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EVERY Canadian has a stake in Canada's forests, because \$25 of every \$100 of our wealth and income branches out from our trees. One quarter of the things we need from abroad is obtained in exchange for wood products — sugar from the Indies, oranges from the United States, tableware from Britain: things which we cannot grow or make at home.

Forests are among our five main natural resources, the others being farm land, mineral areas, water-power and fisheries. When combined, forests and water-power form the base of Canada's greatest industry, pulp and paper.

Trees suited to commercial use do not only offer an opportunity for business profit, but vitally affect the social life of Canada. Besides the large firms employing thousands of persons, there are many small operators and individuals who find a source of income in the woods. Veterans of the war have shown interest in establishing themselves and their families in forest activity, where they supplement their woods operations with such "sidelines" as trapping, guiding, conducting fishing and hunting camps, and growing root crops. Farmers in many sections gain their main "cash crop" by working in the woods in winter.

It is common to look upon the forest as a kind of residuary in the resource scheme: whatever land is not good enough for annual crops is let run to trees. That is a wrong view. Much land which was once densely wooded, then cut clean to make way for the plough, is now useless for either timber or agriculture. Forests can be of permanent benefit, not only by preserving nature's balance but by providing an annual cash income to maintain the farmer's balance in the bank, or the woodsman's daily living: they can supply raw materials for industrial use, giving employment to scores of thousands.

On the basis of productive possibilities, Canada has 813,110 square miles of forest land. In addition, there are 477,850 square miles of inaccessible or unproductive forest land. The useful forest area is as big as two Ontarios, or all of British India; it is twice the size of the Union of South Africa, equal to seven New Zealands, and nearly as big as the Belgian Congo. If one wishes to count forest and jungle of all kinds, Canada has eight per cent of the world's forested area. Of Canada's own area, 38 per cent is forested.

The forests are the foundation and support of the pulp and paper industry, the great lumber industry, and hundreds of subsidiary businesses. We are so accustomed to having plenty of wood for many purposes that we seldom stop to think of what conditions would be like without it. Look at a few examples. No satisfactory substitute has been found for wooden cross-ties in railway line construction: Canada has 57,000 miles of railway line and sidings, each with 2,860 ties eight feet long — a total of about 26 million trees each 50 feet tall and a foot thick. Frame houses are commonplace in Canada, forming 72 per cent of the total dwellings. Telephone poles alone would form a large forest of trees.

The following short table tells the annual average use of wood in the years 1934 to 1943, in millions of cubic feet:

Logs and bolts.....	856
Pulpwood for domestic use.....	525
Pulpwood for export.....	130
Firewood.....	713
Ties, posts, poles, etc.....	64
Miscellaneous products.....	24

In the same period the average annual destruction by fire was 337,888,000 cubic feet and by insects and disease 500,000,000 cubic feet. This shocking amount of loss by pests and fire gives cause for concern.

Greater governmental activity in forest care is needed, and individual operators should make forest protection an integral part of forest management, and accept broader individual responsibility for conservation and fire fighting. The pulp and paper industry in pledging its support to any practical plan, has suggested the following measures to the Ontario Royal Commission: augment the forest protection service by men trained in the science of fire protection, entomology and pathology, with sufficient remuneration to encourage continuity of service; expand the fire fighting equipment of the department; improve transportation and communication systems. As the President of this bank remarked in his annual address: "There is a general feeling that the forests should be maintained as a renewable asset yielding harvests in perpetuity, and as such they become not only a source of public revenue but a matter of public responsibility. If the nation is not to live upon its

capital, sufficient must be expended to protect and maintain the forests. This means research, organization of defences, education, and proper control regulating systematic cutting. . . . It seems to me that the way to make our forest resources economically sound is by consultation between provincial governments, and between governments and the forest-using industries, with regard to their use and conservation."

It cannot be overlooked that more than 92 per cent of Canada's total forest land is owned by the crown, or, in other words, by the people. The productive forest of Canada works out at about 70 acres for every Canadian of voting age. This means that the share of any 55 adult persons could produce an annual harvest of 1,000 cords of wood a year, and every cord is roughly equal to a ton of newsprint. It is a nice prospect, but it carries responsibilities with it. One is the responsibility for so handling the forests that they are renewable assets, yielding harvests in perpetuity.

It is suggested by many conversant with the need that while responsibility rests first of all with the provinces, because crown lands are administered by the provincial governments, and upon the industries which use the forests, there is room for expansion in the interest taken by the Dominion Government. In view of the fact that pulp and paper operations have created great sources of Dominion Government revenue, some way should be found around any constitutional difficulty centring upon provincial ownership, so as to encourage greatest co-ordination. It is a need big enough in its national implications to demand the greatest degree of co-operative effort.

There are, fortunately, signs that such a view is coming to the fore. In December 1945 the Minister of Mines and Resources issued a statement on government policy which included this comment: "The nation cannot afford to see forests, as a source of raw materials, dissipated. It is believed that the Dominion could properly assist the orderly development of the national forest resources in two directions, first, by expanding activities for which it would be fully responsible, and second, by assisting through provision of funds to raise provincial standards in respect of the conservation, protection and development of the provincial forest resources."

The brief presented by the pulp and paper industry in Ontario included a suggestion for permanent provision for consultation between the government and the industry, and recorded the industry's readiness to establish a representative committee to work with the government on forestry problems. Besides the protection of forest lands, this consultation should cover such factors as the uniformity of operating methods and conditions; harmful colonization methods under which forest land unfit for agricultural use is stripped of its timber; education of the people with regard to forest care and usefulness, and provision of adequate regulation of reforestation. In addition to participation of provincial governments and representatives of the pulp and paper and other wood-using industries, it would be advantageous if

the Dominion Government had a department specially charged with care of the forests, as it now has departments to care for fisheries and agriculture.

For its part, the pulp and paper industry has been active. The Canadian Pulp and Paper Association, representing the industry as a whole, has not only prepared recommendations but has led actively in carrying out plans for a modern and extensive forest management policy. Not only moral forces impel the industry, but economic forces, too. For its raw material, it must depend on limits more or less adjacent to its mills. In his excellent book on World Resources and Industries, E. W. Zimmermann remarks: "The fact that pulp and paper manufacturers, as a class, show greater interest in reforestation than does the average representative of the sawmill industry finds its explanation, at least in part, in the greater average investment." With close to a billion dollars invested in plants which cannot be moved and cannot operate without pulpwood, and as the largest lease-holder of crown woodlands, the industry's interest has spurred it to employ some 200 trained foresters whose aim is the scientific cutting of the forests and their conservation for future use. The experience and technical knowledge of this force are at the service of governments and others interested in the same aims.

Much is being said about "forest management", so it would be well to examine what it means. Proper forest management simply means obtaining the maximum yield from the forest. At present it appears that the annual increment exceeds the annual demand made upon the forest, but Canada is approaching the critical stage where the annual depletion will exceed the annual growth. This means that if forest industries are to be kept in healthy condition, extensive investment must be made now for returns at distant dates as the individual crop units attain merchantable growth, which may vary, according to the kind of tree and conditions, from 25 to 100 years. To put it in the words of Vernon E. Johnson, Vice-President and Manager of Woodlands, Canadian International Paper Company: "My goods consist of pulpwood delivered at our mills. The mills must depend for wood on the limits I manage, not only this year and next, but in perpetuity. And if I can't keep our forests productive, my boss will find someone who can. For he cannot pick up a \$25 million paper mill and lug it over to another forest."

Such a programme of management can be built only upon knowledge. It is a rare accident when right decisions are based on insufficient data. This is why operators are insistent that the government should develop its forest knowledge and protection system covering all forest resources. Laboratory and experimental station information is needed, telling the rate of growth, regeneration, yield and suitable cutting methods. Aerial photography should be used to survey resources. Periodical inventories would guide operators in the intensity and kind of their cutting. There should be more men engaged, not to chop down trees, but to see that the forests grow. If operators

work with nature, and not against her, tree growing is easy, as has been found in European countries where the rule has been followed for centuries.

So much for the Canadian forest; now look at the pulp and paper industry which stems from it, one of the major industrial enterprises of the world. It has a world-wide reputation for quality and dependability. From the standpoint of capital invested, it is far the largest industry in Canada. It is first in employment among manufacturing industries, first in total wages paid, first in export values, first in the net value of production. It is the largest single industrial buyer of goods and services. It provides the principal, and in some cases the only, industrial activity of many towns: in Ontario alone there are some 20 thriving towns that were built and are maintained by the Ontario pulp and paper industry. It is a substantial contributor to government revenues.

During the war, besides making munitions and increasing mill output to meet other war needs, the industry provided Canada with $1\frac{1}{4}$ billion United States dollars. This sum helped to pay for immense purchases of war material in that country, and helped make unnecessary any lend-lease arrangements. Through the form of exchange many thousands of tons of pulp and paper shipped across the border reappeared in Canada in the shape of aircraft, guns, tanks, and other war supplies which could not be manufactured here.

Some people think of the pulp and paper industry as a continually ravenous consumer of the forests, and they will be surprised to learn that it takes only 16.7 per cent of the annual forest consumption. Fuelwood uses 22.6 per cent; timber, pulpwood for export, and miscellaneous products 34.1 per cent; and fire, insects and disease take 26.6 per cent. Yet so vital is the continued supply of its raw material that the pulp and paper industry has done more on its own in the way of forest management and more in the way of developing the forest for use in perpetuity than all the other users combined.

There are three forms of activity: operations in the woods with pulpwood as a product, the manufacture of pulp, and the manufacture of paper. The 82 pulp and paper companies in Canada operate 109 mills in six provinces. In addition to newsprint, they have a highly developed production of fine paper, book paper and paperboard, of which they make, all told, about 800 types.

Some 220,000 Canadians receive pay from the industry, and at least half a million directly depend, in whole or in part, on the industry for their livelihood. The sums paid to workers run to \$150 million annually, divided about evenly between workers in the mills and seasonal workers in the woods.

The supplies and services purchased by this industry affect many other businesses. In the average year, transportation costs \$74 million, fuel \$19 million, electricity \$20 million, chemicals and mill supplies \$36 million, fibres \$7 million, food and fodder \$8

million, and purchased pulpwood \$19 million. Pulp and paper has been largely responsible for the development of Canadian hydro-electric resources, using about 50 per cent of all the power generated for industry and mining. In 1945, for instance, it used 10,854 million kilowatt-hours of electric energy, of which 9,088 were purchased and the remainder generated in the plants of the industry.

In a publication last March, the pulp and paper industry remarked that it had made its own way against world competition "without subsidies, price floors, guarantees or other forms of public financial assistance." It admitted that investors had, at times, been disappointed, but the industry had always been a contributor to, and never a drain upon, the public treasury. The owners have, in fact, received little, if any, investment returns over the last 20 years. In the 16 years between 1930 and 1945 the index of wholesale commodity prices rose 16.4 per cent, whereas newsprint prices increased by only one-half of one per cent. Yet so far as production of a much needed commodity is concerned, the industry has had an excellent record. Employees in the mills alone have increased in ten years by more than 12,000, salaries and wages by \$44 $\frac{1}{2}$ million, and gross value of product by \$250 million.

After its demonstration of enterprise and resiliency before and during the war, the industry faces new highs in demand and production. There is a world-wide shortage of pulp and its products. An advertisement in a British trade paper urges people to save even bus tickets for paper salvage. Comparing the pre-war year with 1946, this bank has had an increase of 100 per cent in pocket cheque books, a 68 per cent increase in current account deposit slips, and a 100 per cent increase in savings deposit slips. Newsprint consumption is up 26 per cent. Weekend newspaper circulations in Canada have doubled, the book publishing trade has expanded, the backlog demands for catalogues is tremendous (one medium-sized firm now needs 375 tons of paper for catalogues alone), and there are many new uses, such as for bags for cement, cereals and other bulk commodities. Box and container plants are far behind in the race to keep up with demand. A return of the fancy container, particularly desired by the food and drug trade, is postponed until more essential requirements have been met. Supplies of writing paper, tissues and specialty papers are far short of public demand.

Phenomenal advance has been made since the first paper mill was established at St. Andrews, near Lachute, in 1803. By 1860 wood pulp had proven itself as a substitute for rags, and in 1866 what is claimed as the first wood grinder in America was set up at Valleyfield. From 10,000 tons in 1871 the production of paper rose to some 5,000,000 tons in 1946.

Newsprint is a story all by itself. In pre-war years Canada supplied three out of every eight newspaper pages printed throughout the world; today she provides three out of every five. The newsprint section of the industry is operating at its full capacity, and Canada is besieged by would-be buyers. Producers

all have firm commitments with customers of long standing, and are turning aside attractive offers from others. There is none of the "spot" buying which caused serious shortages after the first world war.

Some complaints have been heard about the size of exports in view of domestic shortages of newsprint, but proportionately to their pre-war consumption, publishers here are doing better than publishers anywhere else in the world. Government controls of newsprint were removed in December 1945, since when manufacturers have been free to select their own export markets, with the proviso that domestic consumers be supplied with at least the same proportion of the total supplied to North America.

Now turn from paper to pulp. Canada is second only to the United States in production of wood pulp, and Canadian pulp is a significant factor in world supply. The wood cut for pulp in one year would make a pile 4 feet wide by 4 feet high by 13,333 miles long. Exports of pulp in a year account for more than 35 per cent of the total pulp and paper exports, now amounting to \$360 million. In pre-war years Canada supplied slightly under 30 per cent of United States pulp imports; in five war years we supplied over 92 per cent. Whether the unlesened United States requirements can continue to be met in face of insistent demands from 41 other countries cannot yet be determined.

Of the pulp made in Canada, some 70 per cent is manufactured for immediate conversion into paper and paper products. Of the remaining total of 1,600,000 tons, about 200,000 tons is made for the domestic market. A log is about three times as valuable to the economy of the country if it is used by a pulp mill than if it is merely sawn. If the log is exported, according to the brief prepared for the Ontario Royal Commission, its value is only one-fifth or one-sixth as great as if converted into paper. In the last year for which figures are available, we exported 1,672,000 cords of wood. Some of this wood comes from freehold limits. Some of it represents integrated pulp and paper operations on both sides of the border. Nevertheless, the manufacture of a portion of these exports at home would be of value to Canada.

Not long ago the Premier of Quebec said that because of the loss to the economy through not processing the wood in Quebec, it had been decided not to give cutting rights to those who have no mills or at least a plan showing in a convincing manner that the limits would be used for benefit of the province. The premier said the Government believes in orderly changes and betterments, not in attempts to do things overnight, and was animated by a sincere desire to work with honest concerns interested in the forestry industries, but, as to those who thought only of immediate profits, and were not scrupulous in the matter of setting fictitious values on holdings, and watering stock operations generally, he said the Government would defend the province and the people.

In Ontario prior to 1930 pulpwood was produced mainly on freehold lands, but to relieve the unemployment situation in the Thunder Bay district in 1932

it was decided to allow shipment of small quantities from Crown lands. By 1939, according to the Ontario brief, "the practice had increased to the point where, in the Thunder Bay district, the amount of spruce pulpwood produced and exported equalled or exceeded that produced for Ontario mills . . . One consequence of this undue increase has been the movement of pulpwood to the United States past Canadian mills that were operating below capacity for lack of that raw material."

When running at capacity, the pulp and paper industry uses some 8 million cords of pulpwood annually, of which about 6 million cords are cut from limits leased or owned by the industry, while the remainder is purchased from private forest owners, the majority of whom are farmers. More could be made of the private business of raising pulpwood for sale if private woodlots were operated under any kind of long-term forestry plan, assuring continuity and certainty of supply. In 1945 the industry paid \$19 million for pulpwood it bought from private vendors.

From this brief survey several reflections may be drawn.

Technology in the industry is constantly changing and advancing. For example, the art of making paper from wood pulp was originated in the 19th century, and the manufacture of cellophane and rayon and plastics is an achievement of the first half of the 20th century. The industry must be prepared for further scientific and technological advances in the second half.

It needs not only to be adaptable to external influences, but flexible within itself. The manufacture of pulp and paper is not a single operation, but a co-ordination of specialized occupations. That is why one school offers 35 distinct courses all related in some way to the pulp and paper industry.

Workers are needed. There appears to be a permanently insufficient supply of woods labour. The Ontario brief recommends: "that the deficiency should be supplied by selected immigration from Europe, and that immediate representations be made to federal authorities by the provincial government in support of such a policy."

Enlightenment of the public is necessary. Because woods activity is dispersed throughout the outlying areas, far from large centres of population, the average person has little understanding of the significance of the forest industries in Canada's economy.

Capital outlay and working capital are important to ensure production, keep up with the march of progress, supply people's wants, and provide employment.

And, finally, there is imperative need for world law and order. World trade is vital to this Canadian industry. Agriculture can vary its crops from year to year according to surplus or dearth, but in growing perennials such as trees there must be a long-time assurance of peaceful commerce. There will be no advantage in the most perfect system of forest management if the forest industries are unable to sell their products.