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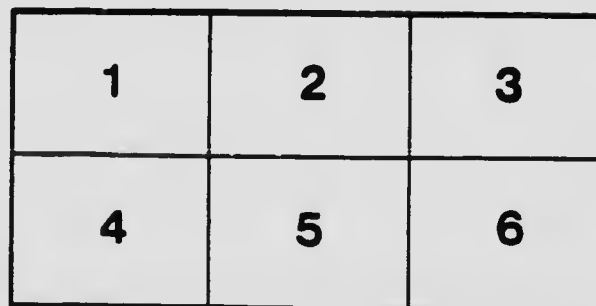
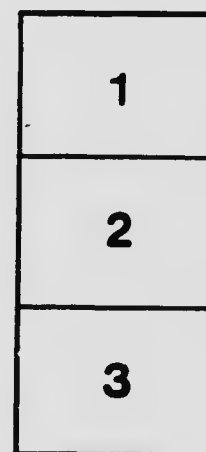
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A paper to be presented at a meeting of the International Engineering Congress, 1915, in San Francisco, Cal., September 20-25, 1915.

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## TIMBER IN CANADA.

By

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Canada's present supply of commercial timber has been variously estimated as lying between five and seven hundred billion feet, board measure (500,000,000,000 to 700,000,000,000), and covering an area of approximately 170,000,000 acres. This estimate of quantity and area refers only to timber of commercial value as saw timber. It does not include pulpwood, firewood, tie and pole material or small timber of any description, although this may have considerable commercial value.

Even pulpwood values are difficult to estimate as so much depends on accessibility to market. Firewood may be worth four dollars a cord in the settled parts of the country, and may have absolutely no value whatever in more remote districts. Ties may be worth forty cents at the railway but the cost of transporting them may exceed this value, and they then become valueless for the present at least.

A complete estimate of available forest products could not even be attempted with the information existing, and this estimate is therefore largely confined to commercial saw timber (including all material ten inches and over in diameter at the stump).

British Columbia contains a land area of approximately 226,186,240 acres (353,416 square miles), of which about twenty-one percent is covered with commercial saw timber. This area of about 50 million acres has been estimated to contain 300 billion feet, board measure.

The Coast type is made up largely of Douglas fir, hemlock, Sitka spruce, western red cedar, western tamarack, western white pine and others of less commercial importance, and contains the bulk of British Columbia's best saw timber (about

225 million feet). The interior is divided into two distinct types. The Dry Belt country is characterized by light precipitation and the tree growth is light in consequence. It consists largely of Douglas fir and western yellow pine. The Kootenay country has a high annual precipitation and is practically a modified repetition of the Coast type, characterized by the addition of such species as mountain fir and Engelmann spruce, and a lack of Sitka spruce. This type grades into the Southern Rocky Mountain type of mountain fir, Englemann spruce and lodgepole pine, which crosses the summit and clothes the eastern slope of the Rockies down to the prairie line.

British Columbia cut in 1913: 1,173,647,000 feet, board measure, of lumber in her mills. Over two thirds of this was Douglas fir, about seven percent was tamarack and seven percent red cedar, and of the remainder, five percent was spruce, five percent western yellow pine, three percent hemlock, two percent western white pine, and one percent each, mountain fir and jack pine. With the exception of unimportant quantities of cottonwood, maple and birch, no hardwoods are found in this province. Twelve kinds of wood were reported.

The lands in this province are under the administration of the provincial government, with the exception of the Railway Belt and the Peace River Block, which are under the administration of the Federal Government.

The reservation from sale or pre-emption of all lands carrying 8,000 board feet per acre west of the Cascade Mountains, or 5,000 board feet per acre east of this range, replaces the creation of formal reserves in that part of the province under provincial administration. This area is said to exceed 100,000,000 acres.

The Railway Belt consists of the land lying within twenty miles of the Canadian Pacific Railway's right-of-way across the Province. This belt which is forty miles wide and about five hundred miles long (containing about 12,800,000 acres in all), is said to contain 2,500,000 acres of saw timber or approximately thirty-six billion feet, board measure, of standing timber. In this district thirteen reserves have been set aside containing 2,420,838 acres in all. These are protected and administered by the Federal Government.

The Peace River Block of 3,500,000 acres has been estimated as 175,000 acres of saw timber or about one billion feet. This last is located in the northern Rocky Mountain region of the Province and the timber consists largely of spruce, mountain fir and lodgepole pine. So far none of the lands in the Block have been set aside as forest reserves.

The Province of Alberta has a total land area of 161,000,000 acres (252,925 square miles), of which 5,416,000 acres are said to contain saw timber to the extent of twenty-one billion board feet. Four reserves exist in Alberta at the present time, and these contain 16,711,776 acres. The largest of these, the Rocky Mountain Reserve, consists of all the non-agricultural land on the east slope of the Rocky Mountains. It covers an area of 14,474,856 acres, nine percent of which is saw timber land containing about eight billion feet, board measure. This province sawed in 1913, 44,662,000 feet of lumber of the following composition: spruce, 93.8 percent, jack pine, five percent, and small quantities of Douglas fir, tamarack, poplar, balsam fir and birch. With the exception of birch and poplar the forests of Alberta are entirely coniferous. The Douglas fir, Engelmann spruce, mountain fir and lodgepole pine, extend from British Columbia down the eastern slope and mix with the typically northern forest type.

In the saw mill returns these mountain species are mixed with those of the northern type of forest. Engelmann spruce is sold mixed with white spruce, mountain fir with balsam fir, and lodgepole pine with jack pine.

The northern forest type covers the country from the Rockies to the Atlantic and extends northward to the limit of tree growth. The type consists largely of white and black spruce, jack pine, balsam, and aspen—poplar with balsam fir and tamarack in smaller quantities. Toward the north this type of forest is of no commercial value except for purely local purposes and much of it is useless except for firewood and fencing. The trees become smaller and more gnarled and twisted until the place of the forest is taken by the treeless tundra or barren lands.

Further south this type improves and provides a great part of the consumption, at least of rough lumber, in the three prairie

provinces. With the exception of the poplars and white birch this is a coniferous forest. The eastern hardwoods are entirely absent from this type. In northern Ontario and Quebec this type merges into the southern Laurentian type of mixed conifers and hardwoods.

In the northwest territories and the Yukon the forest at the present time has practically no commercial value. Forest cover exists but the trees are not found in commercial sizes or quantities. Wood is used locally for fuel, fencing and rough construction, but none is sawn and brought to the lumber markets. The country is sparsely settled; much of it has never been explored. Enormous areas have been burned repeatedly by forest fires and a considerable portion of the most northern part is composed of treeless barren lands or tundra. As a source of lumber supply for the future this district cannot be expected to supply more than the purely local demand.

Saskatchewan's land area is 155,764,080 acres (243,382 square miles) and the province's timber area covers 3,584,000 acres and contains about fourteen billion board feet. The province in 1913 cut 114,800,000 board feet of lumber. The lumber was made up of spruce (98.2 percent) almost entirely, with small unimportant quantities of tamarack, jack pine and poplar. The forest reserves in Saskatchewan cover an area of 1,152,889 acres and consist of eight different reserves, the largest of which (Porcupine No. 2) covers 361,440 acres.

Manitoba now contains a land area of 148,432,640 acres (231,926 square miles), of which 1,920,000 acres are saw timber land with a stand of some 6,850,000,000 feet of timber. The northern part of this province is covered with the same northern forest type found in Saskatchewan and eastern Alberta, but another type is found in the southeastern part. This is sometimes called the southern Laurentian type. The type proper is characterized by white and red pine, cedar and hemlock among the conifers and such eastern hardwoods as maple, yellow birch, elm, ash, basswood, beech, etc. The white and red pine reach Manitoba as do also the cedar, black ash, white elm and basswood; the other trees of this type are usually confined to Ontario and the provinces farther east. While none of these trees are commercially important in Manitoba, they indicate the

transition stage between the northern coniferous forest and the northeastern hardwood type.

Green ash, Manitoba maple and burr oak are common in Manitoba and their range extends into Saskatchewan along the river bottoms although they are not commercially important in the prairie provinces.

Manitoba in 1913 cut a total of 71,961,000 feet of lumber in her saw mills. Spruce formed about 90 percent of this quantity as in the other prairie provinces. Smaller quantities of poplar, tamarack, jack pine, birch and balsam fir are also produced. Five of the eastern species have also been reported from this province: these were cedar, oak, elm, white and red pine, although the quantities cut were never commercially important.

Five forest reserves have been set aside in this province containing an area of 2,629,440 acres. These reserves in the prairie provinces do not contain much of what would be classed as saw timber, but they contain promising young growth which is being protected from fire and managed on forestry principles and will in time produce saw timber. Many of these reserves are situated at stream sources to protect these and to insure steady stream-flow throughout the year. All of them contain firewood and posts which are of great value to settlers in the immediate neighborhood, especially in those parts of the country where tree growth is scarce.

The saw timber on all Dominion Forest Reserves is sold when it becomes mature. The timber is estimated, the sale advertised and the right to cut timber sold by tender.

Ontario is Canada's largest lumber producing province and probably contains more mature standing timber than any other province except, perhaps, British Columbia. The land area of Ontario has been estimated at 234,163,200 acres (365,880 square miles). The greater part of this area is covered with the northern forest type of spruce, jack pine, poplar, balsam fir and tamarack. The parts of the northwestern portion of the province are covered with timber of no commercial value. This northern type in Ontario covers at least 80 million acres. South of this in Ontario and, generally speaking, south of the height of the St. Lawrence and Hudson Bay basins, we find the southern Laurentian type of forest which



covers the southern rim of the Laurentian shield of rock formation. The rock is all igneous and has been worn by glacial action to a typical peneplain. The rock is seldom far from the surface and over large areas there is little or no soil cover at all. The type is characterized by the white and red pine, hemlock, cedar and the characteristic trees of the northern forest, together with such hardwoods as yellow birch, hard maple, ash, elm, basswood and some red oak and beech on the southern fringe of the type. The jack pine covers enormous areas of sandy plains and rocky country. White and red pine are generally found in deeper, moister soil, and hemlock cedar and the hardwoods are confined to the moist rich bottom lands in this type. The southern Laurentian type covers some hundred million acres in Ontario and Quebec, and has been estimated to contain 200 billion feet of saw timber. In this area are situated the principal forest reserves of both these provinces. Ontario has a forest reserve area of 11,539,200 acres (18,030 square miles) and Quebec has 111,400,320 acres (174,062 square miles). Ontario is Canada's premier white pine province and the stand of this species has been estimated at about 40 billion feet for this province. The productive forest area in Ontario probably consists of from 70 to 90 million acres. The greater part of the newly added territory (the district of Patricia) is not covered with commercial timber, and is probably not capable of producing more than pulpwood.

South of the southern Laurentian type would be the northern fringe of the great central hardwood type of the United States. This type of forest covers the middle west and eastern states of the Union and extends across the boundary to Southern Quebec and Ontario.

The conifers, such as white and red pine, hemlock, cedar, etc., are still common, although the balsam fir, spruce and jack pine begin to disappear. The greater part of the forest is made up of hardwoods such as maple, birch, elm, oak, ash, beech, hickory and basswood, with smaller quantities of walnut, cherry, tulip, chestnut, butternut, black gum, sycamore and sassafras. These last species are confined to the St. Lawrence Valley and in some cases to a narrow strip of territory along the north shore of Lake Erie. The area covered by such species is small

and unimportant in relation to the forest area of the province, being at the northern limit of their range. They grow largely on agricultural land and once removed will, in all probability never be planted or reproduced in commercial quantities.

Ontario in 1913 cut 1,101,066,000 board feet of lumber, of which white pine formed about half of the total. The cut was made up as follows: white pine 46.9 percent, hemlock 13 percent, red pine 12.0 percent, spruce 9.5 percent, maple (the most important hardwood) 5.6 percent, and twenty-two other kinds of wood, making a total of twenty-seven kinds.

Quebec with its recently added territory now contains a land area of 442,153,600 acres (690,865 square miles). Of this, about 367 million acres belong to the Northern Forest type of pure conifers, 50 million to the southern Laurentian type of conifers with mixed hardwoods and about five million acres to the hardwood type. The eastern counties of Quebec, south of the St. Lawrence, belong to another type which is characteristic of the Maritime Provinces, and is similar to the southern Laurentian. This type in Quebec covers about twenty million acres.

The Quebec government has reserved, as before stated, 111,400,320 acres (114,063 square miles) of forest land. The greater part of this lies in the northern portion of the Province, either in southern Laurentian or Northern Forest type and most of it is not heavily timbered.

Quebec in 1913 cut 630,346,000 feet of lumber. Spruce here forms 65.4 percent of the total, white pine only 11.4 percent and hemlock 6.1 percent; birch comes fourth on the list with 5.4 percent, and is the most important hardwood. Generally speaking the rest of the lumber output in similar in composition to that of Ontario. Tulip, walnut, black gum, willow, ironwood and sycamore cut in Ontario are not reported from Quebec.

The provinces of New Brunswick and Nova Scotia and the eastern counties of Quebec, or in short that part of Canada lying south of the St. Lawrence River, is covered by a forest type often called the Acadian. This consists chiefly of "the hardwoods" birch, maple and beech, with smaller quantities of basswood, ash, elm, oak and butternut. Those hardwoods which belong properly to the central hardwood forest, such as tulip,

hickory, walnut, chestnut, sycamore, cherry and black gum are normally absent from this type. Red spruce is the most important conifer as compared to white pine in the southern Laurentian, and white spruce in the northern forest type. White and red pine are found in the Acadian type often in great abundance, but pure stands are scarce and most of the best material has been removed. The forest area might make up a total of 14 million acres, and is supposed to contain in round figures 100 billion feet of lumber. There are no forest reserves in the Maritime Provinces.

New Brunswick has a land area of 17,863,040 acres (27,911 square miles). The forest area has been estimated at 12 million acres, but this of course includes more than commercial saw timber land. The standing timber has been estimated at 22 billion feet of the following composition: spruce 60 percent, pine 10 percent, hemlock 5 percent, cedar 5 percent and hardwoods 20 percent. With the spruce in this estimate would be included balsam fir which is often sold mixed with spruce. New Brunswick in 1913 cut 399,247,000 feet of lumber of the following kinds: spruce 79.3 percent, white pine 7.8 percent, hemlock 5.5 percent, balsam fir 4.3 percent and birch (the most important hardwood) 1.4 percent. Ten other woods were cut in smaller quantities.

Nova Scotia's land area is 13,483,520 acres (21,068 square miles), and as a forest survey has been made of this province its forest conditions are better known than those in other parts of Canada.

The forest area has been estimated at 5,744,000 acres, and the coniferous saw timber at ten billion feet board measure. The hardwoods might provide five billion feet, making the total for the province about 15 billion feet. The standing timber (conifers) would have the following composition: red spruce five billion feet, hemlock three billion, white pine one billion, and the remainder, balsam fir, tamarack, red and jack pine, and white and black spruce. The hardwoods would be beech 40 percent, sugar maple 30 percent, yellow birch 20 percent, and white and wire birch, soft maple, red oak, white ash and black ash, the remaining 10 percent. Nova Scotia cut about 274,722,000 board feet of lumber in 1913. Spruce formed 56.9 percent

and hemlock 23.2 percent of this total. Seventeen kinds of wood in all have been reported from this province.

The forest area of Prince Edward Island is too small to be considered in a general estimate of this sort as the entire area of the province is only 1,397,760 acres (2,184 square miles). The annual production is 6,771,000 board feet, of which spruce forms a half and balsam fir a quarter. Fifteen kinds of wood in all were reported in 1912.

#### CANADIAN TREE SPECIES.

##### CONIFERS.

Pinus	Strobus	White pine.
	monticola	Western white pine.
	flexilis	Limber pine.
	albicaulis	Whitebarked pine.
	resinosa	Red or Norway pine.
	ponderosa	Western yellow or Bull pine.
	Murrayana	Lodgepole pine.
Larix	laricina	Tamarack.
	occidentalis	Western larch.
	Lyallii	Lyalls or alpine larch.
Picea	Mariana	Black spruce.
	rubra	Red spruce.
	canadensis	White spruce.
	Engelmannii	Engelmann's spruce.
	sitchensis	Sitka spruce.
Tsuga	canadensis	Hemlock.
	heterophylla	Western hemlock.
	Mertensiana	Alpine hemlock.
Pseudotsuga	muerezata	Douglas fir.
Abies	balsamea	Balsam fir.
	lasiocarpa	Alpine fir.
	grandis	Lowland fir.
	amabilis	Amabilis fir.
Thuja	occidentalis	Cedar.
	plicata	Western red cedar.
Chamaecyparis	nootkatensis	Yellow cypress.
Juniperus	virginiana	Juniper.
	scopulorum	Juniper.
	communis	Juniper.

##### HARDWOODS.

Juglans	cinerea	Butternut.
	nigra	Black walnut.

- Carya cordiformis*  
*ovata*  
*alba*  
*glabra*  
*Salix* sp.  
*Populus tremuloides*  
*grandidentata*  
*balsamifera*  
*acuminata*  
*angustifolia*  
*deltoides*  
*trichocarpa*  
*Alnus sitchensis*  
*oregona*  
*Ostrya virginiana*  
*Carpinus caroliniana*  
*Fagus grandifolia*  
*Castanea dentata*  
*Quercus alba*  
*Garryana*  
*stellata*  
*macrocarpa*  
*Prinus*  
*acuminata*  
*prinoides*  
*bicolor*  
*rubra*  
*coccinea*  
*velutina*  
*palustris*  
*Ulmus fulva*  
*americana*  
*racemosa*  
*Morus rubra*  
*Asimina triloba*  
*Sassafras variifolium*  
*Hamamelis virginiana*  
*Platanus occidentalis*  
*Pyrus americana*  
*Amelanchier canadensis*  
*Crataegus* sp.  
*Prunus serotina*  
*Gymnocladus dioica*  
*Acer spicatum*  
*pennsylvanicum*  
*macrophyllum*
- Bitternut hickory.  
 Shagbark hickory.  
 Mockernut hickory.  
 Pignut.  
 Willow.  
 Aspen.  
 Large toothed aspen.  
 Balsam poplar.  
 Lance leaf poplar or cottonwood.  
 Narrow leaf poplar or cottonwood.  
 Common cottonwood.  
 Black cottonwood.  
 Sitka alder.  
 Oregon alder.  
 Ironwood.  
 Blue beech.  
 Beech.  
 Chestnut.  
 White oak.  
 Garry oak.  
 Post oak.  
 Burr oak.  
 Chestnut oak.  
 Chinquapin oak.  
 Dwarf chinquapin oak.  
 Swamp white oak.  
 Red oak.  
 Scarlet oak.  
 Black oak.  
 Pin oak.  
 Red elm.  
 White elm.  
 Rock elm.  
 Red mulberry.  
 Paw-paw.  
 Sassafras.  
 Witch ha. el.  
 Sycamore.  
 Mountain ash.  
 Service berry.  
 Hawthorn.  
 Black cherry.  
 Kentucky coffee-tree.  
 Mountain maple.  
 Striped maple.  
 Large leafed maple.

*Acer Saccharum*  
*saccharinum*  
*rubrum*  
*Negundo*  
*Tilia americana*  
*Nyssa sylvatica*  
*Fraxinus nigra*  
*americana*

Sugar or hard maple.  
White maple.  
Red maple.  
Manitoba maple.  
Basswood.  
Black gum.  
Black ash.  
White ash.



