

THE PULP AND PAPER INDUSTRY IN CANADA

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"It is impossible to overestimate the importance of paper as a factor in modern civilization.* The entire structure of our civilization is bound up with the availability of paper supplies. Our highly complicated and minutely organized industrial and commercial system, the existence of our political organizations, the maintenance of our democratic institutions, the enormous expansion of the press as the basis of our political system, the institution of popular education, in short, all that constitutes modern civilization, is dependent upon the continuous forthcoming of abundant supplies of this commodity. In the past the printed word helped to build up our civilization and at the present conditions its maintenance. To give a survey of the development of the recording material used in various ages of history it is necessary to go back thousands of years. The earliest human records are found to be made on stone, in some countries scratched or chiselled, in others written, with chalk or coloured ore. The earliest traces of these date back to 8000 to 10000 years B. C. Later many minerals were used such as gold, ivory plates and bronze, and still later pieces of wood, bamboo and bark. The Chaldeans (4000 B. C.) wrote their records on soft clay, bricks. But to satisfy the growing requirement of a recording humanity, a new and better material was necessary and such a material was prepared by the Egyptians from papyrus. The earliest papyrus document can be traced

back to 3600 B. C., and many are preserved to the present day. The manufacture of the first real paper must be credited to the Chinese the date being 130 A. D., they making paper from rags. For hundreds of years the Chinese preserved their secret but finally the art of paper-making was brought over into Arabia, then from there to Italy and Spain and in the XIVth century became firmly established in the rest of civilized Europe. In the middle ages the production and consumption of paper was very small because there was only a small percentage of the people in Europe who could read or write. The first great stimulus to the production of paper was the invention of the art of printing by Gutenberg in the middle of the XVth century. The result of this was an increased demand for paper which has continued up to the present day. In the last few decades, the paper industry has experienced an enormous impetus. Compulsory education, the organization of public opinion, the decrease of illiteracy in western countries, the spreading of the printed word into the most distant parts of the inhabited world and lastly the growing importance of advertising as a factor in modern commercial enterprise coupled with the enormous volume of periodicals and papers as a result of modern life.

The Development of the Pulp and Paper Industry in Canada

The manufacture of pulp and paper is a comparatively recent development in Canadian industry. Paper was first manufactured in Canada about a hundred years ago, but prior to

1860 no wood pulp was used or produced. Rags, straw, esparto grass, cotton waste and other substances were the raw materials used. The first paper-mill was established at St. Andrews in Quebec (then Lower Canada) in 1803 by a party of Americans who obtained concessions from the Seigneurs. Upper Canada's first mill, which is still in operation, was built in 1813 at Crook's Hollow (now Greensville) near Hamilton, and the Maritime Provinces entered the industry in 1819 with a mill at Bedford Basin near Halifax. These, however, were not wood-pulp mills. There seem to be varied opinions as far as the birth of the actual pulp industry in the Dominion is concerned. One calculation places it in the neighbourhood of the year 1860 but from a very reliable source it is stated that in 1866, Alexander Buntin installed at Valleyfield, Quebec, what is claimed as the first wood grinder in America and began the manufacture of wood pulp by the mechanical process. During the same year Angus Logan and Co. built the first chemical wood pulp mill in Canada at Windsor Mills in Quebec. A notable expansion took place during the American Civil War which paralyzed for a time American industry and consequently also played an important part in the development of the industry opening up the Maritime market to the paper-trade of the Upper Provinces. In 1887 Charles Dordon installed the first sulphite mill in Canada at Merritton in the Niagara Peninsula. At the close of the century the pulp and paper industry already represented a capital investment of nearly twenty million dollars

offering employ next to over six thousand people and also the output of the industry had exceeded eight million dollars. The growth of the industry was phenomenal in the last quarter of the century, new companies year after year being formed and new plants built. In 1911 the total capital invested in the industry in Canada by the Census was over 58.8 million dollars and in 1924 a capital of nearly 460 million dollars an increase of nearly 900 per cent in fourteen years. The gross output of the industry increased rapidly and steadily until the boom years following the Great War, when it jumped to a peak of over \$232,000,000 in 1920. This was followed by a drop in 1921, but since that year there has been a steady recovery, resulting in a total for 1928 of \$233,077,236 and in 1929 of \$243,970,761 which exceeds the abnormally high total reported in 1920.

There are a number of factors that have brought about this remarkable expansion. In the first place, there is the enormous increased consumption of paper in the United States increased from over ninety pounds per head in 1909 to one hundred and fifty pounds in the 20's, and there is a tendency pointing at even much further consumption records in the future. The reckless exploitation of American forests has caused the Americans to depend more and more on Canada for their supply. At the present time more than 100 Canadian and United States newspapers have a circulation exceeding 150,000 copies daily. Yet another reason for the increase of newsprint used is that the present size of newspapers is due to the large volume of advertising now carried. In this connection it may be said

that twenty years ago eight to twelve papers were considered very fair average sizes for metropolitan daily newspapers in Canada and the United States. To-day from thirty to sixty-page newspapers are common, while Sunday edition frequently total one hundred pages or more. In Great Britain the same observation is true where consumption of newsprint in a few years has increased from 650,000 to nearly 1,000,000 tons annually. Several London daily newspapers have a circulation of over 1,000,000 copies and being printed simultaneously in London, Liverpool or Glasgow are read at breakfast time from Lands End to Inverness. (4) Another very important element contributing to the great expansion of the industry is the abundance of cheap water power in the Dominion and so cheap water power, cheap raw materials, backed by a thrifty and industrious population and the presence of a large market to the South have been the reasons for the rapid increase of the pulp and paper industry in Canada. The downward revision of the tariff of the United States of 1909, 1911, and 1913 especially ^{→ affected Cdn in good way.} helps to explain the growth of the newsprint section and may be said to have opened to Canada the great United States market. To illustrate the growth of paper as an important commodity on the North American continent, the figures are almost startling. In 1810, the average consumption of paper in this continent was one pound per person per year. In 1850, it was nine pounds; in 1869, twenty-five pounds; in 1899, it was fifty-seven pounds; in 1923, it was one hundred and fifty pounds and in 1926, it was one hundred and fifty-eight pounds.

Canada has been fully aware of her rich tracts of pulp wood for a good long life-time. Though their exact extent could not even be guessed at and still is uncertain, it was no secret that they were vast. This was known when it was first learned that wood pulp could be used commercially to make paper, when scientists gave up experimenting with mulberry leaves, reeds, straw and all manner of things in an attempt to find some sort of raw material more plentiful than rags. So that the uncovering of new natural resources was not the chief reason. The exploitation of them, after they were known, was delayed for a number of decades.

The Technique of Modern Paper-Making.

In order to understand the process of paper-making, it is necessary to know what are the main substances that enter into the composition of paper and by what processes paper is manufactured. Paper is a deposit of vegetable fibres commingled and felted together so as to form a homogeneous sheet. The task of paper-making thus falls into two main stages, of which the first is the preparation of pulp, and the second the manufacture of paper. There are in Canada four methods of preparing wood pulp, one of which is the mechanical and three chemical. The chemical methods are known as the sulphite, sulphate and soda processes. The first wood pulp mill in Canada was built by Angus Logan and Company at Windsor Mills, Quebec, about 1870. Since then it has undergone an enormous development and the mechanical production, or as it

is called ground wood pulp, is one of the most important branches of the paper industry in Canada, and exceeds the production of all varieties of chemical pulps put together. The most important of the chemical pulps is sulphite pulp of which there are two varieties, the bleached and the unbleached. Sulphite pulp is used in making paper board, wrapping, book and writing paper. It is also used as an ingredient in newsprint production in the proportion of 20 per cent sulphite pulp to 80 per cent of ground wood. During the last ten years the artificial silk industry has been absorbing more and more sulphite pulp until at the present time the total is quite large. The sulphite process was introduced in Canada in 1877 by Russell and Riordon at Merritton, Ontario. After a slow development the production of sulphite pulp at present constitutes over half the total Canadian output of pulp. The second chemical method is the sulphate process which is used largely for the manufacture of wrapping, cover and all other kinds of paper where strength is the most important factor, while the dark colour of the paper is of no disadvantage. This process was first used in Canada by the Brampton Pulp and Paper Co. at East Angus, Quebec, in 1907 and is now sometimes used in place of sulphite in making newsprint. The third chemical process is the soda process which is the oldest of the three chemical processes and is more expensive than the sulphite process. The advantage of this method is in the wider range of woods used for pulp production, hemlock being

the most important kind of wood. The paper produced as a result of this process lacks strength but can be readily finished to a good surface and so is chiefly used in the manufacture of the best class of book, magazine and writing papers. The first soda pulp mill was established in 1864 in Canada but to date there are not many mills of this branch of the industry in Canada. Germany and the United States rather than Canada lead in the production of soda pulp. Once wood is reduced to pulp then it has to go through several treatments before it is conveyed to the actual paper machine in the pulp mill and then the greater part goes to the printing press.

A Survey of the Pulp and Paper Industry in Canada.

The industry in Canada includes three forms of industrial activity, the operations in the woods, with pulp wood as a product, the manufacture of pulp and the manufacture of paper. These three stages can not be treated as entirely distinct nor can they be separated from the different stages of the lumber industry. Some of the important pulp companies operate saw mills to utilize the larger timber on their limits to the best advantage, and many lumber manufacturers divert a proportion of their spruce and balsam logs to pulp-mills. So far as operations in the woods are concerned, it is often impossible to state whether the timber being cut will eventually be made into lumber or pulp wood.

The pulp and paper industry is the most ^{wo} important manufacturing industry in Canada, heading the lists in 1929 for

gross and net values of manufactured products as well as for distribution of wages and salaries. In total capital invested, the industry is second only to electric light and power plants and in total number of employees only to saw mills. The industry has headed the lists in wage and salary distribution since 1922 when it replaced the saw mills in this respect and it has been first in gross value of products since 1925, exceeding the gross value of flour mill production. Considering only the manufacturing aspect of the industry, the gross value of production in 1929 was \$243,970,761, an increase of 4.7 per cent over the figure for 1928. The gross values of the manufactured products of the industry for the last five years are as follows:- Dept. of Trade and Commerce.

Gross Production

1925.....	\$193,092,937
1926.....	\$215,370,274
1927.....	\$219,329,753
1928.....	\$233,077,256
1929.....	\$243,970,761

CHART 1.

This gross value represents the sum of the values of pulp made for sale in Canada, pulp made for export and paper manufactured. It does not include pulp wood nor the pulp made in combined pulp and paper mills for their own use in making paper. The net value of production is one of the best indications of the relative importance of a manufacturing industry. It represents the difference between the values of

raw materials and finished products. In the pulp and paper industry it is obtained by subtracting from the gross value of production, as described above, the sum of the values of pulp wood and chemicals, etc., used in pulp-making and pulp, chemicals, etc., used in paper-making. The pulp made in combined pulp and paper mills for use in paper-making is considered as a stage of manufacture and is not included either as a product of the pulp mill or a raw material of the paper mill. The next value of production of the pulp and paper industry for the last five years according to the Department of Trade and Commerce is as follows:

Net Production

1925.....	\$116,577,947
1926.....	\$130,004,809
1927.....	\$134,516,673
1928.....	\$144,586,815
1929.....	\$147,096,012

CHANGE 2

If the total value to Canada of the industry be desired, then operations in the woods being taken into consideration, the sum of the values of pulp wood and pulp exported and the gross value of paper products will give the desired result. This removes any duplication that might arise by the inclusion of pulp wood used in Canadian pulp mills, and pulp used in Canadian paper mills but makes no allowance for pulp that might be used in Canada for purposes other than the manufacture of paper, such as the manufacture of artificial silk, fibreware,

etc. This total in 1929 amounted to \$249,227,136, an increase of 1.6 per cent over 1928. There were 108 establishments in operation in 1929 as compared to 110 in 1928. Of these mills 34 made pulp only, 46 were combined pulp and paper mills and 28 made paper only. In New Brunswick an idle mill resumed operations making a net gain of one pulp mill for the Dominion as a whole because in Nova Scotia one mill making paper only, ceased operations in 1929 and one new mill started production. In Ontario one combined pulp and paper mill ceased operations but there were no other changes in this class of mills elsewhere in Canada. In Quebec one mill making paper only closed down and in Ontario, two mills closed down and one new mill came into production making a net loss of two mills making paper only in the Dominion. Therefore, for all classes of pulp and paper mills, there was a net loss of two establishments in the Dominion as a whole.

The total capital invested in the manufacturing part of the industry was \$644,773,806 as compared to \$685,687,459 for 1928, a decrease of six per cent. Only capital invested in mills is included in this total. The total number of employees or salaries and wages in pulp and paper mills in 1929 was 33,584 and the total pay role was \$50,214,445 as compared to 33,614 employees in 1928 with salaries and wages amounting to \$47,322,648. The table on page 12 will make the situation more clear and is published by the Department of Trade and Commerce, Ottawa.

Provinces	Total Capital Invested	Total Employees	Salaries
Canada	\$644,773,806	33,584	\$50,214,445
Nova Scotia	\$ 2,554,166	323	\$ 308,297
Quebec	\$353,401,187	17,244	\$25,933,911
Ontario	\$207,005,896	11,023	\$16,466,693
Br. Columbia	\$ 47,590,726	3,077	\$ 5,068,733
New Brunswick and Manitoba	\$ 34,221,831	1,917	\$ 2,436,811

The gross contribution toward a favourable trade balance resulting from the activities of the pulp and paper industry as a whole in 1929 amounted to approximately \$195,542,429, being made up of the difference between the value of pulp wood exported and pulp wood imported amounting to \$13,018,925, the difference between the value of pulp exported and pulp imported amounting to \$42,552,452, and the difference in value between paper exports and imports amounting to \$139,971,052. The total for 1928 was \$193,673,186. Quebec is the most important province re total production in the pulp and paper industry having 14 pulp-mills, 22 pulp and paper mills and 13 paper mills. The total gross production of the industry in Canada is \$243,970,761 and Quebec claims as her share \$129,745,028. Quebec is also the largest employer of labour and consumer of power in the industry employing 17,244 employees out of a total of 33,584. Also Quebec houses some of the biggest pulp and paper plants in Canada, of the 108 mills in Canada 49 are situated in this province. Three Rivers is becoming one of the largest paper centres of the province. It is the

seat of the Wayagamach Pulp and Paper Co. Ltd. controlled by the Canada Power and Paper Corporation, which is the largest producer in the world of sulphate pulp and wrapping paper. It has under a license from the government 2000 square miles of timber in the St. Maurice Valley. Three Rivers is also the seat of the International Paper Company, an American Company. This company controls at present an area of over nine million acres, containing a pulp wood stand, amounting to 28 million cords, a stand equal to the entire pulp wood of Nova Scotia. The other important paper company operating in Three Rivers is the St. Lawrence Paper Company. The Canada Power and Paper Corporation is one of the largest newsprint manufacturing companies in Canada and produces more than twenty per cent of the world's output. The mills of this company are located at Shawinigan Falls, Grand' Mere, Three Rivers, Cape de la Madeline and Port Alfred - all in the province of Quebec. Its timber areas embrace more than 21,600 square miles, and are estimated to contain approximately eighty million cords of pulp wood. Without benefit of reforestation this is said to last more than seventy years at full capacity of 2,400 tons of newsprint and other paper daily. In the island of Anticosti, the Corporation controls the largest known freehold timber area in the world of 15,000,000 cords of pulp wood. The location of the Corporation's properties is unique, inasmuch as four of the five mills draw from the same watershed, both for power and wood supplies; this permits economies

in woods, operations, management, etc. There are several other important plants in the province such as the Brompton Pulp and Paper Co. at East Angus and the Canada Paper Company which is the oldest company operating in Canada at Windsor Mills.

Ontario, the second most important province re total production in the pulp and paper industry, has nine paper mills, eighteen pulp and paper mills and fourteen paper mills. This province leads in the production of sulphite pulp, bleached and unbleached, as well as in the manufacture of finer grades of paper, such as book and writing paper, etc. The total gross production of the industry in Canada being \$243,970,761, Ontario claims \$82,352,183 as her share and out of a total of 33,584 employees 11,023 come from this province. The largest producer in this province of newsprint is the Abitibi Power and Pulp Company and the newsprint mill of the company situated at Iroquois Falls is the largest individual newsprint mill in Canada. The daily capacity of the mills of this company which number nine is 2,240 tons of newsprint paper, and 225 tons of blocked sulphite pulp. The capital involved in this nine-mill company is close to \$200,000,000. The Fort William Paper Co. Ltd., the Fort Francis Pulp and Paper Co., the J. R. Booth plant, the Ontario Paper Co. and the Keewatin Power Co. Ltd. at Kenora are other large producers of newsprint in the province.

British Columbia is third in rank as a producer of pulp

and paper in the Dominion. This province has two pulp mills, three pulp and paper mills and one paper mill. The total production is about one-twelfth of the total in the Dominion and the employees in about the same proportion. British Columbia is second in the Dominion in pulp wood resources and the explanation of her rather small share in the industry when her huge potentialities are taken into consideration is due to the fact that this province is so far from the principal markets. But there is no doubt in the future the splendid pulp and water resources of this province and the actual development of the Pacific trade will not fail to attract the necessary capital for development.

The Maritime Provinces are not very important in the manufacture of paper and a few figures should give ample explanation. In Nova Scotia, the gross production total was just under the million mark while that of New Brunswick and Manitoba taken together was \$14,028,009, employing in the neighbourhood of 2000 employees.

The pulp and paper industry includes two forms of industrial activity: the manufacture of pulp, and of paper. The operations in the forest with pulp wood as the product do not belong here properly. It is treated as a part of the lumber industry. Taking pulp first, we find Quebec, Ontario, British Columbia, Nova Scotia and New Brunswick producing various quantities. The total production in all the five provinces from seventy mills was 4,021,229 tons valued at \$129,033,154

as compared to 3,608,045 tons in 1928 valued at \$121,184,214 representing an increase of 11.5 per cent in quantity and 6.5 per cent in value. Of the total for 1929 the combined pulp and paper mills produced 2,992,268 tons valued at \$78,255,415 for their own use in paper-making. A total of 165,364 tons valued at \$8,058,363 were made for sale in Canada and 863,597 tons valued at \$42,719,376 were made for export. To illustrate the great increase in production of pulp wood; in 1910 the total production was 474,604 tons; in 1915 it was 1,074,805 tons; in 1920 it was 1,960,102 tons and in 1925 the total was 2,772,507 tons. The most important kind of pulp produced is groundwood, or as it is often called, mechanical pulp. The reason for this predominance of groundwood is the enormous expansion of the newsprint production, which is a very heavy consumer of this particular kind of pulp. The production of groundwood pulp amounted to sixty per cent of the total output. Sulphite pulp claimed thirty per cent leaving ten per cent to sulphate, soda and other kinds of pulp. The following figures show that Quebec is far in the lead in the output of pulp. Statistics supplied by the Department of Trade and Commerce, Ottawa.

Provinces	Quantity (Tons)	Total Value
Canada	4,021,229	\$129,035,154
Nova Scotia	32,625	\$ 948,889
Quebec	2,174,805	\$ 69,286,498
Ontario	1,255,010	\$ 39,963,767

Provinces	Quantity (Tons)	Total Value
British Columbia	304,619	\$ 7,790,494
New Brunswick and Manitoba	254,170	\$11,043,506

As regards the export of wood pulp from Canada to the countries of the world. The following total gives the quantities of pulp exported by the principal pulp-producing countries of the world in 1928. Figures for 1913, the year immediately preceding the war, and for 1927 are shown for comparison.

Countries	1913 (LB)	1927 (LB)	1928 (LB)
Sweden	2,224,626,000	3,723,770,000	3,453,265,000
Norway	1,558,049,000	1,615,402,000	1,751,909,000
Canada	596,339,000	1,758,308,000	1,727,602,000
Finland	265,348,000	1,171,052,000	1,568,489,000
Germany	412,083,000	427,266,000	520,562,000
Austria	225,428,000	245,945,000	265,435,000
Czechoslovakia	47,871,000	203,711,000	206,326,000
United States	39,552,000	64,112,000	66,967,000
Switzerland	14,655,000	26,285,000	30,099,000
Poland		19,386,000	35,891,000
Newfoundland	<u>115,331,000</u>	<u>8,263,000</u>	<u>49,000</u>
Total		9,263,500,000	9,626,594,000

In the year 1929, Canada exported the total of 835,710 tons of wood pulp valued at \$43,577,021; of this the United States bought 711,430 tons, the United Kingdom 56,885 tons and to other countries 87,395 tons. Quebec leads in the production

es well as in the export of pulp, with Ontario close behind, and followed by British Columbia, New Brunswick and Nova Scotia. The following table shows the wood pulp production and export by provinces for the year 1929.

Provinces	Produced Tons	Exported Tons	Imported Tons
Nova Scotia	32,625	143,608	
Quebec	2,174,805	512,872	9,798
Ontario	1,255,010	459,860	27,282
British Columbia	304,619	23,886	
New Brunswick and Manitoba	254,170	154,769	2
Canada	4,021,229	1,294,995	37,082

The second phase of industrial activity in the pulp and paper industry is the manufacture of paper. The field of production re paper-making concerns only four provinces: Quebec, Ontario, British Columbia and New Brunswick. The bulk of the industry is situated in the two central provinces. British Columbia has all the requirements of a potential paper producer, the present production is not very large. The seventy-four mills making paper in 1929 produced 3,197,149 tons of paper valued at \$193,193,022 as compared to 2,849,199 tons in 1928 valued at \$184,305,405 an increase of 12.2 per cent in quantity and 4.8 per cent in value. The following table gives the paper production by kinds for selected years in Canada. The figures by the Department of Trade and Commerce, Ottawa.

	Quantity Tons	Quantity Tons	Quantity Tons
	1925	1928	1929
Newsprint Paper	1,536,523	2,414,393	2,725,331
Book and Writing Paper	74,724	79,138	73,502
Wrapping Paper	91,417	111,667	91,374
Paper Boards	144,646	193,061	250,061
Other Paper Products	<u>37,395</u>	<u>50,940</u>	<u>56,881</u>
Total Paper	1,884,705	2,849,199	3,197,149

So we see that newsprint made up 85.2 per cent of the total reported tonnage manufactured in 1929 an increase of 12.9 per cent and 4.6 per cent in total value over 1928. This increase has continued during the current year (1930) and for the first eight months of 1930, the Canadian output of newsprint was estimated at 1,702,070 tons, or 91.1 per cent greater than that of our nearest competitors in the world's newsprint market. The following is the order of production by provinces 1929. Figures by Department of Trade and Commerce, Ottawa.

	Quantity Tons	Value Tons
Canada	3,197,149	\$193,193,022
Quebec	1,780,720	\$107,504,475
British Columbia	229,724	\$ 13,226,274
New Brunswick and Manitoba	106,677	\$ 5,640,043
Ontario	1,080,028	\$ 66,822,230

Newsprint is the mainstay of the industry and it will continue to be so as long as the other kinds of paper will be shut out

by a high tariff from the American market. The rapid development of the newsprint industry in Canada is a splendid illustration of the natural superiority of the Canadian producer.

From 1911 when tariff duties were abolished by the United States on newsprint importations, and producers in both countries were placed on an equal competition basis the American manufacturer has been rapidly and steadily overcome by his Canadian competitor. This explains why Canadian newsprint production in 1925 was 12.05 per cent higher than in 1924 and there was a steady increase each year until the increase of 1929 over 1928 was 11.5 per cent. To-day Canada leads the world in newsprint production. The world's production of newsprint in 1928 has been estimated at 6,733,000 short tons, of which North America supplied over 60 per cent and Canada alone almost 36 per cent.

The estimated production of newsprint paper in the ten leading countries, 1928 - Department of Interior.

Country	Production Tons	Country	Production Tons
Canada	2,414,000	Sweden	224,000
United States	1,415,000	Newfoundland	231,000
Great Britain	646,000	Finland	214,000
Germany	600,000	Norway	198,000
Japan	<u>267,000</u>	France	<u>136,000</u>
Total	6,345,000		

Regarding export of paper from Canada. In 1908 exports

of printing paper were for the first time separately recorded and valued at \$2,833,535. In 1913 when quantities were first shown, Canada exported 146,791 short tons valued at \$5,692,126. In 1928 the total was 2,206,588 tons valued at \$141,103,527 and ranked second only to wheat in the Dominion among the exports. In 1929 the total was 2,510,653 tons valued at \$148,656,611. In 1913 Canada led the world in the exportation and since that date, her exports have increased over eight-fold in quantity while those of Newfoundland, her nearest competitor, have not increased five-fold. The exports of the United States and of Great Britain have decreased in quantity during the period. The following table shows the exportation of newsprint from the thirteen principal exporting countries in 1913, 1926, 1927 and 1928, amounting in the aggregate in 1928 to 6,896,475,000 pounds or 3,448,237 short tons, of which Canada contributed 64 per cent or more than all the other twelve countries combined. Canada's exports of newsprint paper undoubtedly exceed those of the rest of the world, being estimated for the calendar year of 1929 of 5,021,266,000 pounds.

Exports of newsprint paper from principal paper-producing countries of the world, 1913, 1926, 1927, and 1928.

Note: Countries arranged in order of importance of export 1928.

Countries	1913	1926
Canada	513,322,000	3,463,972,000
Newfoundland	99,510,000	238,076,000
Germany	151,522,000	390,340,000

Countries	1913	1926
Finland	154,425,000	317,162,000
Norway	217,014,000	305,163,000
Sweden	135,876,000	383,583,000
United Kingdom	210,305,000	213,612,000
Austria	29,711,000	103,576,000
Japan	6,540,000	59,184,000
Netherlands		71,385,000
Czechoslovakia		37,924,000
Switzerland	24,000	19,969,000
United States	<u>86,602,000</u>	<u>38,518,000</u>
Total		5,642,464,000

Countries	1927	1928
Canada	3,763,731,000	4,413,175,000
Newfoundland	383,515,000	414,292,000
Germany	440,900,000	411,415,000
Finland	342,603,000	378,126,000
Norway	380,117,000	367,549,000
Sweden	378,507,000	352,372,000
United Kingdom	196,294,000	188,703,000
Austria	112,590,000	116,528,000
Japan	63,822,000	110,368,000
Netherlands	73,325,000	66,947,000
Czechoslovakia	38,859,000	30,629,000
Switzerland	22,027,000	23,560,000
United States	<u>24,657,000</u>	<u>22,781,000</u>
Total	6,220,947,000	6,896,475,000

Thus we see that the position of Canada as a principal newsprint exporter is quite assured since there is very little hope that the United States will find her supplies in the European paper producing countries. The annual surpluses of the European countries are small compared with the enormous consumption capacity of the United States. The steadily increasing demand for paper coupled with just as steadily dwindling timber resources, compel the American publishers to turn more and more to Canada for their paper supplies. In 1924 the United States took 92.4 per cent of our total exportable surplus, and the United Kingdom less than three per cent. Smaller amounts went to New Zealand, South Africa, Australia, Newfoundland, Argentine and Japan. For the year 1929 Canada exported a total of 2,510,633 tons of newsprint paper, the United States took of this 2,173,087 tons, the United Kingdom 173,555 tons and other countries the remainder of 163,991 tons

Canada is also an importer of paper goods but the importations are insignificant as compared with the export figures, and are largely confined to certain specialities not manufactured in Canada. Where the total value of paper export from Canada amounts to \$154,710,085, the paper and paper goods import total is \$14,739,033, made up of from the United States \$11,595,592, from the United Kingdom \$1,642,177, and from all other countries \$1,501,464.

The Danger of Foreign Competition.

That American mills will regain lost ground and supply

a much greater part of the needs of the United States seems almost impossible. The reason is because their pulp reserves are being exhausted to such an extent that anything more than a moderate increase in production is beyond probability. There is no reason why Canada should in the future favour additional exports of unmanufactured pulpwood from this country. Also as time goes on American mills will find it increasingly difficult to compete with the Canadian product in their own market. For example in newsprint, the United States was forced to take second place to Canada in 1926, after the latter had been gaining on her since 1915. In 1926 the Canadian output was almost 200,000 tons greater than the American, and this lead has been steadily increasing. American manufacturers also now find that Canadian mills are more up-to-date and efficient, their machinery being more modern and their costs lower. For example, Canadian pulp-makers can take the logs to their mills, as far as a great percentage of pulpwood is concerned, over the natural transportation systems in the way of lakes and rivers, which providence has so kindly provided. Americans must add a costly freight-haul to the total. So for these reasons, instead of progressing the United States pulp and paper industry is more apt to slip back. Re Canada dominating world trade - there is the possibility of other competitors for Canada's present export trade appearing, or of other nations making a bid for Canada's present status as the world's greatest producer. Russia is perhaps the greatest

challenger because she has enormous pulp resources which to date not really true figures have been stated. But Russia because of her geographical location is severely handicapped and although she might supply pulpwood in its natural state to American mills, the raw material would be made very costly by the time it was transported across the ocean. Another handicap is that the rivers in the pulpwood areas of the Soviet Republic flow toward the Arctic. The logical location for the industry which they could create, would be somewhere toward the mouths of these waterways, which would place the mills in the vicinity of the icebergs. Russia's great potential market is in the Orient but the Orient has not reached that stage of civilization or in other words has not developed that particular kind of civilization where pulp and paper and newsprint come in the class of vital necessities. So therefore, there is no danger of Russian competition at the present time and Canada seems destined to remain at the top at least for some years.

Research in the Industry.

The field for research in the pulp and paper industry is enormous because every aspect of the entire industry seems capable of so many variations and adaptations. In time it may be possible to create almost anything out of Canadian trees. Montreal is the seat of the laboratories of pulp and paper research and have come into being as a result of the co-operation of the mills, the Dominion Government and to a large

extent McGill University. The pulp and paper mills put part of their profits into a common fund to be used for investigation in the interests of the industry as a whole, a relatively new departure in Canadian business methods. The Canadian pulpwood Association has as its chief objects (1) to promote dominion-wide co-operation in all movements aiming at improved methods in forestry generally, and in the pulpwood business particular. (2) To promote investigation and study in all matters of general interest to wood pulp owners, jobbers and dealers; the collection, classification, and distribution to members of all statistics of any value relating to the pulpwood business.

Government Legislation

Legislation has had a very important influence on the rapid growth of the pulp and paper industry in Canada. The chief legislative enactment that has encouraged the industry is that the bulk of pulpwood must be manufactured in Canada, instead of being exported as timber. The pulp and paper industry started out as an infant offspring of the lumber industry. Various lumbering interests understood that their forest tracts contained larger amounts of pulpwood and, at first, were anything but pleased about it. Naturally they wished to turn this portion of their assets into cash and the easiest way to do it was to sell the pulpwood. They proceeded to do this and exported large quantities of pulp logs to the United States. In 1900 the Ontario Government felt that

stripping our pulp resources to supply raw material for American mills was by no means an excellent idea and put on restrictions which consisted of prohibiting the export of unmanufactured pulpwood cut on crown lands. Similarly Federal Legislation, covering Dominion crown lands in the Prairie provinces and elsewhere, came into force in 1907. During 1909, when export from Quebec, New Brunswick, Nova Scotia and British Columbia was not restricted, the total shipments of pulp logs to the United States formed 63.6 per cent of the apparent total production. Since then, additional regulations of the same sort have become effective in every province and the ratio of exports to total production has been steadily falling. Since 1912, it has increased in only one year, 1923, and in 1926, it only amounted to 24.8 per cent of the total, a tremendous drop but a figure which was then considered unnecessarily large in many quarters. In 1929 the percentage was 12.7 which is half that of the previously stated year. These prohibitions have done a great deal to foster manufacture within Canada instead of developing it somewhere else. The export of unmanufactured wood cut from private land is not prohibited and as a result of this the export figures in this branch of the export trade have risen to an enormous total. The reason for this is that when the export of crown timber was prohibited, the source of supply was considerably limited and consequently the demand increased from privately owned lands. In the year 1930 there exists

absolutely no restriction of export from private lands except in the case of British Columbia land Crown - granted since 1887 and certain patented lands in Ontario in which timber was reserved to the Crown. In connection with the export of unmanufactured pulpwood from Crown lands the following legislation is in force: (a) Every province (except as cited below) now forbids the export of unmanufactured pulpwood cut on its Crown lands (1) poplar may be exported from every province except Quebec and New Brunswick. (2) In Ontario the Minister of Lands and Forests may at his discretion suspend operations of the so-called "Manufacturing Clause" in case of pulpwood, for any district and for such time as he deems it necessary to permit export of same. (3) In New Brunswick, export may be permitted in certain cases if the Governor in Council deems it in the public interest. (4) In British Columbia the Timber Export Board may at their discretion permit export of certain lots of timber where the market conditions demand such outlet. (5) Timber cut on Indian lands may be freely exported with the single exception of pulpwood or pine cut in Ontario, which is non-exportable. It is now proposed since the provincial authorities will not take any action to have federal legislation enacted to stop the exportation of pulpwood. Those who favoured Federal Legislation proposed that an export tax be placed on all outgoing wood pulp and that the proceeds be used to aid conservation of pulp trees. Two arguments were put forward namely of stimulating the home

manufacturer and that of conservation. In regard to the former argument, since the United States imports about one third of her pulpwood requirements and practically all this from Canada, then with her supply shut off she will have to build thirty-six mills in Canada. In this way it is said employment would be given to 10,000 persons earning thirteen million dollars in wages and producing a million tons of news print representing a value of about \$75,000,000, which if exported as pulpwood this timber would only represent about \$18,000,000. The second argument advanced is that of conservation and that the industry is in immediate peril and that no steps can be taken by the lessees of Canadian pulpwood lands that would be economical. It is said that the embargo would lessen the annual cut and so there would be a conservation. Also it is said that as the mills could not be started in Canada at once but would take several years to be established and so there would be a conservation for a time. But conservation should not mean "hoarding" prohibition of cutting, instead it means wise cutting, elimination of waste and protection against fire. Statistics show that the loss by fire is several times the total cut per year. The claim has been advanced that if Canada prohibits the export of pulpwood and imposes an export tax, then American manufacturers will transfer their plants to Canada. The question is does Canada really control the supply of pulpwood, or in other words is there another source where Amer-

ican mills might derive their supplies. Where a country supplying raw material enjoys monopoly conditions and possesses all the facilities for home manufacture, then an embargo would act as a stimulus to the home industry and there would be an increase in the output of the finished product. There is a great deal of doubt as to whether Canada has a monopoly in the supply of pulpwood. R. S. Kellogg in his book "Pulpwood and Wood Pulp in North America" summarizing the discussion on the pulpwood resources of the North American continent says "of the species which are the most largely used for pulp at the present time, there may be the equivalent of 2000 million cords in North America. If we deduct from that amount the total of the most widely used species of pulpwood in Canada (875,594,000 cords) we get a stand of approximately 1,100 million cords for the United States, an amount larger than that of Canada, with a smaller proportion of inaccessible timber as that compared with the Canadian stand". Re the proposed embargo on wood pulp exportation, a memorandum of the Canadian Pulp and Paper Manufacturers Association said: "Incidentally it may be pointed out that the United States is perfectly capable of supplying its own pulpwood requirements from its own territory, when Alaska is included, and that nothing but the lower price of Canadian wood prevents the exploitation of the Alaskan forest". It is reasonable to assume that the American manufacturer who imports his supplies from Canada will for a

time manage with domestic sources. But without doubt American newsprint manufacturers will be forced out of production and will either turn to the manufacture of other kinds of paper that are protected by the tariff or transfer their plants across the border. There would however be a hardship inflicted on those thousands of settlers and farmers who depend on the proceeds from the sale of their pulpwood in the United States to make a living. It has been estimated that fifty thousand settlers and farmers would be affected. Most of the paper companies have their own limits and can draw upon them for years while the farmer and settler can not wait with their sales. Perhaps the most important benefit to be derived from an embargo would be to use it in negotiation with the United States in order to obtain the admission of other paper products. Suppose the Americans objected to such an embargo and no doubt they would, then Canada could answer saying the way to prevent such an embargo is to give free entry to all paper entering the United States from Canada. If the above was carried out, then it would act as a great stimulus to the paper industry in Canada. We have only to look at the rapid advance of the newsprint industry in Canada since free entry has been permitted by the United States to see the extent of expansion in the future, supposing free entry be granted. There is an added advantage when considering this proposal, namely that it will not interfere with the interests of the farmers and settlers which are so dependent on pulp-

wood export.

Pulpwood Resources and Pulpwood Depletion.

No forests are inexhaustible, and the history of lumbering operations in the past offers a sad example which Canadians are anxious to avoid where pulp is concerned. The saw mills crept north rapidly using up the bush as they went. The United States at the present time are fast using up the country's raw material and rapidly reducing its available sources of supply. Drastic steps re conservation must be taken in that country which seems almost impossible if the industry is not to go steadily backward. Canada at the present time is in the same danger and unless steps are taken in the near future re conservation, then the result will be the same as the United States. Up to the last few years, we have been told that the forest resources of Canada are unlimited but this idea has been discarded and justly. The problem that must be discussed is - what are the pulp resources of the country, what are the prospects of the durability of the supplies, and consequently as to the permanence of the paper industry, and to what extent can the available resources serve as a basis for further expansion. In discussing the problem of forest resources a different treatment must be accorded to each geographical region. Canada may be divided into five main divisions: 1. Maritime Provinces 2. Quebec. 3 Ontario. 4. Prairie Provinces. 5. British Columbia. When we speak of pulpwood resources only the three leading species balsam,

spruce and hemlock will be taken into consideration as they make up about 86 per cent of the raw material. The following figures re the above mentioned five pulp-producing regions in Canada are taken from the Report of the Royal Commission on pulpwood in Canada 1924.. (This is the latest available report.)

Available Stand of Pulpwood in Canada.

Quebec	131,000,000	Cords	30.1%
British Columbia	125,000,000	"	28.7%
Ontario	84,500,000	"	19.4%
New Brunswick)	26,600,000	"	(10.5%
Nova Scotia)	20,000,000	"	(
Alberta)	26,000,000	"	(
Saskatchewan)	13,600,000	"	(11.3%
Manitoba)	<u>9,500,000</u>	"	(
Total	436,200,000	Cords	

The total pulpwood stand of the Maritime Provinces excluding Prince Edward Island is estimated at 62,490,000 cords. Only forty-seven per cent of this total is available for cutting purposes at the present time, the other 53 per cent being undersized, inaccessible or sparsely situated and therefore not suitable for cutting purposes. In this region there is also the handicap to the pulp manufacturer that the coast line has been entirely depleted and cutting must be confined to the interior. Another important feature of this region is that 86 per cent in Nova Scotia and 49 per

cent in New Brunswick of the pulpwood stand is under the control of private interests rather than that of the Crown. To determine the annual increment of this region no figures are available and therefore we must be content with an estimate, perhaps the arbitrary rate of 1 per cent set by the Royal Commission on pulpwood is the best estimate. Since this region has 62 million cords of a total stand, then with a rate of increment of 1 per cent, the result will be that each year the Maritime Provinces benefit by the increase of 620,000 cords of pulpwood. But let us look at the annual cutting which amounts to 1.6 million cords and we will see that this amounts to nearly three times the annual increment, losses by fire, diseases etc. not included. Suppose that the natural increment balance losses by fire, then by dividing the annual cut into the available stand the result is that the pulp supplies in the Maritime Provinces will last but twenty-nine years. There does not at the present time seem any likelihood of the losses by fire becoming less unless very drastic fire prevention methods are introduced in this region. The situation in the second region, Quebec, is grave though not so serious as that of the Maritime Provinces. Quebec takes first place in Canada in both size of forest area and amount of pulpwood supplies. The total forest area is 512,822 square miles, and constitutes 75 per cent of the total land area, but only 203,125 square miles are considered merchantable and accessible. The total pulpwood stand of this re-

gion is about 285 million cords, of which 131 million cords are available under present conditions. In the future when there are better transportation facilities the remaining 154 million cords will be of commercial use. At the present time the greater part of the pulpwood supplies of Quebec is derived from the Laurentian plateau. In Quebec only 6.6 per cent has been alienated by the Crown and 13.9 per cent is licensed and leased of the total forest area which presents quite a change from the situation in the Maritime Provinces. Of the 131 million cords of available pulpwood stand only twenty and a quarter million cords passed from the hands of the Crown leaving the remainder subject to the provincial Government regulations. The annual consumption in the manufacture of pulpwood for domestic use and export trade is three million cords and if the available stand of 131 million be divided by the annual consumption, the result will be that the life of the industry will be forty-four years. Now suppose we take the arbitrary rate of 1 per cent as taken in the determination in the Maritime Provinces, then the annual utilization is slightly ahead of the annual increment and that the net diminution of the forest stock is that amount of pulpwood destroyed by fire, etc. Consequently greater emphasis should be placed on fire protection and re-forestation so as to reduce that loss to as small a total as possible. Passing on to Ontario, the third region in our discussion, it is seen that a similar condition prevails as

in the preceding two regions. Ontario is second in importance in the manufacture of pulp and paper and ranks third in pulpwood resources. The total stand of pulpwood is 131 million cords of which only 84.5 million are available at the present time of which 74.6 per cent of the total stand is Crown retained and 20.2 per cent has been disposed of under the license system. Similar to Quebec, the pulp lands disposed of under the license system contains the bulk of the available stand but is subject to certain government restrictions re cutting and manufacturing. The total that has passed into private hands is insignificant only amounting to 3.4 per cent or 13.75 million cords of which all is accessible. The annual cut is in the neighbourhood of 1.8 million cords and is derived from the available stand of 84.5 million cords and by division as in the calculations re the preceding regions, the result is a period of supply for 46 years. Now if the total stand of 131 million cords and the 1 per cent rate of increment be taken then the annual increment is 1.3 million cords whereas the annual cut is 1.8 million cords. Even if the losses by fire, etc. were to be eliminated, still there would be a diminution of the total forest stand. The problem is what can be done to remedy this. Two ideas are advanced:- a policy of re-forestation and a policy of curtailment in consumption. The fourth region is the Prairie provinces which takes in Manitoba, Saskatchewan and Alberta. The total pulpwood stand in this region is 135 million cords

of which only 49 million can be utilized under present conditions. The pulpwood resources of this region are only of local importance because owing to the distance from the East entailing high freight rates, it is not likely in the future that they will supply the eastern pulp mills. The Dominion controls 87 per cent, 2 per cent has been let under the license system and the remaining 10 per cent has passed to private interests. The annual consumption for this region has been estimated to be 600,000 cords which therefore means that 81 years must elapse before the supply will be exhausted. By applying the same rate of production as the other regions, the result is that the annual increment balances the annual cut. Therefore the great problem in the provinces is to guard against losses from fire and other ravages. The fifth and last region is British Columbia which ranks second in forest wealth in Canada having a forest area of 149,334 square miles. It has been estimated that only one-fifth of the forest area is accessible or merchantable. To illustrate the magnitude of this forest area we can say that it is over seven times as large as the entire area of the Province of Nova Scotia. The reason why such a small proportion of the forest area is not accessible for commerce is because of the peculiar topographical features of the province which to date has not been overcome but in the near future it is hoped that the further extension of railways into the interior will overcome this obstacle. The total pulpwood stand

is 263,000,000 cords of which 138,000,000 cords is either unaccessible or unmerchantable, leaving 125,000,000 cords available for cutting purposes and therefore British Columbia is second to Quebec in this respect. The annual cut has been estimated to be 639,500 cords and since the available stand is 125 million cords, therefore, by division we find that if the present rate of cut per annum is continued the duration of supply will be 195 years. Again let us suppose that the annual cut be offset by the annual increment and the great problem remains of eliminating the losses by fire and other wastes. If this is done British Columbia may look into the future without any apprehension re her pulp supply. British Columbia like the prairie provinces has retained the greater part of her forest area under the provincial control having only disposed of 8 per cent under the license system and 2 per cent in fee simple and also 92 per cent of the merchantable pulp stand is subject to export restrictions and the regulations of the Provincial Department of Lands.

When we look at the pulpwood situation in Canada as a whole, we see that the situation is most grave in the Maritimes and decreases as we pass from East to West. So serious is the situation in this eastern region that in thirty years their pulpwood supply will be entirely exhausted unless a very rigorous system of curtailment in cutting, prevention of fire and other wastes, and lastly re-forestation is in-

stituted. The situation in Quebec and Ontario is not nearly so serious though the annual increment is less than the total cut per year, yet this could easily be overcome by a rigorous campaign of fire and waste prevention as well as a more intense re-forestation system. If the above measures were carried out, there is no reason why the present rate of cut could not be carried on without endangering the future supply of pulpwood. Passing on to the prairie provinces, we see that the present cut can be kept up for eight-one years and so there should be no worry in that region. British Columbia is perhaps in the best situation of any of the provinces in the Dominion, abounding in pulpwood resources and excellent reproduction conditions. There is no apparent reason why this province should not expand her pulp and paper industries since she is so admirably situated. Without doubt, the present cut per annum could be greatly increased without endangering the total pulpwood stand provided that this province would not relax her efforts re fire and waste prevention and complied with an adequate re-forestation system.

The protection of the pulpwood supply is very important and of late years a great deal of attention has been bestowed upon this work by the different agencies administering forest lands in Canada. Also the representatives of the pulp and paper industry having an investment of hundreds of millions of dollars in this industry to protect must either look ahead or prepare to fall back. For this reason, they

are less likely to forget to-day in order to keep an eye on the raw material required for to-morrow. The result is that very careful attention is being given to forest fire and waste prevention, and re-forestation. In the case of the Dominion Government, this duty falls chiefly on the Forest Service of the Department of Interior. The Provincial Governments each maintain a fire prevention organization which co-operates with owners and licensees for the protection of all wood pulp areas, the cost being distributed or covered by special taxes on pulp lands. The most single important development in fire protection in recent years has been in the use of aircraft to detect fires and then to transport fire fighters to the scene of the fire. Another very important improvement in fire fighting has been the portable gasoline fire pump which can be transported by motor boat, canoe or car, etc. For years the spruce bud-worm has caused tremendous losses to the spruce and balsam forests in Eastern Canada. From 1912 to 1923 it has been estimated that in Quebec 100 million cords of pulpwood were destroyed and in New Brunswick 15 million cords by this insect. This region happily now has overcome the activities of this insect but at the present time Northern Ontario and Cape Breton Island are trying their best to combat the activity of this insect. Since the year 1928 the Dominion Entomological Branch of the Department of Agriculture has been carrying on the system of dusting by aeroplane and this has every appearance of in

practice of pulpwood growing in private lands by the proper adjustment of taxation to meet the special needs of pulpwood property and by furnishing advice and assistance in the establishment and care of the pulpwood stands. (4) In the near future a complete inventory of the pulpwood resources should be secured in order that the Government and the public may understand fully as to the extent to which these pulpwood resources have been depleted and what the prospects are for future supplies, and also the industries dependent on the pulpwood forests may be guided in their development by a knowledge of the location and extent of both present and future sources of raw material.

The Present Condition of the Pulp and Paper Industry
in Canada.

The year 1930 has been a year of great depression in the pulp and paper industry. All industries in the past year have suffered severely because of this depression and in particular this industry which is dependent on export trade and the United States. The world-wide depression so affected all the markets that the result was that there was keener competition to fill the reduced demands and thus causing reduction in prices. Accordingly, prices of wood pulp were reduced to unprofitable levels, chemical pulp selling at the lowest prices in years and production was curtailed because of the decreased demand. One fact that was a great handicap to the prosperity of the industry was that last year the industry began the year with an excess productive capacity and

to overcome this had to operate on reduced schedule throughout the year. As a consequence, there must be a decrease in production until the demand increases to the present productive capacity. An explanation of the decreased demand in the United States is that there has been a reduction in the size of daily and Sunday newspapers and also a decrease in advertising due to the depression in business. In Canada and the United States the consumption of newsprint declined by 6 per cent in the past year. The difficulties of the past year have not been without their value and we might as well be optimistic and believe that we can look forward with confidence to a return of better times in the near future. No doubt progress will be slow but it is hoped that it will be more certain on that account.

The Future Prospects of the Pulp and Paper Industry

It is rather uncertain whether the same rate of increase will be maintained in the pulp and paper industry in the future. It is possible to point to some new factors that may counteract and to some extent retard the rapid rate of increase in paper consumption. For example the radio in time may become so cheap and so convenient a way of reaching millions of people that this may retard the development of the press and consequently decrease the consumption of paper. But all indications at the present time seem to point to the fact that production has by no means reached its climax. The demand is increasing although perhaps the rate of growth is less than that of the last decade. The opening up of China,

the industrialization of the Orient, the decline of illiteracy in such countries as Russia without doubt will increase the demand for paper. Therefore, on the whole, the outlook for the pulp and paper industry in Canada is excellent.