19 062 809</u>	<u>964 287</u>	<u>50.59</u>	

Source: Statistics Canada.

As may be seen, the range of regional price return, or value per thousand square feet, to the boxmaker is wide, the highest return being approximately 32 per cent or approximately \$15 above the lowest. While regional raw material input costs have some effect on regional pricing levels, a major influence is the regional demand/capacity balance. Outside Ontario and Quebec, this ratio is, in fact, not unacceptable in the industry's view. On the other hand, in the central region, particularly in Ontario, there is a definite imbalance and the overcapacity condition has bred a highly competitive market where price is the dominant factor. In these two provinces a further depressant on price levels is the proximity of U.S. boxmakers whose presence on the threshold of the major domestic regional market is much more real than apparent. Such is the lower cost structure of these U.S. producers that given even a 90-cent dollar, in 1983, based on the U.S. average price, their delivered price would be three to five per cent below the Ontario average. In a market that can be price sensitive to the one to two per cent level, a three to five per cent advantage is significant.

In the case of sheet plant operations, which generally emphasize fast response to customer demand and small order runs, the competitive scramble is less hectic. Their trade, frequently of a custom service, is conducted at substantially higher price levels. In effect, this increase is the "premium" exacted for the service provided, and it is this service aspect that shields the sheet plants from U.S. producers that can and do influence combiner plant pricing.

In the most general way, the U.S. counterpart is the sole competitor to the Canadian corrugated container producers. The nature of the product, with its inherently high transportation costs, and the traditional fast customer response requirements combine to make offshore markets irrelevant to domestic producers. Indeed, for these same reasons, the important American states are those along the border, in particular those close to Ontario and Quebec. These states lie in, and form part of, two of six regions that constitute major markets in the U.S. where producers have become particularly cost-effective in a highly competitive market.

Competitive Position

Given the sizeable transportation-cost barrier and the general requirement for quick response to customer needs, corrugated container production generally serves local markets. Thus, border states constitute the only export market that may be contemplated by Canadian producers. By the same token, U.S. producers in those same states pose an import threat to domestic producers.

In general, Canadian container production facilities are fully comparable to the facilities in the U.S. Indeed, much of the equipment used in Canada is designed and manufactured in the U.S., particularly the major items such as corrugators and flexographic printers. By world standards, the structural and graphics design of Canadian containers is second to none, and the quality of the containers is good. In other words, against the U.S. Canada is fully competitive in the quality and design of the corrugated container products. It is on the basis of price that the Canadian producer fails to be wholly

competitive against his U.S. counterpart, no matter on which side of the border they meet.

The size and user-population density of the U.S. market undoubtedly gives rise to economies of scale for many U.S. container producers. But, while these economies are beneficial and important, by far the most important are the factor input costs of labour and material. It is its advantage in these two elements that allows the U.S. producer the freedom to maneuver successfully in pricing. Cost and selling price data, on a national average basis, are published for both Canada and the U.S. Comparison of average selling prices, FOB plant, for 1983 shows that the Canadian selling price was C\$50.59 per thousand square feet or US\$37.94. The comparable U.S. figure was US\$36.83 or C\$47.22, based on a 75-cent exchange rate.

For a Canadian producer seeking export sales to the U.S., the modest U.S. import duty, approximately five per cent at present, and transportation charges of approximately the same magnitude add to the FOB price differential to give a landed-price spread of some 13 to 15 per cent. The corrugated container is viewed as a commodity item, and in commodity selling a price differential of this order makes the high offer virtually non-competitive.

In contrast, the U.S. product, on a landed-price basis, is quite competitive, on average, in the Canadian market. While it is true that imports have not been significant in the past in their relation to apparent consumption, they pose a continuing and constant threat to Canadian producers, most particularly in the major market region of Ontario and, to a lesser degree, in Quebec. So much so that container pricing in these large regional markets is, at least partially, influenced by pricing levels in the adjoining U.S. states.

HORIZONTAL FACTORS

Raw Material Supply

Containerboard (kraft linerboard, recycled linerboard, semi-chemical corrugating medium and recycled medium), adhesives and coatings are the essential raw materials used in the corrugated container manufacturing process. Of these materials, the most important is containerboard which accounts for almost 70 per cent of manufacturing cost, compared to eight to 10 per cent for the other materials.

Historically, the corrugated container producers or, more specifically, the combiner plants, have sourced their requirements in Canada, principally from mills in Ontario and Quebec. Imports, mainly in the linerboard grade, have been modest, have tended to be "top-up" tonnages of convenience, and have been a negligible proportion of apparent consumption.

A high degree of integration with a producer mill characterizes the domestic supply of the container producers, and some 70 to 75 per cent of containerboard domestic shipments from the mills are in fact intra-company transfers. The balance of supply is secured on an open-market basis by the independent (i.e., non-integrated) combiner plants. In 1983, "captive"

sourcing accounted for some 950 000 tonnes out of 1 280 000 tonnes of domestic demand for containerboard. Of this total national requirement, Ontario and Quebec absorbed about 83 per cent or just over one million tonnes. In common with the U.S., the Canadian market shares a high preference for kraft linerboard over recycled linerboard, and in 1983 this usage pattern was maintained with kraft linerboard being about 70 to 75 per cent of total linerboard domestic demand. Similarly, the usage of corrugating medium reflected the preference for the semi-chemical grade versus the recycled product, the usage ratio duplicating that of the linerboards.

The combiner plants share their supply source with the export market, at least in the grades of kraft linerboard and semi-chemical medium. There is no serious export activity in the recycled grades, and it is in the kraft linerboard grades that, over time, there may develop some constraint in supply. Overall, the general condition for containerboard, in its demand/capacity ratio, is that this ratio will tend to a value of 0.9 in 1995, assuming a level of exports that reflects some loss of overall export market share. Within containerboard, and specifically in kraft linerboard, the demand/capacity ratio, with provision for the 1982 export level being retained, is expected to approximate 1.0, i.e. balance between supply and demand. Normally, this would indicate the need for additional capacity, but it is unlikely that a greenfield mill could be justified in Eastern Canada. New kraft linerboard capacity could conceivably be considered in Western Canada because of the lower mill-production costs, but such a mill could not supply the major domestic market of Eastern Canada economically because of transportation costs.

The position of eastern corrugated container plants could thus become precarious with respect to full supply of their kraft linerboard requirements in the longer term (i.e., in 1995) because of mill capacity constraints. Recourse to imports would be required to cover the shortfall in supply, and this would certainly be expected for the independents who are without the captive supply relationship enjoyed by the integrated container producers. The progressive reduction of the Canadian import tariff to the 6.5 per cent level by 1987 will facilitate such "top-up" import action.

Productivity

As is the case with the companion packaging segment -- folding cartons -- no published productivity data per se are available for corrugated containers. Limited operating data from the U.S. trade association, the Fibre Box Association and some Statistics Canada data have been adapted to provide a basis for comparison. A nine-year, rather than ten-year, period has been used to avoid the year 1982, when an extended labour dispute occurred in the Canadian corrugated container industry.

TABLE V
INDEXES OF PRODUCTIVITY IN CORRUGATED CONTAINERS
MANUFACTURING IN CANADA, 1973-1981

	P-H Paid (000)	Output M.sq.ft. (000)	Output Ratio Index	Output M.sq.ft. /P.H.	Output Ratio Index	Value- Added per P.H. (\$P/H)	Value of Shipments 1971=100	Aver. Wage Rate (\$/Hour)	Wage Rate Index
1973	17 585	18 050	100.0	1.026	100.0	9.62	305 148	3.91	100.0
1981	17 189	19 938	110.4	1.159	113.1	21.15	424 687	9.43	241.2

Source: Statistics Canada.

Note: P-H denotes person-hour, M sq. ft. denotes thousand square feet.

Little comfort can be drawn from the comparative data in Table V. The real output, surface area of corrugated shipments and surface area per person-hour indexes show only marginal improvement, on average, in each year. The aggregate improvement over the nine-year period is less than encouraging for the future prospects in the Canadian industry if it should face serious competition from U.S.-based producers. By contrast, the latter were not only ahead of their Canadian counterparts in 1973, but in the period since also have achieved substantial improvement in each index. In 1973, the Canadian and U.S. figures for output per person-hour were 1027 and 1408 square feet respectively. By 1981 those rates had become 1153 and 1961. In short, in terms of real output, the Canadian industry is falling further and further behind its likely future competitor for domestic sales. If that were not enough, there is an even greater divergence in the respective wage rate indexes. Here, in 1981, the respective wage rate indexes were 241.2 and 141.2. Thus, while Canadian output has gained some 13 per cent, the modest gain has been entirely lost to the inflationary wage increase. On the other hand, U.S. producers, on average, have matched the increase in wage rate with almost exactly the same rate of gain in output. The resulting competitive advantage of the U.S. producer is all too obvious and calls for a Canadian response to a problem that, as experience would suggest, seems destined only to become more severe with time.

Profit Performance

No detailed data are published for this industry segment alone. Nevertheless, some inferences about the health of the industry's earnings can be drawn from information provided in discussion with industry sources.

In general, the national earnings performance of the segment has tended to follow the trend for both the Paper and Allied Group and Total Manufacturing. A major aberration was caused in 1982 by the lengthy labour dispute that affected a major portion of the industry in Quebec and Ontario. This apart,

the trend has been generally down, particularly for the Ontario producers and, to a lesser degree, for those in Quebec. More acceptable earnings have been secured by producers in the areas outside of the central region, and Western Canada producers would appear to have been particularly favoured in this respect. The rankings of regional price returns in Table IV give some support to this contention and show that all western regions achieved price returns above the national average.

Earnings have reportedly been less than satisfactory, however, in the the major markets of Ontario and, although to a lesser extent, Quebec. In 1983, price levels in this region were notably below the national average.

The high overcapacity condition is held to be a major influence on prices, while a further depressant effect stems from the threat of lower-cost imports. Against this ceiling on price, the inflationary rise in production costs has squeezed profit margins, and one major company indicates before-tax earnings in the two per cent range. There is reason to believe that this level of earnings is not unique to that company. If that is so, a major part of the segment is suffering from poor profit performance.

There is, of course, some recognition of the effects of depressed economic conditions on earnings in 1981, 1982 and 1983, but there is a growing concern that the future, in the short to medium term at least, offers little prospect for improvement.

Capital Investment

Statistics Canada data on past and intended capital investment cover, in aggregate form, several segments including corrugated containers, folding cartons and bags. No information is available that is unique to each of these segments.

The group data do suggest that, in recent years, capital investment by the group has been modest and only moderately higher -- about 20 per cent on average per year -- than the depreciation charged in the group income statements. In the case of corrugated containers, this was partially confirmed in discussion with major producers in the segment.

Most of the capital investment over the decade ending in 1983 was directed to improvement of the boxmaking process in the combiner plants, and only towards the end of the period was capital spent on corrugator equipment.

In a study recently completed by Paperboard Packaging, an established and leading trade journal, the investment intentions of the industry were examined. For 1985, the industry contemplates light expenditures in production equipment and, tentatively, a continuation of the same in 1986. This does not preclude, however, the possibility of some "defensive" capital spending by a small number of companies that can afford it, to acquire equipment for pre-printing linerboard prior to production of the corrugated sheet. This technology is not currently in use in Canada, and the pre-printing is done under contract in the U.S. In 1985, two pre-printer

units will be placed on stream in Canada and it is likely that at least two, possibly three, more will be acquired by companies to maintain a volume of business they would otherwise lose.

Companies generally justify investment on the basis of satisfactory return in the context of associated risk. "Defensive" investment, while relevant to the risk of lost business, tends to breed overcapacity in the process involved. The case of preprinted linerboard is no exception, and an overcapacity condition is likely to develop by 1986 or 1987.

Distribution Costs

Corrugated containers move through the distribution system in a single direct channel from producer-plant to user, and no distribution/wholesaling function intervenes. Almost without exception, the transportation mode is trucking and rail movement is rare. When used, rail transportation is invariably at customer request, and the increased cost is paid by the customer.

In general, corrugated containers are sold in the domestic market on a "delivered-price" basis, transportation costs being treated as an operating expense item for control purposes by the producer plants. Information on this cost element was gathered from discussion with various companies and indicates, for the combiner plants, a range of two to six per cent of net sales billed. In the central region of Ontario and Quebec, where the customer population is highly concentrated, this distribution cost lies in the two to three per cent range. Outside this main region, with a more dispersed customer group, the cost ranges at the four to six per cent level.

Sheet plants, on the other hand, appear to have higher costs approaching, in the Ontario region, four to six per cent of net sales. It should be noted that the typical sheet plant generally serves a highly localized market -- sometimes no larger than the city limits -- but its delivery rate is nevertheless high because of the small size of a normal run (50 to 500 boxes) and the large number of customers placing small orders on short lead-time between order placement and delivery requirement.

Labour

The seasonal activity pattern of container demand is readily met from a flexible labour supply. Almost without exception, the combiner/sheet plant establishments are located in or near population centres that historically have provided adequate labour pools containing the range of skills needed for equipment manning and maintenance. On the other hand, the new generation of continuous corrugator, while diminishing the actual staffing requirement by reason of sophisticated, computerized control systems, sharply raises worker skill levels required for operating and maintenance. For these higher skills the container segment will have to compete with other industry segments for the skill levels required. To date, however, no critical supply problem has arisen.

Staffing Requirements

The segment employs approximately 7200 persons directly, and about the same number of workers depend indirectly on the segment. This combined employment is not a significant proportion of the total labour force employed, and segment employment has been diminishing slowly but steadily over time, especially in the combiner plants. There, through some direct labour productivity gains, capital substitution for labour and plant closures, the reduction in the work force has been greater than the increase in the sheet plant workers, despite the sharp increase in the number of sheet establishments. Ontario shares most heavily in the net decrease in segment employment. Like other sectors of industry, the proportion of female employees in the work place is increasing, and it is estimated that women represent between 55 and 65 per cent of the work force in this segment. The downward trend in segment employment is expected to continue, particularly if the investment in new-generation corrugators becomes more widespread. Roughly speaking, for equal machine width, these new units will do the work of two conventional corrugators. Thus a combination of much lower staffing requirements and, perhaps, intra-company rationalizing among its regional plants may well accelerate the overall work force reduction in the combiner plants.

Wages

Comparison of average-wage data available from Statistics Canada and the U.S. Fibre Box Association, adjusted for the exchange rate effect, show a lower average rate prevailing in the Canadian industry in 1982. The Canadian average is given as \$10.22, while the U.S. rate in Canadian funds is \$11.64, based on a 78-cent rate of exchange. The reality of wages, however, is not the rate paid, but rather the cost of the wages into the product and the ratio of cost to net sales. In the case of corrugated containers, the U.S. cost ratio is, in fact, 48 per cent of the Canadian. This has been commented upon elsewhere in this report, but it bears repeating because of its critical importance.

For the bulk of the industry work force, wage rates are set by collective bargaining in the various regions. Attempts have been made in the past to secure parity in all plants of a company, but with little success to date, although within a given region and a given company the parity concept is frequently in force. For non-unionized plants, whether combiner or sheet, the "going rate" concept of the negotiated rates is used, although many sheet plants operate without a hierarchy of job classifications and the range of wage rates associated with a union agreement. The sheet plant employee is usually capable of handling several tasks and is switched from one to another as the need arises. This practice gives considerable flexibility to the work force and can minimize the wage bill.

Labour-Management Relations

As noted above, most of the work force is unionized. About 80 to 85 per cent of the employees are represented by various Canadian and international unions. Jurisdictional lines by trade are clearly defined and, as a result, in major container plants at least, a company may have several unions represented within the employee group.

Association or group bargaining is not a feature of labour-management negotiations, and bargaining is on a company-by-company, on occasion even a region-by-region, basis.

With the exception of the extended labour dispute in 1982, which affected a large number of integrated combiner plants, labour-management relations are reasonably stable.

(b) FOLDING CARTONS AND SET-UP BOXES

Background

Folding cartons and set-up boxes are the third-ranked packaging containers used by Canadian manufacturers, after corrugated containers and metal cans. The cartons account for approximately 14 per cent of the total value of containers used in the manufacturing sector. The use of set-up boxes continues to decline and, in 1983, was less than two per cent of shipments, as compared to slightly more than three per cent in 1977.

The largest industry user group is the food and beverage industry with tobacco products a remote second and chemicals an even more remote third. As with corrugated containers, the list then contains a wide range of users, one of which accounts for more than two to three per cent of shipments. This pattern has been essentially stable over the years.

The manufacture of cartons is similar to that of the corrugated sector in its geographic dispersion and, save for Prince Edward Island and Saskatchewan, production facilities exist in each of the provinces. As with corrugated containers, the heavy concentration of capacity occurs in the central region of Ontario and Quebec and is estimated at 90 to 92 per cent of the national total. Of the remainder of capacity, the major share is to be found in Western Canada. The chronic overcapacity condition that besets the segment is particularly marked in the central region, and the marginal real growth in prospect will do little to provide relief.

The level of vertical integration is relatively low and, at approximately 40 per cent, is about half the level found in the corrugated container segment. If the specialized grade of solid bleached boxboard is discounted, the integration level drops to about 32 to 35 per cent of national boxmaking capacity. Virtually all of the integration is then accounted for by one company.

Segment Structure

Classified to this industry segment in 1982 were 106 establishments, three fewer than the peak number of 109 recorded in 1981 and one more than the 105 establishments shown for 1973. In that 10-year period, the plant population hit a low of 97 in 1974 and 1977, and only small fluctuations occurred in the other years. Unlike the corrugated container segment, however, there has been no significant upward trend in folding carton establishments.

Ontario is by far the most dominant province with almost 60 per cent of the plant population, more than double the 27 per cent share held by Quebec. B.C. is a distant third with five per cent.

In 1982, total production and related workers numbered approximately 5500 compared to 6250 in 1973. In contrast to the near-zero growth of establishment population, labour has shown a steady down trend over the 10-year period of slightly over one per cent per year. In absolute terms, Quebec has sustained the bulk of the labour force reduction over the period, with a drop of some 446 workers. In the same period, there has been a loss of four establishments. Ontario, on the other hand, has decreased the labour force by 133 workers while increasing the number of establishments by four. There has also been a reduction of salaried personnel, but at a rate almost double that for production workers, 21 per cent compared to 12 per cent. For both groups, the 1982 level of employment is a low in the 10-year period.

Labour distribution by region is available only for Ontario and Quebec in data published by Statistics Canada. These data nevertheless show, as expected, that the labour distribution in these provinces approximates the pattern of establishment allocation. Table VI summarizes the national manufacturing and total activity for the period from 1973 to 1981 inclusive, together with national by-region data, where available, for 1982.

TABLE VI
FOLDING CARTONS AND SET-UP BOXES (SIC 2731)
PRINCIPAL STATISTICS, 1973-1982

	Number of Establishments	Manufacturing Activity				Total Activity			
		Production and Related Workers			Cost of Materials and Supplies (000)	Valued Shipments (own mfr) (000)	Value Added (000)	Employees	
		Number	Person-Hours Paid (000)	Wages (000)				Number	Salaries and Wages (000)
CANADA									
1973	105	6 264	13 179	47 089	129 482	231 129	100 669	7 923	64 811
1974	97	6 249	12 734	52 970	160 170	280 440	131 374	7 794	72 412
1975	103	6 084	12 211	55 737	164 793	307 178	135 018	7 512	77 087
1976	101	6 024	12 483	68 816	192 311	163 484	163 484	7 574	93 367
1977	97	5 830	12 196	73 784	205 985	164 827	164 827	7 283	99 620
1978	102	5 805	12 057	76 158	215 157	183 320	183 320	7 284	102 807
1979	105	5 495	11 339	75 743	250 057	174 003	174 003	6 814	102 373
1980	109	5 611	11 582	85 383	282 153	209 007	209 007	7 056	116 480
1981	109	5 526	11 414	97 466	335 203	234 645	234 645	6 956	130 592
1982									
Nfld	X	X	X	X	X	X	X	X	X
PEI	-	-	-	-	-	-	-	-	-
NS	2	X	X	X	X	X	X	X	X
NB	1	X	X	X	X	X	X	X	X
Quebec	29	1 676	3 494	32 974	96 751	171 194	73 986	2 101	44 064
Ontario	65	3 120	6 377	56 519	209 000	353 506	145 764	3 885	77 797
Manitoba	7	X	X	X	X	X	X	X	X
Sask	-	-	-	-	-	-	-	-	-
Alberta	1	X	X	X	X	X	X	X	X
BC	3	X	X	X	X	X	X	X	X
CANADA	106	5 203	10 712	97 466	335 203	574 394	241 329	6 499	132 428

X — Not available due to confidentiality.

Source: Statistics Canada.

Capacity

Unlike its companion packaging segment, corrugated containers, folding cartons has no "dimension" or unit of measure applied consistently across all production units as a statement of the unit's production capability or capacity. Nor is there a clear measure, other than dollar value, to describe shipments by the segment. Efforts by the trade association to develop a meaningful measure have not been successful and for want of something more definitive the industry has tended to describe its demand/capacity condition in terms of an approximate operating rate, defined by shift utilization. The maximum shift capability is three shifts/day. By implication, this

approximates 100 per cent capacity, and the operating rate is given as an absolute number of shifts or fractions of shifts used, or as a usage ratio expressed as a percentage of the maximum shift condition.

But whatever the imperfections of the capacity measurement or the demand/capacity ratio, it is clear that substantial and chronic overcapacity exists in the segment, principally in Ontario and Quebec. On average, at this time, the segment operates nationally at the 65 to 70 per cent level, but in Ontario 55 to 60 per cent is probably more accurate, while Quebec approximates 60 to 65 per cent. The low real annual growth forecast for the industry, at 1.0 to 1.5 percent offers little relief over time from this capacity problem.

This overcapacity began in the 1950s, when annual growth in double-digit numbers was not unusual. The number of establishments peaked at 142 in 1960. In the 1960s, growth rates diminished sharply, accompanied by a slow but steady decline in the number of establishments, and hence some capacity. In the early 1970s, this downward trend in capacity was reversed. Substantial capital spending occurred in many plants and, as is frequently the case, increased capacity accompanied the improved cost-effectiveness of the modern equipment installed in the 1972 to 73 period. Shortly thereafter, in 1977 and 1978, under pressure from a major user-industry marketing requirement, a further capacity bulge developed with the introduction of the high-speed rotogravure printing and die-cutting presses to the Ontario region. While ostensibly limited to the the few major producers who could afford the substantial investment involved, these sophisticated units created new capacity with significant implications for almost all producers in Ontario and Quebec. This development is commented upon below.

Markets

As in the case of corrugated containers, the folding carton segment is heavily oriented toward a domestic market that has been developed under strong tariff protection. Exports, never of significance as a percentage of shipments, continue to be low, but there are signs that a few companies are probing for niche markets within the large U.S. market.

The dispersion of the user population and the supplying container plants, noted earlier for corrugated containers, applies equally to folding cartons. Folding carton plants, however, are slightly more advantaged in their ability to absorb transportation costs. Thus, on occasion, the insularity of "local" market areas is not so rigid between adjacent provinces.

Regionally the concentration of production facilities is reflected in the value of shipments, with Ontario and Quebec accounting for almost 92 per cent of value in 1982. The remaining eight per cent, while not available in detail, is estimated to break down at some five to six per cent for Western Canada, with two to three per cent for the Atlantic area. The Ontario share, at 61.5 per cent, is slightly more than double that of Quebec at 30.3 per cent. In recent years, this difference has been increasing steadily in favour of Ontario. Figures for 1976 show that, while the Ontario-Quebec total share was approximately 91 per cent, the respective shares were 53 and

38 per cent, with other provinces holding nine per cent. Ontario has picked up all of the shift in market share and is clearly the dominant user of folding cartons and set-up boxes.

The lack of a single, industry-wide physical measure of industry output precludes the detailed price comparison of regional markets that exists for corrugated containers. Nevertheless, the known overcapacity, particularly in the central region, implies highly competitive pricing in that market. Industry members confirm this fact and the generality that Western and Atlantic provinces enjoy higher price returns for comparable containers. The single exception, common to Central and Western producers, appears to be the Pure-Pak container.

This container is of a patented design developed in the U.S. by Ex-Cell-O Corp., which licenses production to container producers in several countries, including Canada. Manufactured from polyethylene-coated solid bleached boxboard, this container is used widely in the distribution of liquid dairy products and fruit juices. It is not an aseptic packaging form, and when filled the package must be moved and stored under refrigeration. In the last few years, Pure-Pak has lost substantial market share to the plastic pouch system for whole-milk sales. Thus, regardless of the region, this product has become an example of near break-even pricing with little more than a contribution to overhead for the producer plant. This container also is an intermittent target for U.S.-based producers who can secure, as required, special transfer-pricing arrangements with their integrated mill suppliers and undercut the prevailing Canadian producer prices. The most recent experience of this activity showed U.S. producers offering a delivered price 12 to 15 per cent below the market price.

In the end-use markets, food products users increased their dominant share of folding carton and set-up box usage in the 1976 to 1982 period from 44 per cent to 48 per cent. By contrast, petroleum, coal and chemical users have reduced their share by half, to just over five per cent. Large consumption by tobacco manufacturers in Quebec makes this end-use market significantly more important than it is elsewhere in Canada: 22 per cent of all folding carton consumption in that province is attributed to the tobacco industry. Quebec and Ontario food and beverage industries, on the other hand, account for a lesser share of usage than in the all-Canadian and Ontario end-use markets.

The national and regional markets show a distinct seasonal pattern with above-average strength from March through June and from September through November. This is largely related to user plant shutdowns in the summer and Christmas periods. Together with cyclical changes in carton and box consumption, this produces wide swings in sales and inventory levels. Correction of those swings of up to 20 per cent of the inventory/shipments ratio tends to exaggerate growth of the industry segment, especially in current dollars. In recent years, real growth has been, and in the longer term ahead is forecasted to be, marginal, approximating less than two per cent. Plastics particularly, along with other materials, have been and are expected to be, certainly in the near term, increasingly competitive as

substitution products in container usage by the Canadian manufacturing industry at large. These substitution products are expected to generate further pricing pressure on the market and, in combination with the excess capacity in Ontario and Quebec in particular, will likely constrain price increases in the period ahead.

Competitive Position

The parallels with corrugated containers continue in the competitive position both in the domestic and export markets. The U.S. is the only meaningful export market for Canadian producers, and U.S.-based producers are the principal potential competitors for the Canadian market. Unlike the corrugated container segment, however, neither the U.S. producers nor the Canadian market export targets need be located in contiguous U.S. states, since transportation costs are somewhat less significant in the movement of the product.

Like its U.S. counterpart, and despite its lack of comparable scale, the Canadian production capacity includes a substantial element of up-to-date equipment. Canadian functional design and graphics capabilities match those of its competitor, but it is in the area of raw material and labour costs, in general, that Canadian producers are particularly disadvantaged. In the former, the basis of advantage lies in cost from the mill and, in the latter, in both absolute terms of cost and usage of the labour factor.

National average data for U.S. and Canadian producers indicate, on an order-of-magnitude basis, the competitive edge held by U.S.-based industry. Published by Data Resource Inc. on a continuing basis, the U.S. data show, in U.S. funds, that the average return, in 1982 was \$1131 per ton of boxboard converted. Average variable cost for labour and material was \$725, or 64 per cent of the selling or realization price. For the Canadian producer in Canadian funds, the comparable numbers were \$1661, \$1175 and 72 per cent. In U.S. currency, based on a 75-cent dollar, the Canadian values become \$1245 and \$881. It is clear, therefore, that under average conditions Canadian exports are not generally competitive in the U.S. market, given some further price increase effect for transportation costs into the market and the token duty levied by the U.S.

The foregoing argument, ostensibly, can be applied in reversing the market roles. On the face of it, Canadian producers are competitive, on average, in their domestic market against U.S.-based competitors, on a landed-cost basis. The reality, however, is that U.S. boxboard price, as a cost factor input for a producer in that country, can be adjusted, particularly by transfer-pricing decisions within an integrated mill/producer group in the U.S. Thus the domestic competitive position of the Canadian producer and especially a major producer, is more apparent than real vis-à-vis the U.S. competition. From time to time, that point has been driven home to the detriment of the Canadian producer, particularly in Ontario and Quebec.

HORIZONTAL FACTORS

Raw Material Supply

Boxboard (folding and non-folding), adhesives and inks are the basic raw materials used in manufacturing folding cartons and set-up boxes. In addition, foils and plastics are used as laminates for special-purpose containers, but their proportion is small.

The primary material is boxboard, the use of which accounts for almost 50 per cent of the sales dollar against approximately five to six points each for all other materials. Folding boxboard is the principal grade used and accounts for about 80 per cent of all boxboard consumed in the domestic market. Import supply derives almost totally from the U.S., and in 1983 accounted for 11 to 12 per cent of apparent consumption. Again, the imports included a high proportion of the folding grade of which almost 94 per cent was the solid bleached type, a virgin fibre boxboard. These imports show a slow but steady upward real growth trend.

The major proportion of boxboard consumed by carton and boxmakers is produced in Canada, principally in Ontario and Quebec, in nearly equal amounts, and totalling almost 94 per cent of the total boxboard production capacity of 789 000 tonnes per year (tpy). Folding boxboard capacity including that of solid bleached board approximates 430 000 tpy and is located largely in these two provinces, with small amounts of capacity in the Maritimes and British Columbia. In the near term, this capacity will increase moderately as a result of mill modernization projects now in hand, and thereafter nominal increases will occur through improved mill efficiencies. No greenfield mills are in prospect in the medium term, i.e. to 1990, and "incremental" growth is expected to average two to three per cent per year.

On the demand side, real growth is forecast in the 1.0 to 1.5 per cent range. Given these slightly divergent growth rates and the present demand/capacity ratio of 0.8, it would appear likely that future domestic supply is assured for the carton and boxmakers.

Productivity

No specific productivity data are available for this industry segment. Statistics Canada data have been adapted and real output per person-hour is used as a proxy for the more comprehensive productivity measure that takes into account the influence of all factors of production including capital, management, technology change and labour itself.

Undoubtedly there have been yearly fluctuations within the 10-year period chosen, particularly as a result of the lengthy labour dispute that affected all but one of the major producers in 1980. The comparison, nevertheless, indicates improvement over the period, in real output per person-hour, of slightly less than four per cent per year. This results from a real growth in tonnage processed and a real reduction in person-hours paid. This rate of improvement is the average for the industry and, as such, tends to mask where

the major improvement occurred. It is likely that the four major producers have had the greatest influence by virtue of heavy capital investment in rotogravure equipment beginning in 1977/78. The many small companies, on the other hand, probably have secured little in the way of productivity improvement.

The following table summarizes the change in the segment.

TABLE VII
INDEXES OF PRODUCTIVITY IN FOLDING CARTON AND SET-UP BOX

MANUFACTURING IN CANADA, 1973-1982

Year	P-H Paid (000)	Output Tonnes (000)	Output Ratio Index	Output Tonnes/PH	Ratio Index	Value Added per P.H. (\$P/H)	Value of Shipments 1971=100 (000 000)	Aver. Wage Rate (\$/Hour)	Wage Rate Index
1973	13 179	297	100.0	.0225	100.0	7.63	210.1	3.57	100.0
1982	10 712	345	116.1	.0322	143.1	22.53	227.3	9.10	254.9

As can be seen, there has been real growth in output tonnage which, accompanied by a drop in person-hours paid, results in an output per person-hour gain of 43 per cent. This productivity gain, however, has been completely offset by the heavy increase, in current dollars, in wage-rate gains and despite a small improvement in the proportion that hourly wages are of value added per person-hour. The figures also illustrate the low real growth of the industry, in terms of constant 1971 dollars, at approximately 0.8 per cent per year in the period and that -- again in constant dollars -- the industry dollar return per tonne, of board converted was less in 1982 than in 1973.

It is unclear whether the industry as a whole can sustain even this modest rate of gain in the future. Small companies are not expected to do better than in the past, while large companies are currently operating with full state-of-the-art facilities. This implies the need for development of new technology, failing which any productivity gain is expected to be minimal.

Profit Performance

In general, over the past few years pre-tax profit margins for carton and box manufacturers have followed the trend for both the Paper and Allied group and Total Manufacturing. Quarterly variations, however, have tended to be much greater, and the main trend-line has been sharper for carton and box makers than for the larger groups of which they are a part. Within the segment, the large companies may have arrested the trend and even achieved a small upturn in 1984, but for the small companies the downward trend appears to continue. In neither case was the profit level in 1983 considered to be acceptable, in the opinion of the industry. One aspect of the problem appears

to lie in the variable cost element composed mainly of material and labour costs. For the group as a whole, material cost continued to rise in 1983 and approximated 56 per cent of net sales versus 49 per cent in 1973. Labour cost reached just over 22 per cent by the close of 1983 compared to approximately 20 per cent in 1973. In total, relative to net sales, cost elements have increased by nine percentage points. The major difficulty lies in prices and the inability to offset the inflationary pressures in the cost elements. In 1971 constant dollars, the industry had a lower price return per tonne of box board processed in 1982 versus 1973. A precipitous slide in prices in 1976 of almost 35 per cent was partially recouped in the 1979 to 1980 period, only to be followed by a further decline that is only now being arrested. About 20 points remain unrecovered.

Given the competitive overcapacity in the market place and the scramble for available business that this entails, and given the competitive pressure from substitution products and the now stagnant real growth contemplated for the segment, it is difficult to envisage a return to acceptable and necessary profit levels for boxmakers, particularly in the Ontario-Quebec area.

Capital Investment

As with corrugated containers, the folding carton segment lacks data on capital investment.

The group data referred to above again indicate modest capital investment, on the whole, in the decade ending in 1983, although heavy investment by the major producers occurred in late 1970s for the acquisition of rotogravure presses.

The paperboard packaging segment survey indicates light capital spending in 1985 with, again tentatively as with corrugated containers, a similar expectation in 1986. This study is a benchmark one, and the proposed yearly updates are expected to provide a meaningful measure of change in capital spending together with highlights on the cycles of growth and decline in both corrugated container and folding carton segments.

Companies in this segment, as with corrugated container firms, justify their investments on the basis of satisfactory return. The financial condition of the segment at this time and its prospects over the long term do not breed optimism, and it is likely that capital investment will remain low.

Distribution Costs

As with corrugated containers, folding cartons and set-up boxes are sold directly to the user. The parallel continues in the general mode of transport used to move the product and the terms of sale of the container, i.e., the price includes delivery.

Industry-supplied information, based on a recent survey, indicates an average cost of delivery of the order of 1.5 per cent of net sales in the central region of Ontario and Quebec, with larger producers generally below this

level, at 1.0 to 1.25 per cent. The medium-size and smaller companies, by nature of their shorter runs of boxes per customer and more frequent deliveries of small orders, incur delivery costs above the average, generally in the 2.25 to 2.5 per cent range. In the areas outside the central region, the indications are, as might be expected from the dispersion of customers within these markets, that delivery costs are higher. Estimates run as high as 3.0 to 3.5 per cent in the Atlantic region and 2.5 to 3.0 per cent in Western Canada.

Labour

While this industry segment has relatively strong seasonal activity, it has experienced little or no difficulty in labour supply. Located in or near urban centres, the boxmaking plants in the segment have had available to them area labour pools that invariably contain the various skill levels required. On the other hand, the labour/cost ratio, despite real output productivity gains mentioned above, has moved up steadily under inflationary pressures and is now a cause for concern in the industry.

For the portion of the industry covered by union agreements, labour-management relations are generally stable.

Staffing Requirements

Approximately 5000 workers are employed directly and roughly the same number indirectly. Total employment is not a significant proportion of the total employed labour force, either nationally or regionally, and the number employed in the segment as a whole has decreased steadily in recent years. This reduction of the work force has resulted from productivity gains and a decline in the number of box plants, particularly in Ontario and Quebec. As is happening in other areas of manufacturing, the number of women in the work force is increasing and it is estimated that an average of 60 per cent of plant labour is female. The overall labour demand is expected to maintain its present down trend, although the rate may moderate somewhat. On the other hand, the newer equipment, with its highly sophisticated controls, is creating a demand for higher skills for maintenance staff and senior machine operators in particular. The supply of this labour, mobile as it is, will depend on competitive wages and other compensation.

Wages

In general, Canadian box plants' wage costs have increased more rapidly than in the U.S. and in 1983 were estimated, for Ontario-based companies, to be some 14 to 16 per cent above costs for comparable operations in Buffalo and Detroit.

Within the Canadian segment, the regional wage rates are those set by negotiation, since non-unionized companies view the union scale as the "going" or competitive rate in the region.

Labour-Management Relations

About 70 per cent of the work force is unionized in a mixture of international and Canadian unions that bargain on a company-by-company basis.

In 1981, in an exception to company bargaining, the major producers engaged in group bargaining. The experiment was less than successful and an extended strike resulted. One company continued to operate with non-union labour in its Toronto plant, but later closed that plant and moved operations to another Ontario location. The strike issues were eventually resolved largely in the union's favour. Other than that incident, labour-management relations are reasonably good and are not marked by the prolonged and frequent intermittent disputes seen from time to time elsewhere in the forest products industry.

REGIONAL IMPACT

CORRUGATED SHIPPING CONTAINERS

Present Employment

Table VIII

EMPLOYEES ENGAGED IN PRODUCTION OF CORRUGATED CONTAINERS IN 1982

	<u>Employees</u>	<u>%</u>
<u>Atlantic Region</u>		
Newfoundland	579(e)	8.0(e)
Nova Scotia, New Brunswick		
<u>Central Region</u>		
Quebec	2078	28.8
Ontario	3545	49.2
<u>Western Region</u>		
Manitoba, Saskatchewan	<u>1000(e)</u>	<u>13.9(e)</u>
Alberta, British Columbia	7202	100.0

Note: Percentages may not add due to rounding. (e) denotes estimate.

Source: Statistics Canada and industry estimates.

Table VIII is derived from employment data shown in Table II, together with estimates for Saskatchewan and the Atlantic regions. In this regional distribution, the central region of Ontario and Quebec provides the most employment and accounts for 78 per cent of the total labour force in the segment. It is estimated that almost 30 per cent of Ontario's employment

total stems from sheet plant operations, which are most numerous in that province.

Possible Future Employment

Product substitution is not likely to be a major factor in any future displacement of the corrugated container. A more likely proposition is the possibility of U.S.-made containers displacing the Canadian product in the domestic market if or when the Canadian dollar moves strongly towards par with U.S. currency.

If this par or near-par condition is sustained, it is likely that the strong competitive position of the U.S. container producers will prevail in the domestic market. The major impact of U.S. competition would be felt by the combiner plants whose large-volume, repetitive business is particularly price-sensitive. Almost certainly the independent producers will seek some cost relief by switching to U.S.-produced containerboard, but experience indicates that a supply switch is of doubtful benefit, especially if the U.S. mill is integrated with container production. At best, this option is likely to do no more than delay the inevitable. In the case of the integrated Canadian container producer, presumably the mill could be expected to protect the affiliated container plants, at least initially. But for the containerboard segment, with its high cost of production and low profit margin, there is an economic limit to production, especially if the mills have already lost substantial tonnage to imports made by independents.

In that event, decreased domestic container sales would be reflected in decreased employment in the combiner plants, and the burden of employment loss would be felt most strongly in Ontario and Quebec. It is estimated that the employment at risk in these provinces approximates 2700 and 1900 respectively of the employment levels shown on Table VIII. The domino effect on the mills would be most marked in those same provinces, where employment at risk for the containerboard grade is estimated at 2000, but could be as high as 4200 if the mills were to withdraw from production of the grade entirely.

FOLDING CARTONS AND SET-UP BOXES

Present Employment

Table IX shows the regional distribution of labour based on the employment data in Table VI for Ontario and Quebec and on estimates for Western and Atlantic Canada.

Table IX

**EMPLOYEES ENGAGED IN PRODUCTION OF FOLDING CARTONS
AND SET-UP BOXES IN 1982**

	<u>Employees</u>	<u>Z</u>
<u>Atlantic Region</u>		
Newfoundland, Prince Edward Island, New Brunswick Nova Scotia	95(e)	2.0(e)
<u>Central Region</u>		
Quebec	1676	32.0
Ontario	3120	60.0
<u>Western Region</u>		
Manitoba, Saskatchewan Alberta and British Columbia	312(e)	6.0(e)
Canada	<u>5203</u>	<u>100.0</u>

Source: Statistics Canada and industry estimates.

Most employment clearly occurs in the central provinces of Ontario and Quebec, where 60 and 32 per cent respectively of the segment's national total occur, and where sales volume is concentrated.

Possible Future Employment

The most likely cause of displacement of Canadian carton and box products in the domestic market is liable to be a strong upward move of the Canadian dollar towards par with U.S. currency. In that event, it is likely that large domestic users, in the first instance, would be responsive to competitive offerings on U.S. products in Canada. If the U.S. pricing were sufficiently attractive, it is conceivable that all but the smallest users would respond, in some measure over the long run to U.S. price penetration of the market. With their high concentration of demand, the Ontario and Quebec regional markets would bear the brunt of displacement while, more remote from U.S. producers, the domestic markets outside Ontario and Quebec could well remain sheltered from U.S. imports, and tend to retain their traditional business. But it should be remembered that this type of container is better able to absorb transportation charges than the corrugated container, and some disruption of these outlying markets should not be discounted. Based on the above comments, it is estimated that U.S. imports could be expected to take up to 65 to 70 per cent of the major central market. This share is currently occupied by the independent producers. U.S. products also could be expected

to take some market share from the integrated converters, particularly in high-volume containers.

The decreased volume of domestic sales would be reflected in reduced employment at the box plant level. The major impact would fall on the provinces of Ontario and Quebec, where employment at risk is estimated at 2200 and 1200 respectively. This outcome does not take account of action by, nor impact on, the boxboard producer mills. This will be commented on in a later section.

The above includes no estimate for employment at risk due to loss of export sales. Exports of cartons and boxes are negligible, but, in any case, it should be recognized that if a producer is not competitive in his domestic market it is unlikely he will be so in an export market.

FEDERAL SUPPORT PROGRAMS

The principal federal support programs to which both corrugated containers and folding carton firms have turned for assistance include the Industrial and Regional Development Program (IRDP) and the Program to Encourage Market Development (PEMD).

Applications to the IRDP have been few, approximately 14 to 16 per cent of the total number of companies in the two segments submitting assistance requests. The aggregate amount of assistance requested was less than \$20 million in the 1983-1984 fiscal year and in the first half of 1984-1985. Because of chronic overcapacity in both segments, most applications have been rejected and less than \$5 million in actual assistance has been provided.

Similarly, requests under the PEMD have tended to be small for the two segments concerned. The industry's general awareness of its lack of competitive capability in export markets has seemed to keep the applications at a low level. Nevertheless, a few requests have been supported, principally for folding carton producers who seek to probe for niches in the large U.S. market, which requires a specific expertise held by the applicant.

OUTLOOK

CORRUGATED SHIPPING CONTAINERS

Recent trends seem likely to continue for Canadian corrugated container producers, particularly those located in Ontario and Quebec. The already strongly competitive activity in the domestic market will increase, the low demand/capacity ratio will persist, modest real growth will obtain and domestic price levels will continue to be influenced by U.S. producers.

Historically, the markets for the combiner and sheet plants have been quite clearly defined and, in general, neither producer group has ventured into the realm of the other, largely by reason of the attributes of each market such as size of order run, etc., and the equipment used to service these requirements.

There is now a changing perception of these traditional supply roles. For their part, the sheet group, or at least the larger firms in that group, are moving to acquire large flexo printer-folder-gluer units, and thus the ability to supply some elements of the traditional market of the combiner plants. The latter, with the advent of the new-generation continuous corrugator, now possess, and will do so in greater numbers, the capability for high-speed changeover of sheet size or weight of sheet or both, all combined with much higher sheet-formation speeds. With this equipment, a combiner plant can now contemplate penetration of the short-run market, hitherto the sole domain of the sheet plant, and can do so on a cost-effective basis. The net result is that the present competitive pressures in the markets will almost certainly increase, likely to the detriment of prices.

Relief from the highly competitive overcapacity condition is unlikely over the long term, in the absence of a deliberate adoption of an asset disposal policy or a massive upward shift in real demand. To some extent, overcapacity will be eased under joint venture activity. A new joint venture company is embarking on a program to rationalize its production facilities and the associated market area served. To date, three plants have been closed and the corrugators and boxmaking equipment either scrapped or disposed of outside Canada. A further closure is scheduled, and this will have a net effect, after equipment transfers, of a further, but small, reduction in corrugator capacity. While this contribution to capacity reduction is modest, but nonetheless helpful, it has been offset by larger additions elsewhere in the segment. As a result, there has been a net capacity increase of some three to four per cent and a sizeable overcapacity problem continues to overhang the market in Ontario and Quebec. The modest real growth forecast for the longer term will require almost 15 years to absorb the present overcapacity, if no capacity additions are made in the meantime. This latter condition is not likely to be met, and overcapacity, therefore, is expected to persist. Its most serious consequence for container producers, whether combiner or sheet, is the depressant effect on price levels, particularly on high-volume, large-run business so necessary to a conventional combiner plant. In its "price-inhibitor" aspect, overcapacity ranks equally with the import threat of U.S.-produced containers.

The influence of the U.S. producer on domestic container pricing has been discussed above. It is expected to continue in the foreseeable future because of the fundamental reasons for its existence. Furthermore, the threat of imports may also become a reality.

Almost without exception, the combiner plants and some sheet plants in Ontario and Quebec face the very real threat of displacement in their domestic markets by lower-cost U.S. producers. That this has not occurred in a substantial way is due almost wholly to the protection provided by the currency exchange premium, rather than the tariff barrier. Currently, this barrier raises the price of imported containers by approximately 12 per cent, whereas the exchange rate adds roughly 33 per cent. Even so, U.S. producers in the Buffalo/Detroit areas are able to make sporadic penetrations into the Ontario market, at prices that are attractive to Canadian container users. Indeed, some Canadian business is still retained by U.S. producers in the aftermath of the major strike in Ontario and Quebec in 1982.

Should the two currencies approach parity, the U.S. producers' competitive advantage would be clearly visible, and their prices would be very attractive to the volume buyers in Ontario and Quebec, the major customers of the combiner plants. Since the shift in currency exchange would also affect import prices for linerboard, it is likely that the independent, i.e. non-integrated, box plants would switch linerboard sourcing to U.S. mills. Accounting for almost 25 per cent of domestic linerboard demand, this tonnage loss to Canadian mills would be serious. While the switch might assist the independents in the short term, it is open to question how long that group could be sustained against its U.S. counterpart when both converter groups draw their major raw material from the same source.

The integrated container producers are in a very difficult position. The loss of open market mill sales to the independents would mean a substantial reduction in mill operating rates in eastern Canada, and it is doubtful that the operating rate, based on captive demand, would be an acceptable option for the mills in the long term. Certainly the resultant increase in mill production costs would represent a continuing penalty to the mill attempting to keep the captive market competitive, either against the domestic independent or the U.S. producer. It is unlikely that the absorption of higher costs could be long sustained by any mill, and the mill would be forced to stop production of the grade entirely. The net effect of this would be to place almost the entire kraft linerboard converting segment at the mercy of foreign suppliers, most probably the U.S. Should this prove not to be a viable alternative for converters in Ontario and Quebec, then a major portion of domestic corrugated production would be discontinued as a result of the domino effect. In that event, Canadian container users would be almost totally dependent on import supply.

FOLDING CARTONS AND SET-UP BOXES

In general, the prospects for Canada's carton and box producers are not encouraging, especially in Ontario and Quebec.

Burdened now with substantial production overcapacity and the expectation of marginal real growth, these producers can anticipate a continuation of the highly competitive market experienced in recent years. Under that condition, pricing will remain keen, and it is by no means clear at this time that rising costs will be accompanied by commensurate price rises sufficient to halt the present erosion of margins. These margins are already unacceptably slender and a cause for concern in many firms in the segment. Further erosion could indeed jeopardize the future of some firms, particularly the smaller ones.

A major downward shift in price levels could be disastrous for the industry segment as a whole, and such change could occur if there is any strong move towards parity between Canadian and U.S. currencies. The exchange premium is today the principal protection against imports for the domestic producers of cartons and boxes. Cost and price advantage lie wholly with the U.S. producers in comparison with their Canadian counterparts. So much so, in fact, that even with the current high exchange charges U.S. producers can and do enter the domestic market. Their potential to compete acts as a further

restraining influence on domestic prices. Given little or no currency penalty, the U.S. advantage, even after modest import duty, would be such that most Canadian producers could not compete using Canadian boxboard. The use of U.S.-produced boxboard then suggests itself. This approach has been tried in the past but, because of the high level of integration of the U.S. box plants and boxboard mills, it proved ineffective and Canadian box plants still lost the domestic business. It is likely that this could occur again, for certainly any U.S. mill will look after its box plant affiliate against an "outsider". In short, it is a "no-win" situation for the Canadian boxmaker, one that would result in a large loss of market share to imports. Particularly vulnerable would be the major producers in Ontario and Quebec, where 65 to 70 per cent of volume is in large-volume, repetitive business which is markedly price-sensitive. Equipped in all respects to service this particular segment of market demand, these large producers could not be expected to survive long the loss of the major part, or all, of their "natural" market. The smaller, non-integrated carton producers, with their more specialized servicing of the balance of the market, could likely remain sheltered from import penetration, but would almost certainly source their raw material requirements, boxboard, from lower cost U.S. mills.

In one way or another, the net effect would be a substantial loss of domestic market for the Canadian boxboard mills. It is open to question how long these mills could be sustained with operating rates even lower than the current less than desirable levels. Here again, the provinces of Ontario and Quebec would be most affected by any reduction of boxboard mill capacity.

GLOSSARY

CORRUGATED CONTAINERS

Containerboard: A general term designating the component materials used in the fabrication of corrugated board: linerboard (q.v.); corrugating medium (q.v.).

Linerboard: A paperboard used as the facing material in the production of corrugated board or sheet. Linerboard is usually classified according to the fibre furnish as for example kraft linerboard of virgin fibre furnish or recycled linerboard of secondary or waste paper fibre furnish.

Corrugating Medium: A paperboard used to form the corrugated or fluted member in the production of corrugated board or sheet. Corrugating medium is usually classified according to the pulp from which it is made as for example semi-chemical corrugating medium or recycled corrugating medium made from recycled waste papers.

Corrugated Board or Sheet: A combined board in which the elements of inner and outer facings of linerboard have been joined to the central corrugated or fluted element of corrugating medium with adhesives by passing all elements through a corrugating or pasting machine.

Corrugated Shipping Container: A paperboard box or receptacle made from corrugated board and used to provide the outer protection in packing goods for shipment.

Combiner or Corrugator Plant: A corrugated container production facility that has one or more corrugating machines in addition to boxmaking equipment.

Sheet Plant: A corrugated container production facility that has no corrugating machine and is supplied with corrugated board by a combiner or corrugating plant.

FOLDING CARTONS AND SET-UP BOXES

Boxboard: A general term designating the paperboard used for fabricating folding cartons and set-up boxes. It may be made of wood pulp (virgin fibre) or recycled paper pulp or any combination of these: folding boxboard (q.v.); set-up boxboard (q.v.).

Folding Boxboard: A paperboard suitable for the manufacture of folding cartons. It possesses strength qualities that permit scoring and folding and has variable surface qualities depending on printing requirements.

Set-up Boxboard: A paperboard suitable for the manufacture of boxes in rigid form as contrasted with a folding or collapsible box. Stiffness, rigidity and resistance to abuse are essential qualities.

Folding Carton: A container (other than a corrugated container) that is the product of a cutting and creasing (die-cutting) operation on relatively lightweight folding boxboard. The carton is capable of being folded flat for shipment by the fabricator and formed up, filled and closed by the user.

Set-up Box: A box or container manufactured in the form and shape in which it is to be used. The term "rigid box" is also in use.

APPENDIX 2

PULP AND PAPER DIVISION

FOREST PRODUCTS DIRECTORATE

RESOURCE PROCESSING INDUSTRIES BRANCH

DEPARTMENT OF REGIONAL INDUSTRIAL EXPANSION

MANAGER

K. Vanderven

OFFICERS AND RESPONSIBILITIES

- | | | |
|--------------|---|--|
| J. Rainville | - | IRDP Projects in Quebec and Atlantic Provinces; Technology, R&D, Special Studies |
| D. Fair | - | IRDP Projects in Ontario; Tissue, Printing, Writing and Other Fine Papers |
| R. Henzler | - | IRDP Projects in Alberta and British Columbia; all Woodpulp, Newsprint, and Uncoated Groundwood Specialties, Tariffs, International Co-operation |
| D. Macgregor | - | IRDP Projects in Manitoba and Saskatchewan; Kraft Papers (Primary) Containerboards, Boxboards, Containers (Corrugated Folding Cartons), Recycled Fibres and Products |

