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Notes on the Forests of Quebec

By

G. C. Piché

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SUGAR MAPLE STAND

(Photo by Miss Privat)

NOTES

on

The Forests of Quebec

by

G. C. PICHÉ

QUEBEC
TELEGRAPH PRINTING CO.

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NOTES

on

The Forests of Quebec

I.—GENERAL REMARKS

The Province of Quebec is situated nearer to Europe than any other of the Dominion, as it extends from the 57th to the 79°30 meridian west of Greenwich and from the 45th parallel to latitude 62°40 North. Its boundaries are as follows: on the *North*, by the Hudson strait and the Bay of Ungava; on the *East*, by the Labrador coast and the Gulf of St. Lawrence; on the *South*, by the Baie des Chaleurs, the Province of New Brunswick, and the states of Maine, New Hampshire, Vermont and New York; on the *West*, by the Province of Ontario, the James Bay and the Hudson Bay.

Physiography.

The main physiographical features are formed: 1st by the Appalachian range, south of the St. Lawrence, extending East to the end of Gaspé peninsula. The Appalachian or Alleghanys range, is called Notre-Dame Mountain in the sector west of the Matapedia Valley, whereas the section in Gaspé is better known as the Shickshocks mountains; 2nd by the Laurentian range, which, extending North of the St. Lawrence river over the Labrador and also in the Province, of Ontario, up to the Arctic Ocean, covers 2,000,000 square miles and occupies about 93% of the total area of the Province. Between the Appalachian and the Laurentian ranges, west of Quebec, is found a lowland section called the Central plain of the St. Lawrence, which extends also in Ontario. This is the most fertile part of the province and where settlement began near the shores of the St. Lawrence river, expanding gradually into the mountainous sections, with more or less success. Near Montreal and in a few places of the central plain are found isolated peaks, called the Monteregian mountains, such as the Mount Royal, the Beloeil or St. Hilaire mountain, etc.

Glaciation.

Excepting a few high peaks in Upper Labrador, all the Province has suffered very much from the effects of glaciation. Frequent morainic deposits have also contributed to modify the original appearance of the country and are responsible for the numerous and large lakes found in the interior.

Hydrography.

In the St. Lawrence watershed, the forests are richer in species and in trees of fair dimensions than in the North. It is also there that lumbering has been carried on since over a century. Its main tributaries, such as the Ottawa river (800 miles long), the St. Maurice river (350 miles) and the Saguenay river (250 miles) are well known for the great value of their forests and for the successful industries which have been established there for a long period.

Along the Gulf of St. Lawrence are also found numerous streams, with large waterfalls, whose basins are wooded but not developed, such as the Portneuf, Sault-au-Cochon, Bersimis, Manicouagan, Moisie, Outardes, Mingan, Romaine, St. Augustin, Natashquan, etc.

In the Baie des Chaleurs district are situated the Cascapedia, Bonaventure, Ristigouche and Matapedia Rivers which are also the scene of active and profitable lumbering operations.

The James Bay receives the waters of large rivers called Harricana, (240 miles) Nottaway (205 miles), Rupert (275 miles) and East Main (400 miles) which are known to contain a fair supply of pulpwood and lumber.

Less is known of the basins of the extensive rivers flowing in Ungava Bay and known as the Koksoak, George, etc.; but, as their headwaters are situated South of the 54th parallel they may contain a certain amount of merchantable forests.

Finally, we have the interesting Hamilton river (600 miles long) which flows into the Atlantic ocean and where valuable forests are also known to exist.

Water powers.

It is not of outplace to mention here the great potential value of the waterfalls of the Province of Quebec, which are estimated to generate, when fully developed, over 15,000,000 H.P. At the present time, only 1,100,000 H.P. is utilized. It is the presence of this white

coal which has enabled the Province to become one of the principal centers of the pulp and paper industry of the world. It will be due to this immense wealth of incessant energy and of its extensive timber lands that the Province will continue its expansion.

Storage reservoirs.

In order to facilitate the operations of the hydroelectric developments, important storage dams have been built by the Government, namely the Gouin dam on the St. Maurice river, which forms a lake of 300 square miles and has a capacity of some 160 thousand million cubic feet; it stores more water than the famous Assouan dam on the Nile. Built at a cost of \$2,500,000.00, the Government obtains, from the companies using this water a revenue which last year, amounted to \$212,459.68. This means that, within thirty years, this expenditure will be repaid and the Province will continue to reap a fair revenue of the surplus water which is saved by this reservoir and which serves not only to regulate the flowage but also helps the floating of logs when the St. Maurice runs too low. The Allard dam on the St. Francis river has a capacity of 12 thousand million cubic feet. A large dam is now being built on Lake Kenogami and another at the outlet of lake St. John, known as the "Grande Décharge"; this will be one of the famous hydroelectric power of Eastern America, as it may generate more than one million H.P. when fully developed.

It may be interesting to state also that, in latter years, the government has followed the policy of marrying together the forest with the water power, i. e. instead of leasing only the forest reserves the new lease of the timber limits now includes the obligation to develop a certain number of H. P. which must be used locally and solely for the operation of the pulp or paper mill which must be erected within a fixed period. Ex: the lease of the Manicouagan property to the Ontario Paper Co.

Climate.

Though situated at a lower latitude than the British Isles and France, Old Quebec has a climate which is somewhat more severe, but is characterized by a sustained heat during summer and cold during winter, while spring and autumn are not as well defined. The cycle of forest vegetation lasts about five months (from May to October).

For the sector south of the 53rd parallel, the average temperature is 58° F. during the summer and 15° F. during the winter. Records kept since half a century give the following data for the annual average temperature.

Brome (Eastern townships, Notre Dame Mountains) . . .	40°F
Pointe au Père (near the beginning of the Shickshocks Mts.)	34°F
Quebec City (Eastern boundary of Central Plain)	38°F
Montreal (center of the Lowlands)	42°F
Hull (Ottawa Valley)	41°F
Anticosti Island (Gulf of St. Lawrence)	34°F

During the year 1921, the total hours of insolation were recorded as follows:—

Montreal	2,098 hours
Quebec	1,832 “
Sherbrooke	1,797 “
Ste-Anne de la Pocatière	1,961 “

North of the 53rd parallel, the climate is getting more and more severe and the tree growth disappears gradually, so much so that no merchantable forest is to be found above latitude 55° N.

Agriculture.

The central plain of the St. Lawrence, formed of alluvial deposits during the glacial period, is the section where farming and settlement have succeeded best; though some parts, covered with heavy deposits of sand have been unfortunately cleared, and, afterwards, abandoned by their owners. The sand outcrops have frequently been transformed into shifting dunes which portions of gradually spread their devastation. Some 3,000,000 acres of waste lands are thus scattered through the municipalities while about 12,000,000 are devoted to profitable mixed farming.

The Province of Quebec is not intended to be exclusively cultivated, as the greatest portion of its territory is only fit for forest cultivation. There remains, on the South Shore of the St. Lawrence, in the Appalachian range, some 5,000,000 acres which may be allotted to the settlers while in the Laurentian districts, there is little left, save in the lake St. John region and in the clay belt of Temiscamingue, Abitibi and the James Bay.

The settlers already established in the mountainous districts cannot thrive exclusively on the products of their farms, they absolutely require the help of the lumbermen to supplement their deficiency of revenue and, should the timber disappear in their neighbourhood, through fire, wasteful cutting or useless clearing, an exodus from many of these small communities is bound to take place. Therefore, it is of the utmost importance to render the relations between the lumberman and the settler as harmonious as possible.

Area.

The total area of the Province of Quebec is now 450,337,761 acres or 703,653 square miles or 1,822,461 kilometers. The annexation of the Ungava territory, in 1912, has practically doubled its former surface. The lakes and other water surfaces are estimated to cover 15,969 square miles (see appendix No. 1).

According to the census of 1911 (see appendix No. 2), the properties belonging to private individuals, companies and communities covered then 15,613,267 acres, so that the Crown would still control in the Old Quebec, 209,585,294 acres, and all the New Quebec or Ungava covering 225,139,200 acres, making a grand total of 434,724,394 acres. In Old Quebec, licenses to cut timber upon Crown lands, subject to special conditions as detailed further on, have been granted over territories aggregating 46,000,000 acres.

II.—CLASSIFICATION OF THE FORESTS OF QUEBEC ACCORDING TO OWNERSHIP

Omitting the New Quebec and a great portion of the Labrador upland, which we are led to consider as not containing any appreciable area of commercial timber, we figure that the merchantable forests of this Province—capable of producing saw logs, pulpwood, etc.—cover approximately 130,000,000 acres.

We have divided them into five classes, according to their tenure:

	Acre
(A) Private forests.....	6,000,000
(B) Forests on lots under location ticket.....	1,300,000
(C) Forests leased or timber limits.....	46,000,000
(D) Township forest reserves.....	200,000
(E) Vacant lands.....	76,500,000
Total.....	130,000,000

A description of each class follows. Practically none of the private lands are managed according to the principles of forestry. The same may be said of the forests belonging to settlers (see appendix No. 3). It is only upon the Crown lands (timber limits and township reserves) that the Forest Service of the Province exercises any influence in the direction and supervision of the cutting of trees and their utilization.

PRIVATE FORESTS

(A) Forests of the private lands

These 6,000,000 acres come from the old seigniories, from farms sold to settlers by the Government, and from land subsidies granted to railways in aid of their construction.

The greatest portion of these forests lie in the central valley of the St. Lawrence and they are divided up into small woodlots, seldom exceeding 50 acres on an average, with the exception of certain seigniorial domains, such as those of Lotbinière and Beauré, and of the territories granted as subsidies to railways.

The stands in these forests vary greatly. In fact, they may include high forests and coppices, pure stands of spruce, or pine, or maple, elsewhere the forest is of a mixed character, consisting of yellow birch, beech, maple, ash, mingled with spruce, balsam fir or white and red pines (see appendix No. 4).

(B) Forests on lots under location tickets

Every year the Government sells to settlers lots of land or homesteads of about 100 acres in average and usually well timbered. This sale is effected by means of a special contract, called "location ticket," imposing several obligations, as to residence, clearings, etc. (see appendix No. 5). When the settler has complied with the various conditions, enumerated in this contract, he is entitled to his letters patent, giving him full and free possession of his lot.

Owing to the low prices of lots and their comparative richness in timber, they have been the object of vast speculations, specially since 1900, when spruce and balsam fir became very valuable, owing to the great demand made by the pulp and paper industry in Canada and in the United States.

These forests are destined, through the force of circumstances, either to become part of the forests of the first group—when the settler obtains his letter patents—or to revert to those of the second group (timber limits) from which they had been withdrawn to be granted, when the so-called settler has not fulfilled in due time the essential conditions of his location ticket. Thus the area of these forests extends or shrinks from year to year.

According to the statistics kept by the Forest Service, the total volume of the cut of saw logs in 1921-1922 was, on private lands, 688,948,776 feet, board measure, compared with 1,296,304,413 feet board measure, upon the Crown lands.

CROWN FORESTS

(A) *Timber limits*

This group comprises all the forests usually called “timber limits” which have been leased at different periods.

Since 1867, our timber limits are exclusively leased by auction, after an official notice of at least thirty days.

In the past, this auction bore upon a special amount called the “bonus” which constituted the fee for obtaining the exclusive privilege or *permit* or *license* to cut timber on a specific area of the Crown Lands; but, in 1923 a change was effected to this system and the auction of said permit was made subject to the following conditions:

- 1.—The price of adjudication, fixed at \$. . . . per square mile, is payable in three equal instalments, the first cash, the second in one year, and the last in two years with interest at the rate of 6% per annum.
- 2.—The Government reserves the right to dispose, as it may see fit, the water powers situated in the above timber territories, as well as of the lands necessary for their exploitation and development.
- 3.—Every bid shall be for an amount to be paid over and above the customary stumpage dues in force.
- 4.—The Minister of Lands and Forests may exact the bounding of all territories thus put up at auction, the cost of the said surveys to be paid by the purchasers in the same manner and within the same delay as the price of adjudication.

5.—The purchaser shall, within a period of . . years from the date of the contract, erect a mill within the limits of the basin of the river .....or in the neighborhood thereof, for manufacturing into woodpulp or paper the woods cut on the said timber limit, of a capacity of at least . . . tons per working day, and also develop within the same delay, at least . . . H.P. to be used for the exploitation of the said pulp or paper mill.

6.—Every intending bidder shall on or before....., make a deposit of \$.....with the Department of Lands and Forests. This deposit shall be forfeited if, at the time of the sale the applicant does not offer a bid at least equal to the upset price or if, being the successful bidder he does not sign the required contract. Out of the sum deposited by the purchaser, a sum of \$.....shall be applied as part payment of the price of adjudication and the balance namely \$....., shall be retained by the Government until the water powers have been developed and the pulp and paper mill erected and in operation, within the fixed delay.

If the purchaser has fulfilled the obligations imposed, this last amount shall be remitted to him, but if he has not done so, it shall be confiscated by the Crown, and the Lieutenant-Governor in Council shall also have the right to cancel the contract and the permit to cut timber, without any indemnity.

7.—The lease of the water powers above mentioned is made subject to the customary conditions, others following:

1.—Emphyteutic lease for a period of . . . years from the date of the execution thereof;

2.—Fixed annual rental of ..... for the duration of lease, payable in advance;

3.—Annual Royalty per H.P. developed, from the commencement of the operations, that is to say not later than . . years after the signature of the contract, as follows: 50 cents per H.P. during the first period of 10 years; \$1.50 per H.P. during the second period of 10 years, and \$2.50 per H.P. during the third period of 5 years. The amount of this royalty and the mode of computing it may be revised after the said period of 25 years aforesaid.

In 1868, there were 19,000 square miles under license; from 1868 to 1922, 58,584 square miles were leased as timber limits. Owing to the sale of lots of land therein to settlers, the present area of the limits is now reduced to 71,837 square miles.

These forests are all situated beyond villages in the upper basin of the various tributaries of the St. Lawrence river. They contain, according to their location, a fairly large variety of merchantable timber, such as white pine, red pine, grey pine or banksian pine, spruce, balsam fir, cedar, hemlock, tamarac, birch, maple, aspen, basswood, etc.

The permit granted to the license holder is valid for twelve months from the first of May; it may be renewed every year, provided the license holder has complied with present regulations or those which may be enacted hereafter.

The permit is considered as a negotiable security, but it can be transferred or pledged only with the consent of the Minister of Lands and Forests and after the payment of a fee of \$20 per square mile. This system has allowed the concentration of extensive timber limits and the formation of important companies for the manufacture of pulp and paper.

The principal conditions imposed on license holders are:

- 1.—To pay the bonus named at the time of the auction;
- 2.—To pay a ground rent of \$6.50 per square mile before September 1st of each year. (This amount will be raised for five years to \$8 per mile, after 1923);
- 3.—To send, before the first of December, a statement of the quantities of timber it is proposed to cut, naming the places where they are to operate and the persons who are to do the lumbering.
- 4.—To have all the timber cut measured by a culler holding a certificate from the Board of Examiners appointed by the Province.
- 5.—To allow all their operations to be inspected by the provincial forest rangers, to keep a shanty book in each camp for recording all the trees cut each day, as well as their measurements, etc.
- 6.—To practice as great economy as possible in the lumbering operations.
- 7.—To produce a sworn report, before June 30 following the cut, stating all the year's operations both upon limits and upon private lands.
- 8.—To pay, before the first of December following the cut, the royalties or stumpage dues on all the timber cut upon the limits according to the tariff adopted by the department.

For the leases made in and after 1923 the amount over and above the stumpage dues, as determined at the time of the auction of the permit to cut on the timber limit.

9.—To efficiently protect the forests leased against fire, trespassers, etc.

10.—To export no timber that is not manufactured in Canada, that is, not converted into pulp and paper, deals or boards, or cut into any other articles of trade or merchandise of which such timber is only the raw material. (Art. 13 of Regulations.)

From 1867 to 1922 the forests under license have brought in the following amounts to the Province:

Ground rent.....	\$ 9,978,344.67
Bonuses.....	4,135,461.32
Transfer fees.....	661,856.69
Royalties or dues on timber cut.....	38,611,017.53
Interest on suspense accounts, penalties for illegal cutting, fire tax.....	1,488,356.58
Making a total of.....	\$ 54,875,339.68

(B) *Township forest reserves*

The Forest Service has devoted much attention to the setting apart of the uncultivable vacant lands in certain townships to form forest reserves, which are destined to supply timber to the inhabitants of the neighboring villages, under special regulations. (See Appendix, No. 6.)

Sixteen township forest reserves, covering a total area of 265,000 acres, have thus been created,

The quantity of timber cut on these reserves, in 1922, amounted to 105,261 cubic feet of building timber and 1,096 cords of firewood, which brought a revenue to the Crown of \$4,618.85 as stumpage dues.

(C) *Forests not leased, or virgin forests*

These forests, which are free from all incumbrances, extend beyond those under license. They lie in the basin of the St. Lawrence, as well as in that of Hudson Bay. No cutting has yet been done on any of these vast territories; but fire, storms, insects, and fungi cause therein considerable damage every year; moreover, the growth in volume of the trees is very slow, as in all Northern forests; therefore the annual increment in volume is very small. To the Forest Service has been assigned the duty of making an inventory of them so that they may gradually be utilized as the country's needs require.

The timber in these forests consists chiefly of spruce, balsam fir, poplar, and banksian pine; the quantity per acre varies between three

and fifteen cords, mostly of pulpwood. This reserve can furnish millions of cords of pulpwood and, as there are considerable water-powers on most of the streams, it can easily be foreseen that, before long, many pulp and paper mills will be erected there, which will contribute to develop the country and advance the progress of civilization.

III.—BOTANICAL CLASSIFICATION

If we follow the classification proposed by Koeppen of the various botanical zones of the world, we find that this province can be divided as follows:

1—Arctic glacial zone.

This zone, characterized by the absence of any tree growth, extends in new Quebec to the north of the 55th parallel. It covers the northern part of Labrador and of Ungava. This country forms barren grounds similar to the toundras of Siberia and to the fjeld of Lapland. According to Low (Geo. Surv. Can., Vol. VIII) "the tree line skirts the southern shore of Ungava Bay and comes close to the mouth of George river, from which it turns south-southeast skirting the western foothills of the Atlantic coast range which is quite treeless, southward to the neighborhood of Hebron."

Immediately south begins the other zone which covers the rest of the province.

2—Zone of coniferous and deciduous trees

Drude, in his Botanical Geography, has divided this zone into three regions. The first constitutes the Northern forests, where the season of vegetation lasts from three to five months and where the land is covered with forests, muskegs, and prairies. The second region includes all the forested areas of the temperate zone which extends in Quebec to the south into New Brunswick and the United States. The third region, formed by the prairie lands of Western Canada and United States will not be considered here.

A.—NORTHERN FORESTS OR SUBARCTIC FORESTS

This group of forests extends from the Atlantic to the foot of the Rockies. In our province, it comprises all the forests of the Hudson Bay and Labrador basins, south of the Arctic glacial zone. Its area

is estimated here at 180,000,000 acres, but not more than one-sixth of it can be depended to contain merchantable forests.

The climate is rather severe. The length of the vegetation period does not exceed five months. The forests are poor in species and the trees reach smaller sizes than further south. The country is rather rolling, covered with fine lakes and numerous streams, but muskegs of all sizes are too numerous; moss appears everywhere, even in the woods, forming a deep carpet.

White and black spruces (*Picea canadensis* and *mariana*) form here very dense stands, bearing from seven to forty cords per acre; but, owing to the waste caused by the muskegs and water surface, the average volume of a forest tract is rather low, running from three to seven cords per acre. Jack pine (*P. divaricata*) finds itself in its habitat as it attains here fair dimensions, as high as 100 feet; this species is found on the well-drained elevations and on the rocky slopes. Tamarack (*Larix americana*) which was rather common in the swampy areas, with little black spruce, disappeared between 1885 and 1900, following the attacks of the larch sawfly (*Nematus Erichsonii*), but we now find that it begins to invade quite rapidly its former kingdom, and will soon form an important adjunct to our forest wealth. Balsam fir (*Abies balsamea*) diminishes here in importance, as it does not reach as far north as the two spruces and the tamarack; it appears to be on the verge of disappearing partly in many sections of the Province owing to the damages it has suffered, since 1910, from the attacks of the spruce budworm (*Tortrix piceaperda*). Aspen (*Populus tremula*) holds the lead among the hardwoods; it acquires, in this region, fairly good dimensions and its wood is of much better quality than in the south. Balm of Gilead (*Populus balsamifera*) occupies particularly wet locations; but its wood is not always sound, though it is used commonly with that of the preceding species. Paper birch (*Betula papyrifera*) is much appreciated as it forms here the main firewood, it is also used for spoolwood, flooring, etc. Arborvitæ (*Thuja occidentalis*), as well as green ash (*Fraxinus viridis*), are found occasionally along the streams, but in small patches. Among the shrubs and the fruit plants, we can mention mountain maple (*Acer spicatum*), mountain ash (*Pyrus sambucifolia*), service berry. (*Amelanchier canadensis*), choke cherry (*Prunus pennsylvanicum*) high cranberry (*Viburnum opulus*), gooseberries (*Ribes oxycanthoides* and *hudsonianum*), raspberry (*Rubus strigosus*), blueberry (*Vaccinium canadense*), cranberry (*Vaccinium vitis-idaea*), cloudberry (*Rubus chameamorus*), etc.

As a rule, the forest is rather uniform in composition, often one species will predominate over a large area with the result that the landscape is rather monotonous and often more or less sad. Forest fires have caused here extensive damages. Windstorms also cause great havoc, especially in the forests of the clay belt. Nevertheless, these immense forests form a substantial reserve, even if they are not all available at present.

B.—FORESTS OF THE TEMPERATE REGION

We will now consider the forests of the second region. According to Fernow (*Forestry Quarterly*, 1908) we may subdivide them into three great types: Laurentian, St. Lawrence, and Acadian (naming them from North to South).

1—*Laurentian forests*

This group of forests occupies all the Laurentian mountains as far North as the group of the Northern forests; its area is estimated at 75,000,000 acres. We find here the best forests of the Province, numerous and beautiful lakes also splendid rivers, well fitted for driving. Since a hundred years, lumbering has been carried throughout in more or less a conservative manner. The conifers here consist of spruce (white and black), white pine, (*Pinus strobus*,) red pine, (*Pinus resinosa*) and jack pine, arbor vitæ, tamarack; whereas the hardwoods are represented by maple, birch (yellow, paper and canoe), ash, elm, basswood, poplar, etc. The muskegs are less numerous, but they always present the typical spruce bog covered with a dense growth of black spruce trees. There is a great diversity in the forest stands. This region looks prosperous and attractive; it is frequented by tourists, fishermen, hunters, campers, etc.

Lumbering has often modified the original character of these forests, owing to the continuous culling of the conifers, as hardwoods can hardly be floated for a great distance. The successive removal of white pine and of spruce has often caused a deterioration in the value of the forest, as balsam and the hardwoods have acquired a greater importance with each passing of the operations. Fires have also largely contributed to diminish the value of these forests. It is estimated that only 75 per cent of this area is now capable of yielding merchantable timber.

2—Forests of the St. Lawrence plain

This group comprising most of the private woodlands, is found on both sides of the St. Lawrence river occupying the vast plain which covers the central part of the provinces of Ontario and Quebec. In the beginning of the colony, white and red pines formed here a very important part of the stands. The gradual cleaning of the land for settlement has confined the forest to the less valuable portions of the farm lands. The present forests are rather rich in hardwoods such as maple (*Acer saccharum*, *saccharinum* and *rubrum*), basswood (*Tilia Americana*), ash, (*Fraxinus americana*, *nigra* and *viridis*), birch, (*Betula lutea*, *papyfera*, *populifolia* and *lenta*), oak, (*Quercus rubra* and *macrocarpa*), beech (*Fagus atropumicea*), etc., mixed with the following conifers: pine (white and red), spruce, tamarack, hemlock (*Tsuga canadensis*), arbor vitæ, etc.

The rest of the flora is also very rich, as thousands of flowers are seen in the woods during the whole season of vegetation. In the autumn, the beautiful colors of the foliage add another note of charm to the landscape.

All these woodlots are more or less grouped, or scattered among the farms, forming a happy combination which renders this region very interesting.

These forests are of an enormous value to their owners as they provide them with firewood, lumber for their buildings and repairs, and also supply the local planing mill, sash and door factory, and sometimes a furniture factory. Maple groves furnish also their rich sap, which is converted into sugar and syrup.

3—Acadian forests

We could also term this group the Alleghany forests, as they are only found on the south shore of the St. Lawrence, in the mountainous sections known as the Notre-Dame and the Shickshocks Mountains; it extends from the Eastern townships to the end of Gaspé peninsula. This type includes also the forests of the Provinces of New Brunswick and Nova Scotia. Its area in Quebec is approximately 20,000,000 acres. In the upper basin of the St. John River, the composition of the forest is very similar to that in the States of Maine and New Hampshire. Red spruce (*Picea rubens*) predominates, forming, with balsam fir, as much as 60 per cent of the forest stands. White pine and red pine are

also met, but their proportion does not exceed 5 per cent; in the Gaspé section, these two species do not produce timber of any great value. Hemlock does not extend beyond east of Quebec, but arborvitæ is abundant, especially in the extensive cedar flats of the counties of Temiscouata, Rimouski, Matane, Bonaventure, and Gaspé; it is there that it acquires the largest dimensions and forms a very important part of the lumbering operations. The hardwoods are plentiful in the Eastern townships where they reach as good dimensions as in the St. Lawrence plain; east of Quebec, they maintain their importance as far as Rimouski; farther east, the conifers form a larger proportion of the forest. Jack pine is seldom met with and does not seem here of great interest.

This group of forests is bound to suffer more, than any other, from the advance of settlers, as it covers yet a fair proportion of arable lands, but we believe that about 70 per cent of it will eventually remain in forest. Excepting the Matane, the Cascapedia, and the St. Francis Rivers, the streams are not large; this drawback has compelled the lumbermen to limit their activity to the making of deals and boards, whereas, in the Laurentian forests, owing to the magnificent rivers and powerful waterfalls, the great development of the pulp and paper industry has taken place and will continue to increase rapidly.

IV.—LUMBER INDUSTRY

During the French régime, our lumber industry did not amount to much as there were practically no exportation of wood goods. The first raft of oak logs floated on the St. Lawrence river was made at Berthierville, in the year 1732, for the building of a sloop in Quebec. Sawmills were scarce, of a small size, and utilized waterpower. The continental blockade established by Napoléon, forced the British government to look elsewhere for its supply, and this was the beginning of our important lumber trade which has developed steadily and so rapidly. The transformation of the sawmill, caused by the introduction of the steam power in lieu of water power, enabled the mill to be located more favorably with reference to the main rivers and closer to markets and shipping points.

The conversion of logs into deals, boards and battens has always been one of the principal parts of our lumbering industry, but with the disappearance of the large trees of pine and spruce, due to successive and repeated cullings and to the increased price of logs, our lumber manufacturer does not find his future very bright. He has also to stand the keen competition of the Pacific Coast millman, who can draw from his virgin forests boards of large dimensions which

he can bring to the New York market, thanks to the Panama canal, for about the same freight price as our own merchant. The rapid growth of the pulp and paper industry has somewhat disturbed the position of the lumber dealer and we find that large companies are gradually abandoning that industry for the making of cellulose products.

As already stated before, the abundance of cheap and considerable hydropower has favored the expansion of the pulp and paper industry in this province, perhaps more so than anywhere else, as nearly 50% of the total production of Canada is made here. From 1909 to 1920, the consumption of the Canadian mills has jumped from 482,477 cords to 1,277,422 cords, but we must not forget that we are still exporting 1,650,000 cords to the United States.

The value of all forest products in Canada for 1921 is estimated at \$311,815,263, (Special Report of Dominion Bureau of Statistics), the share of the products of this province being about 30 per cent. Although a quantity of logs, measuring 250,000,000 feet, board measure, is shipped annually outside of the Province to be converted into boards and deals by the mills of New Brunswick and Ontario, we find that during several years Quebec ranked first for its lumber production.

There are, in Quebec, over 2,600 establishments in which wood is the main raw material, distributed as follows: 2,200 sawmills, 369 sash and door factories, 281 planing mills, 34 furniture and chair factories, 30 pulp and paper mills, 30 box and crate factories, 23 farming implement factories, 22 vehicle and carriage factories, 14 butter tub and box factories, 12 broom and brush factories, 10 boat and ship building factories, 8 casket and coffin factories, 8 flooring factories, besides sundry establishments manufacturing railroad cars, dairy implements, store fixtures, matches, elevators, barrels, bobbins and spools, cigar boxes, cork and cork goods, frames, charcoal, gun handles, clothes pins, stairways, wood fiber or excelsior, patterns, beds, sewing machines, musical instruments, pianos, organs, veneer, sporting goods, trunks and valises, etc.

It is needless to say that several firms will produce at the same time quite a number of the articles mentioned above.

With a few exceptions, all the large mills depend mostly upon the leased timber limits for their annual supply while the rest purchase their wood goods from private forest owners.

The following table gives the quantity of the various kinds of forest products cut in the province during the year 1920 on private lots and in forests under license:

SPECIES	Amount in F. B. M.	Price	Total value
a) SAW LOGS			
Spruce and balsam fir.....	1,406,841,178	\$32.20	\$45,440,970.05
White pine.....	208,833,850	42.23	8,819,043.48
Red pine.....	27,693,091	41.43	1,147,324.76
Jack pine.....	40,267,270	29.13	1,172,985.07
Hemlock.....	48,831,582	29.75	1,452,749.66
Cedar.....	48,837,637	29.96	1,463,175.60
Tamarack.....	1,084,534	36.00	39,043.22
Birch, (Black and Yellow)..	65,497,047	41.23	2,700,443.25
Maple.....	13,678,158	42.07	565,440.10
Basswood.....	13,504,850	45.76	617,576.79
Elm.....	7,880,200	44.50	350,669.79
Ash.....	7,579,229	39.62	300,288.03
White birch	5,540,940	38.29	212,162.60
Aspen.....	1,874,532	25.88	48,512.89
Poplar.....	1,270,759	29.33	37,271.36
Oak.....	519,644	49.00	25,462.55
Butternut.....	102,232	40.00	4,089.28
Cherry.....	76,608	40.00	3,064.32
Beech.....	1,951,239	40.45	78,927.62
Boom timber.....	3,388,489	32.00	108,431.65
Total.....	1,905,253,089		\$56,587,632.00
b) OTHER FOREST PRODUCTS			
Shingles (thousands).....	320,053,830	\$4.44	1,421,039.00
Ties, (pieces).....	890,792	.74	659,186.08
Pulpwood, (cords).....	729,373	13.53	9,868,416.69
Poles, (pieces).....	13,938	3.65	50,673.70
Posts, (pieces).....	164,208	.21	34,483.68
Laths, (thousands).....	103,062,890	6.13	631,775.51
Square timber, (C. F.).....	562,730	.35	196,955.50
Firewood, (cords).....	47,161	7.48	352,764.28
Spoolwood (cords).....	16,528	20.00	330,580.00
Boom timber, (F.B.M.).....	213,861	2.15	459,801.15
Knees, (pieces).....	50,100	.04	2,004.00
Large wood, (Lin. ft.).....	130,760	.13	16,998.80
Stavewood.....	819,228	.14	113,691.92
Hemlock bark, (cords).....	4,547	10.50	47,743.50
Total.....			\$14,186,113.81

The value of sawn lumber, estimated at \$56,587,632, in 1921, shows the importance of the lumber trade in the Province of Quebec. In 1920, the trees that were cut represented an amount of \$66,542,236 say \$9,954,604 more than in 1921. This decrease is due to a drop in prices. From \$38.17 per 1000 f.b.m. the average price dropped to \$29.70.

The Province of Quebec has not escaped the general depression which affected the world trade after 1920 and our industry is only recovering from the effects of this crisis. The prices for lumber jumped from \$19.73 per thousand f. b. m. in 1917 to \$38.17, then dropped to \$29.70 in 1921 and to \$21.00 in 1922. Now they are going up and the exportation trade, which was completely paralyzed in 1922, has started again very favorably.

In the course of the Session of 1922, Parliament passed an act of considerable importance for the exploitation of our forests. In fact, article 1597a, which we refer to, stipulates that, for the operations constituting an exception to the regulations in force, the limit holders must produce a working plan prepared according to the instructions of the Forest Service and sanctioned by the Executive Council. As we know, the majority of timber limits are now confined to the upper basins of rivers, on account of the progress of forest operations and of colonization. In those high and remote regions, the climate is much more severe than in the central St. Lawrence plain, therefore the trees are smaller and their growth is slower than in the lower regions where the climate is more favourable and the soil better. Consequently, the limit holders are now obliged to request special permission to cut out large areas, so as to enable them to obtain sufficient material to supply the requirements of their mills. This permission can now be granted only after the company has produced to the Department a working plan of its forests, that is, has furnished the Government with a statement showing the total amount of trees actually growing. This inventory is completed by growth studies, permitting to determine the volume of wood which the forest produces annually. This quantity, designated under the name of "possibility", is, consequently, that which can be allowed to be cut each year without decreasing the volume of the forest. However, as disastrous fires or insect invasions, like that of the spruce budworm, are liable to occur the possibility must be reduced by a certain percentage, in order to meet contingencies, and increase the forest capital, which is smaller than it should be.

V.—REFORESTATION

It was only recently that some efforts have been made in Canada to reclaim our waste lands; the first experiment being done at Oka, P. Q. in 1889, under the direction of Father Lefebvre, a Sulpician priest, who succeeded in reforesting some eighteen acres of shifting sands. This plantation consisted mainly of white pine and spruce wild stock, but it has grown so well that many of the trees have now a diameter of 9 to 15 inches and a height of some 45 to 80 feet. These dimensions would be greater had any thinnings been done at the right periods. Several persons have devoted their attention to the introduction of foreign trees, and we have to-day at Le Platon, the Seignorial residence of the Joly family, a beautiful grove of black walnut, besides plantations of different forest trees.

In 1908, a provincial nursery of forest trees was established at Berthierville, with the object of raising not only indigenous trees for the reforestation of waste lands and plantations in the forested areas, in view of increasing their productivity, but also of foreign forest species, and a systematic study is being conducted there of all the trees growing under this latitude. At the present time, the nursery has a stock of over six million plants. Already, it has shipped more than 4,500,000 trees. At Lachute, a tract of 300 acres of shifting sands has been reclaimed partly by planting and partly by the sowing of beach-grass; near Berthier Junction, the same work is in progress. Planting stock is given to different colleges with the view to educating the young generation on this important question. The demands of plants from private owners are now very large. The limit holders are also beginning to plant, and we are pleased to mention the good work done by the Laurentide Company in this connection to whom we have sold over $1\frac{1}{4}$ million plants for their work.

We are led to believe that this movement will increase very much in magnitude, and it is the intention of the Government to keep pace with the demand.

We must also mention that the students of the Quebec Forest School go to Berthierville, every spring, in order to assist in the shipping of the material and in all the work of seeding, transplanting, etc.

VI.—FOREST SUPERVISION AND FOREST SERVICE

From the beginning of Confederation until 1873, the supervision of cutting timber on Crown Lands was left to some local agents under the direction of two superior officers. License-holders were bound, then as now, to send in detailed reports of their lumbering operations, but the Crown could only effectively check the quantities of square timber by its cullers and, consequently, only a portion of the timber reported by the license-holders.

In 1873, a body of forest-rangers was established and placed under the orders of the agents of the Department of Lands & Forests. The duties of these forest-rangers (numbering 28 at first and 78 later, in 1889) who were acting under the direction of special officers called superintendents, consisted in finding out offences against the forest laws and regulations by limit-holders and settlers and in ascertaining the farming value of Crown Lands most advantageously situated for settlement. The statistics show very clearly that, with the addition to the supervising staff, the amounts collected for penalties and stumpage dues have gradually increased. After 1900, it was found necessary to reorganize the Forest Service, owing to the numerous offences committed against the laws by speculators.

In 1905, the Provincial Government sent two students to the Yale Forestry School; then, it established a forestry School in Quebec which opened its doors in September 1910, and where forestry engineers are trained for the supervision of lumbering operations and the management of the forests.

The Forest Service of the Province of Quebec, as at present constituted, has charge of the exploration of the unsurveyed territory of the Province of Quebec, the protection against fires and other enemies, the classification of soils, the supervision of lumbering operations on Crown Lands, reforestation and other technical work of the Department in connection with forests.

The present staff consists of the chief forestry engineer, his assistant, 28 forest engineers, 84 forest-rangers and expert scalers besides the personnel affected to protect the forest against fires. In addition, the students of the forestry school are employed, in technical forestry work, during the summer season.

A rangers' School will be started at Berthierville next September (1923), to recruit the personnel needed for forest and fire ranging and also for the scaling of the forest products. An annual subsidy of \$20,000.00 has been given to this institution by the Government.

VII.—RESEARCH WORK

In order to gather the essential data for the preparation of working plans, forest researches are absolutely necessary. These studies should be carried out not only in the forest, but also in the nurseries and at special experimental stations. They should cover not only facts governing the reproduction of trees by natural or artificial methods, but also involve the influence of thinnings, the draining of peat lands, etc.

The Government realizing the importance of these forest researches has decided to establish, within the Forest Service, a bureau of research which will have an annual appropriation of \$25,000.

The first questions to be studied will be the following:

10.—Forest tree seeds, influence of the origin, of the altitude, of the age of the mother seed trees, of their health, of the time of the collection. Influence of the mode of conservation. Data on the fructification of forest trees, on the dissemination of their seeds. Study of germination.

20.—Nursery work, methods of sowing, use of fertilizers, pruning, transplanting, growth of seedlings, and of transplants, storing of plants, etc.

30.—Natural regeneration, stimulation of the growth by draining or irrigating, influence of the various methods of thinnings, of improvement cuttings.

40.—Studies of the growth in volume of forest trees and stands.

50.—Diseases and injuries of trees.

60.—Acclimatization of foreign species.

70.—Studies of forest soils and classification of lands.

80.—Protection of forests against fires, insects and fungi.

VIII.—FOREST FIRES

The system of forest fire protection in the province is now provided for by:

(a) The Forest Protective Associations, of which there are four, viz:—

The Ottawa River Forest Protective Association,
The St. Maurice Forest Protective Association,
The Laurentian Forest Protective Association,

The Southern St. Lawrence Forest Protective Association, East and West parts.

(b) The Limit-Holders who are not affiliated to the Associations.

(c) The Provincial Government's special organizations in the Abitibi, Temiscamingue, Lake St. John and Saguenay Districts and on the North Shore of the St. Lawrence, each under its own inspector.

(d) The Board of Railway Commissioners.

(e) The Public Utilities Commission.

The whole coming under the supervision of the Provincial Government.

The Associations are subsidized by the Provincial Government, to whom they make monthly reports of their activities and submit all claims for forest fire fighting. One half of the amount of such claims, if approved, being paid by the Government, the other half being paid by the Associations.

The limit-holders who are not affiliated to the Associations, also file all claims for fire fighting on licensed lands, to the Government, who pays one half of the claim, if it is approved, the limit-holder paying the other half.

All fire-rangers are chosen and paid by those who employ them, but they are appointed by the Government, who supplies them with a book of instructions and a copy of the laws of the Province of Quebec, regarding the protection of forests from fire. The Government also furnishes each ranger with the necessary forms of reports to be sent in monthly and a certain number of fire warning posters to be tacked up by him along the portages, at camp sites and in other prominent places.

The rangers employed by the Associations, report to their respective Associations. All other rangers report directly to the Government.

The fire organization of the Province applies to Government lands only. The owners of free-hold lands are expected to protect their holdings at their own expense, although in certain cases where fire occurs on privately owned lands, if such fire appear to be a menace to the Crown Lands, in the vicinity, it is fought by those entrusted with the patrolling and protection of the Government Lands of the locality and all the expenses are paid by the Department of Lands & Forests.

The Railway Board, in conjunction with the Provincial Government and the Forest Protective Associations, have speeder patrols

along railways, where they run through forest lands. Where the lands are under license, the railway, the Government and the Association concerned, each pays one third of the cost. Where the lands are not under license, the Government pays two thirds and the Railway pays one third of the cost.

The Public Utilities Commission, on the railroads which come under its jurisdiction, co-operate along similar lines to the Railway Board.

The Provincial Government, in connection with the Aerial Board of Ottawa, have been experimenting during the past three seasons with hydroplanes with the object of determining to what extent this method can be used for forest protection, but owing to its high cost and certain technical points to be overcome, aviation at the present time can only be considered as an auxiliary to the ground patrol, though possibly in years to come it may be of more general use for fire protection.

During the present year (1923) 115 Inspectors, 1138 Rangers, 741 Assistant Fire Rangers, a total of 1994 men are employed. This is more than four times the number of men who were in the field five years ago.

The Department of Lands & Forests has entered into an agreement with the Geodetic Survey of Canada, by which the Provincial Government undertakes to pay one half of the cost of construction of all towers erected by the Geodetic Survey, which are suitably situated to be used for forest fire lookout stations, the intention of the Government being, to allow the interested limit holders the use of these towers free of charge and it is hoped that these and other lookout towers will be connected before long with the telephone system of the district in which they are situated.

The Forest Protective Associations and some of the unaffiliated limit-holders have also erected such towers.

During the present season 70,000 fibre and cotton forest fire posters were distributed throughout the Province, to be posted by the fire rangers in prominent places.

52,000 calendars, bearing forestry scenes and texts, were also distributed throughout the Province.

375,000 postal cards, bearing texts on forest protection were also sent to the schools to be distributed among the children.

APPENDIX

No. 1—Statistical yearbook of Quebec, 1915, p. 131.

No. 2—Vol. V. pp. 9 and 95 of Dominion of Canada for 1911.

No. 3—A certain premium has been placed on the private forests by the fact that no restriction is exercised on the operations nor on the exportation of timber in the round. This has lead numerous persons and companies of Canada and of the United States to purchase them outright or the right to cut on them. Of course, it is the pulpwood which is seeked and should the Federal Government put in force the law passed at the last Session to prevent the exportation of pulpwood, it will lessen this premium on the private forests.

No. 4—The following complete inventory of 45 acres of a private forest, made by the students of the Forestry School, in the vicinity of the city of Quebec, is an instance of this variety of species:

	<i>Feet, b. m.</i>
190 white pine trees, containing	41,854
43 red pine trees	6,740
936 spruce trees	54,163
967 hemlock trees	40,547
100 cedar trees	1,637
3,033 balsam fir trees.....	57,084
457 red oak trees	46,068
31 yellow birch trees	1,065
197 ash trees	6,360
10 elm trees	1,895
27 butternut trees	1,549
1,358 sugar, soft and silver maple trees	70,120
232 American beech trees	3,100
829 white birch trees	7,000
50 ironwood trees	1,204
68 cottonwood trees	1,290
Total.....	341,675

or about 7,000 feet board measure per acre. It should, however, be observed that this stand is much richer than is usually found in most of the other private forests. This tract has, in fact, been properly managed while, in the others, there are no rules regarding cutting, beyond the monetary exigencies of the owner or the sporadic needs of the market.

A detailed inventory of all the trees measuring more than 4 inches D. B. H. on a woodlot of 20 acres, near Berthierville, has given the following result:—

Maples (<i>Acer saccharum</i> , etc.).....	3017 trees
White pine (<i>Pinus strobus</i>).....	916 “
Balsam fir (<i>Abies balsamea</i>).....	162 “
Iron wood (<i>Ostrya Virginiana</i>).....	148 “
Basswood (<i>Tilia americana</i>).....	137 “
Beech (<i>Fagus atropumicea</i>).....	118 “
Hemlock (<i>Tsuga canadensis</i>).....	89 “
Birches (<i>Betula lutea</i> , etc.....	80 “
Spruce (<i>Picea canadensis</i>).....	29 “
Poplar (<i>Populus canadensis</i> and <i>tremuloides</i>)...	28 “
Ash (<i>Fraxinus viridis</i>).....	7 “
Sundries.....	2 “

4,723 trees

The volume of this tract is estimated at 32,000 cubic feet.

No. 5.—The location ticket reads as follows:—

PUBLIC LANDS SUITABLE FOR CULTIVATION

.....192

M.....

IS AUTHORIZED TO TAKE POSSESSION OF LOT No..... OF THE RANGE.....

IN THE TOWNSHIP OF.....

THIS GRANT is made on the following conditions, namely:

1. The settler must clear, each year, three acres and not more than five acres on each hundred acres, unless previously authorized by the Minister to clear more;
2. He must cultivate each year the land which he has thus cleared;
3. Within eighteen months from the date of the sale, he must build a habitable house of at least 16 feet by 20, and must personally and without interruption occupy it from that time until the issue of the letters-patent;

4. At the expiration of six years, he must possess on the lot a barn of at least 20 feet by 25 and a stable at least 15 by 20, but the two may form only one building;

5. The letters-patent will not be issued until an extent of land, representing 30% of superficies of the lot, will have been cleared in a single block and brought to a state of good cultivation for a profitable crop. Five acres at least of the part under cultivation must be ploughable.

6. No wood must be cut before the issue of the letters-patent only for firewood, buildings and fences, and all wood cut contrary to this condition will be considered as having been cut without permit on public lands;

7. All the wood which a settler is permitted to cut on his lot and which he intends for commercial purposes must be manufactured in Canada, and all the provisions of Article 13 of the Wood and Forests Regulations now in force will apply to it.

8. This grant is also subject to licenses for cutting timber at present in force and the purchaser will be obliged to conform himself to the laws and regulations concerning public lands, woods and forests, mines and fisheries.

.....
Agent.

NOTICE

"2090u. No lot sold or otherwise granted for colonization purposes after the 19th of March, 1921, may, for six years from and after the date of the location ticket, be sold by the holder of the location ticket, nor otherwise alienated or transmitted, in whole or in part, except by donation in a marriage contract or by will, in favour of a relative within the order of succession, or by abintestate succession, or by will in favour of a consort, and in such case the donee, the legatee or heir shall be subject to the same prohibition as the original holder.

Every alienation or transmission of land held under location ticket, by donation in a marriage contract or by will in favour of a consort, prior to the 19th of March, 1921, shall be valid if it be not null or voidable for some other reason.

The Minister may, nevertheless, allow any other transfer or alienation within six years of the date of the location ticket, upon proof, to his satisfaction, that such transfer or alienation is in the best interest of colonization. The new holder shall be subject to the same prohibition as the original holder. Every transfer or alienation so authorized since the 1st of July, 1909, shall be valid.

Every transfer made in contravention of this article shall be null ab initio as between the parties, and shall entail the cancellation of the sale or grant of the lot.

The prohibition in this article shall not apply from and after the date of the issue of the letters-patent, when they are issued before the expiration of the six years.

"2090ee. No timber dues shall be exacted on any timber cut by settlers on lots regularly acquired by location ticket from the Crown, provided such timber be cut in good faith, upon that part which the settler is obliged to clear to fulfil his obligations.

"2090ff. For five years after the issue of the letters-patent, the holder of the license to cut timber upon the uncleared part of any lot sold for colonization purposes, must pay double timber dues to the Crown.

This provision shall be inserted in the letters-patent.

"2090gg. For twenty years after the issue of the letters-patent, an area of fifteen per cent of each lot conveyed by the Crown for colonization purposes, must be kept wooded, for the domestic use of the owner or possessor.

In case of contravention, the latter must pay to the Crown double timber dues.

This provision shall be inserted in the letters-patent.

"2090hh. If the Minister be satisfied that any purchaser, grantee, lessee or locatee of any public land or any assignee claiming under or through him, has been guilty of any fraud or imposition, or has violated or neglected to comply with any of the conditions of the sale, grant, location, lease or occupation license, or if the sale, grant, location, lease or occupation license have been or be made or issued by mistake, or contrary to the law or to the regulations, he may cancel such sale, grant, location, lease or license, and resume the land therein mentioned, and dispose of it as if no sale, grant, location, lease or license thereof had ever been made.

The provisions of this article have applied and shall continue to apply to every such sale, grant, location, lease or license made prior to the act 32 Victoria, chapter 11, section 20.

No. 6—Below will be found a table giving the classification in 1913 of timber limits in the Province of Quebec, according to their extent.

CLASSIFICATION OF LIMITS ACCORDING TO AREA IN 1913

Area of limits	Number of license holders	Total area in square miles	Average area per holder in square miles
0 to 50 square miles	94	1,790	19
51 to 100 square miles.....	33	2,265	68
101 to 500 square miles.....	73	19,798	271
501 to 1,000 square miles. ...	13	9,853	578
Over 1,000 square miles.....	18	35,102	1,950
Totals.....	231	68,798	3,066

No. 7—*Regulations of forest township reserves:*

1—No one is allowed in the reserves without a written permit from the warden.

2—Permits to cut timber may be given to any householder within a radius of 20 miles for a certain quantity of timber not exceeding 10,000 feet, board measure, or 20 cords of fire wood, or 300 ties.

3—The permits are subject to existing regulations of the Department, consistent with the present ones.

4—Permits must be applied for by registered letter, addressed to the warden of the reserve, between September 1st and December 1st.

5—The permit holder must cut only the trees marked or indicated to him by the forest agent. He must, within a delay of two years, remove all the timber mentioned in the permit; after such delay the Minister of Lands and Forests may dispose of all the timber not removed. All the timber cut must be piled so as to be measured, in the forest, by the forest guardian, whose measurement is binding. One-half of the stumpage dues payable for the timber requested must be paid cash when the permit is issued, and the balance before the timber is removed. Stumpage dues will also be levied on all timber wasted such as stumps over 18 inches high, tops larger than 5 inches in diameter at the thicker end, skids not carted away, trees marked that have not been logged, etc. All remnants of the cutting must be lopped, so that the branches and other debris may lay flat on the ground.

6—All timber cut contrary to these regulations will be considered as cut illegally and dealt with accordingly; the permit may be cancelled for any infraction of the regulations.

7—The permit cannot be transferred.

LIST
of the
PRINCIPAL TREES
and
SHRUBS
of the
Province of Quebec

LIST of the principal trees and shrubs of the Province of Quebec.

BOTANICAL NAMES	FRENCH NAMES	ENGLISH NAMES
<i>Abies balsamea</i> , Miller.....	Sapin baumier.....	Balsam Fir.
<i>P. balsamea</i> , Linn.....	Sapin blanc.....	Fir ou Balsam.
<i>A. balsamifera</i> , Michx.....	Sapin rouge.....	Canadian Fir.
<i>Acer negundo</i> , Linn.....	Erable négundo.....	Boxelder.
<i>Negundo aceroides</i> , Moench	Plaine à Giguère.....	Manitoba Maple.
<i>N. fraxinifolium</i> , Nutt.....	Erable à feuilles de frêne.	Ash-leaved Maple.
	Aune-buis.....	
<i>Acer nigrum</i> , Michaux fils....	Erable noir.....	Black Maple.
<i>A. saccharum</i> , var. <i>nigrum</i> .	Erable à sucre.....	Hard Maple.
<i>Acer pennsylvanicum</i> , Linn	Erable jaspé.....	Striped Maple.
<i>A. striatum</i> , Du Roi.....	Bois barré.....	Moosewood.
	Erable de Pennsylvanie.	
	Bois noir.....	
<i>Acer rubrum</i> , Linn.....	Erable rouge.....	Red Maple.
<i>A. coccineum</i> Michx f.....	Plaine rouge.....	Soft Maple.
	Erable tendre.....	Scarlet Maple.
<i>Acer saccharum</i> , Marsh.....	Erable dur.....	Sugar Maple.
<i>A. saccharinum</i> , Wang.....	Erable à sucre.....	Hard Maple.
<i>A. barbatum</i> , Michx.....	Erable piqué.....	Rock Maple.
	Erable moiré.....	Bird's-eyes Maple.
	Erable ondé.....	Curly Maple.
<i>Acer saccharinum</i> , Linn.....	Erable blanc.....	Silver Maple.
<i>A. dasycarpum</i> , Ehrh.....	Plaine blanche.....	White Maple.
<i>A. eriocarpum</i> , Michx.....	Erable à fruits cotonneux	Broad-fruited Map
<i>Acer spicatum</i> , Lam.....	Erable bâtard.....	Mountain Maple.
<i>A. montanum</i> , Aiton.....	Plaine bleue.....	Dwarf Maple.
	Erable à épis.....	
	Plaine bâtarde.....	
<i>Aesculus hippocastanum</i> , Linn	Marronnier d'Inde.....	Horse Chestnut.
<i>Alnus incana</i> , Willd.....	Aune commun.....	Common Alder.
<i>A. glauca</i> , Michx.....	Aune blanc.....	
<i>Alnus viridis</i> , D. C.....	Aune vert.....	Green Alder.
<i>Amelanchier canadensis</i> , T.G.	Amélanchier du Canada..	Service Berry.
<i>Mespilus Can.</i> Michx.....	Petites poires.....	
<i>Betula alba</i> , Linn.....	Bouleau blanc d'Europe...	European Birch.
<i>B. verrucosa</i> , Ehrh.....	Bouleau verruqueux....	Europe White Birch
<i>Betula lenta</i> , Linn.....	Bouleau merisier.....	Sweet Birch.
<i>B. nigra</i> , Sommers.....	Merisier rouge.....	Cherry Birch.
<i>B. excelsa</i> , Aiton.....	Merisier odorant.....	Black Birch.
	Bouleau acajou.....	
	Bouleau à sucre.....	

LIST of the principal trees and shrubs of the Province of Quebec.—
(Continued).

BOTANICAL NAMES	FRENCH NAMES	ENGLISH NAMES
<i>Betula lutea</i> , Michx..... <i>B. excelsa</i> , Aiton.....	Merisier..... Bouleau jaune..... Merisier jaune..... Merisier onde..... Merisier rouge.....	Yellow Birch. Tall Birch. Curly Birch.
<i>Betula nana</i> , Linn.....	Bouleau nain.....	Dwarf Birch.
<i>Betula nigra</i> , Linn.....	Bouleau noir..... B. à balai.....	River Birch. Red Birch.
<i>Betula papyrifera</i> , Marsh....	Bouleau blanc..... B. à papier..... B. à canot.....	Paper Birch. White Birch. Canoe Birch.
<i>Betula populifolia</i> Murch....	Bouleau gris..... Bouleau rouge..... B. à feuilles de peuplier.	Grey Birch. White Birch.
<i>Betula pumila</i> , Linn.....	Bouleau arbrisseau.....	Low Birch.
<i>Carpinus Carolina</i> , Walt....	Charme d'Amérique.....	Blue Beech.
<i>Celtis occidentalis</i> , Linn....	Micocouiller occidental.... Orme bâtard.....	Hackberry. Nettletree.
<i>Cornus alternifolia</i> , Linn....	Cornouiller bleu..... C. à feuilles alternes.....	Blue Dogwood.
<i>Cornus Florida</i> , Linn.....	Cornouiller de la Floride... Bois de fêche.....	Flowering Dogwood.
<i>Cornus stolonifera</i> , Michx....	Cornouiller stolonifère.... Harts rouges.....	Red Dogwood. Kinnikinnik.
<i>Corylus Americana</i> , Walt....	Noisetier..... Avelinier..... Coudrier.....	Hazelnut.
<i>Corylus rostrata</i> , Ait..... <i>Corylus avellana</i> , Holmes..	Coudrier..... Noisetier coudrier..... Coudrier à involucre en bec.....	Beaked Hazelnut.
<i>Crateagus coccinea</i> , Linn....	Aubépine écarlate..... Pomettier rouge..... Senellier rouge.....	Scarlet Haw. Scarlet Thorn.
<i>Crateagus crux-galli</i> , Linn...	Aubépine ergot-de-coq....	Cockspur Hawthorn.
<i>Crateagus oxyacantha</i> , Linn..	Aubépine blanche..... A. épineuse..... Bois de mai..... A. commune.....	English Hawthorn.

LIST of the principal trees and shrubs of the Province of Quebec.—
(Continued).

BOTANICAL NAMES	FRENCH NAMES	ENGLISH NAMES
<i>Crateagus tomentosa</i> , Linn...	Aubépine noire..... Pommétier jaune.....	Black Thorn. Pear Haw.
<i>Fagus atropumicea</i> , Marsh...	Hêtre.....	Neech.
<i>F. ferruginea</i> , Aiton.....	Hêtre rouge.....	American Beech.
<i>Fraxinus Americana</i> , Linn...	Frêne blanc..... Franc frêne.....	White Ash.
<i>Fraxinus nigra</i> , Marsh.....	Frêne noir.....	Black Ash.
<i>F. sambucifolia</i> , Lamb.....	<i>F. à feuilles de sureau</i> ...	Swamp Ash.
<i>Fraxinus Pennsylvanica</i> , Mar.	Frêne rouge.....	Red Ash.
<i>F. pubescens</i> , Lamb.....	<i>F. pubescent</i> ..... <i>F. de savanne</i>	River Ash.
<i>Fraxinus viridis</i> , Michx.....	Frêne vert.....	Green Ash.
<i>F. lanceolata</i> Borkh.....		
<i>Hamamelis Virginiana</i> , Linn.	Hamamélide de Virginie ..	Witch Hazel.
<i>Hicoria alba</i> , Linn.....	<i>Carya tomenteux</i>	Mockernut Hickory.
<i>Carya tomentosa</i> , Nutt....	Noyer dur..... N. à noix douces..... N. blanc.....	Black Hickory.
<i>Hicoria glabra</i> , Mill.....	<i>Carya glabre</i>	Pignut Hickory.
<i>Carya porcinea</i> , Nutt.....	Noyer à noix de cochon. <i>Carya des pourceaux</i>	Brown Hickory.
<i>Hicoria minima</i> , Marsh.....	<i>Carya amer</i>	Bitternut Hickory.
<i>Carya amara</i> , Nutt.....	Noyer dur.....	Swamp Hickory.
<i>Hicoria ovata</i> , Mill.....	<i>Carya blanc</i>	Shagbark Hickory.
<i>Carya alba</i> , Nutt.....	Noyer écailleux..... Noyer blanc d'Amérique.	Shellbark Hickory
<i>Ilex Canadensis</i> , Mich.....	Houx canadien.....	Mountain Holly.
<i>Nemopanthus Can. D. C.</i> ...	Apalanche..... Némopanthé du Canada.	
<i>Juglans cinerea</i> , Linn.....	Noyer tendre.....	Butternutt.
<i>J. cathartica</i> , Michx.....	Noyer gris..... Arbre à noix longues.... Noyer cendré.....	White Walnut.
<i>Juglans nigra</i> , Linn.....	Génévrier commun.....	Dwarf Juniper.
<i>Juniperus Virginiana</i> , Linn	Génévrier rouge..... Cèdre rouge.....	Red Juniper. Red Cedar.

LIST of the principal trees and shrubs of the Province of Quebec.—
(Continued).

BOTANICAL NAMES	FRENCH NAMES	ENGLISH NAMES
<i>Larix laricina</i> , Du Roi.....	Tamarack.....	Tamarack.
<i>L. Americana</i> , Michx.....	Mélèze d'Amérique.....	Black Larch.
<i>Abies pendula</i> , Poiré.....	Epinette rouge.....	Hackmatack.
<i>Myrica cerifera</i> , Linn.....	Myrique cirier.....	Wax Myrtle.
	Arbre à cire.....	
<i>Ostrya Virgiana</i> , Willd.....	Ostryer de Virginie.....	Ironwood.
	Bois dur.....	Hornbeam.
	Bois de fer.....	
<i>Picea brevifolia</i> , Peck.....	Epinette de savanne.....	Swamp Spruce.
	Petite épinette noire.....	
<i>Picea Canadensis</i> , Mill.....	Epinette blanche.....	White Spruce.
<i>Picea alba</i> , Link.....	Epinette grise.....	Single Spruce.
<i>Abies alba</i> , Poiré.....	Sapin blanc.....	Skunk Spruce.
	Sapinette blanche (en France).....	
	Epinette à bière.....	
<i>Picea mariana</i> , Mill.....	Epinette noire.....	Black Spruce.
<i>P. nigra</i> , Link.....	Epinette jaune.....	Red Spruce.
	Epinette bâtarde.....	Doble Spruce.
	Sapinette noire (en France).....	
	Sapin noir.....	
	Epinette rouge.....	
<i>Picea rubens</i> , Link.....	Epinette rouge.....	Red Spruce.
<i>Pinus divaricata</i> , du Mont de Cours.....	Pin gris.....	Jack Pine.
<i>P. Banksiana</i> , Lamb.....	Pin de Banks.....	Scrub Pine.
<i>P. rupestris</i> , Michx.....	Pin chétif.....	Grey Pine.
	Cyprés.....	Banksian Pine.
	Pin des rochers.....	
<i>Pinus resinosa</i> , Ait.....	Pin rouge.....	Red Pine.
<i>P. rubra</i> , Michx.....	Pin résineux.....	Norway Pine.
	Pin de Norvège.....	Canadian Red P.
<i>Pinus strobus</i> , Linn.....	Pin blanc.....	White Pine.
	Pin jaune.....	Yellow Pine.
	Pin potiron.....	Sapling Pine.
	Pin Weymouth.....	Quebec Pine
	Pin baliveau.....	(England).
	Pin du lord.....	Pumpkin Pine.

LIST of the principal trees and shrubs of the Province of Quebec.—
(Continued).

BOTANICAL NAMES	FRENCH NAMES	ENGLISH NAMES
<i>Platanus occidentalis</i> , Linn...	Platane (d'Occident)..... Sycamore.....	Sycamore. Buttonwood.
<i>Populus balsamifera</i> , Linn....	Peuplier baumier..... Tacamahac (Indien)....	Balm of Gilead. Poplar Balsam.
<i>Populus alba</i> , Linn.....	Peuplier blanc..... Ypréau.....	White Poplar. Abele.
<i>Populus Canadensis</i> , Michx f. <i>P. deltoides</i> , Maesh..... <i>P. monolifera</i> , Ait.....	Liard..... Peuplier du Canada (Eu- rope). <i>P. monolifère</i> . Cotonnier.	Cottonwood.
<i>Populus grandidentata</i> , Mich	Grand tremble..... Peuplier à grandes dents.	Largetoothed Aspen. Poplar.
<i>Populus nigra</i> , Linn. var. <i>pyramidis</i> ..... <i>P. dilatata</i> , Ait.....	Peuplier d'Italie..... Peuplier noir pyramidal .	Black Poplar. Lombardy Poplar.
<i>Populus tremuloides</i> , Michx.	Tremble..... Peuplier faux-tremble... Peuplier d'Athènes.....	Aspen. Quaking Aspen. Poplar.
<i>Prunus America</i> , Marsh.....	Prunier (d'Amérique).....	Wild Plum.
<i>Prunus nigra</i> , Ait.....	Prunier canadien.....	Canada Plum.
<i>Prunus Pennsylvanica</i> , Linn.	Petit merisier.....	Wild Red Cherry. Bird's Cherry.
<i>Prunus serotina</i> , Ehrh..... <i>Cerasus Virginiana</i> , Michx. <i>Padus serotina</i> , Agardh....	Cerisier tardif..... Cerisier noir..... Cerisier d'automne.....	Black Cherry. WildBlack Cherry Rum Cherry.
<i>Prunus Virginiana</i> , Linn. .... <i>Padus oblonga</i> , Moench....	Cerisier à grappes..... C. de Virginie..... Cerisier sauvage.	Choke Cherry. Wild Cherry.
<i>Pyrus Americana</i> , D. C..... <i>Sorbus Americana</i> , D. C. . .	Cormier. .... Sorbier d'Amérique. Masquabina (Indien).	Mountain Ash.
<i>Pyrus arbutifolia</i> , Linn..... <i>Mespilus arbutifolia</i> , Michx	Poirier sauvage..... P. à feuilles d'arbousier.	Chokeberry.
<i>Pyrus malus</i> , Linn.....	Pommier sauvage.....	Wild Apple. Crab Appletree.
<i>Quercus alba</i> , Linn.....	Chêne blanc.....	White Oak.

LIST of the principal trees and shrubs of the Province of Quebec.—
(Continued).

BOTANICAL NAMES	FRENCH NAMES	ENGLISH NAMES
<i>Quereus macrocarpa</i> , Michx...	Chêne à gros glands..... Chêne blanc frisé.....	Burr Oak. Mossycup Oak.
<i>Quereus platanoides</i> ..... <i>Q. bicolor</i> , Wild.....	Chêne bicolore..... Chêne bleu.....	Swamp White Oak. Blue Oak.
<i>Quereus rubra</i> , Linn.....	Chêne rouge.....	Red Oak.
<i>Rhus copallina</i> , Linn.....	Sumac copal.....	Dwarf Sumach.
<i>Rhus glabra</i> , Linn.....	Sumac glabre.....	Smooth Sumach.
<i>Rhus hirta</i> , Sudw..... <i>R. typhina</i> , Linn.....	Sumac amaranthe..... Vinaigrier. Sumac de Virginie.	Staghorn Sumach.
<i>Robinia pseudacacia</i> , Linn.....	Robinier..... Robinier faux-acacia....	Locust. Yellow Locust.
<i>Salix alba</i> , Linn..... <i>S. fragilis</i> Winn.....	Saule blanc..... Saule argenté.....	White Willow. Silver Willow.
<i>Salix Babylonica</i> , Linn.....	Saule pleureur.....	Weeping Willow.
<i>Salix bebbiana</i> , Sarg.....	Saule à épéron.....	Bebb Willow.
<i>Salix discolor</i> , Muhl.....	Saule discolore.....	Glaucous Willow.
<i>Salix fluviatilis</i> , Nutt.....	Saule à larges feuilles.....	Longleaved Willow.
<i>Salix nigra</i> , Marsh.....	Saule noir.....	Black Willow.
<i>Sambucus Canadensis</i> , Linn .	Sureau vlanc.....	Elder.
<i>Taxus baccata</i> , Linn.....	Buis..... If du Canada.	Yew. Ground Hemlock.
<i>Thuja occidentalis</i> , Linn.....	Thuja..... Cèdre blanc.....	Arborvitae. White Cedar.
<i>Tilia Americana</i> , Linn.....	Bois blanc..... Tilleul d'Amérique.....	Basswood. Linden.
<i>Tsuga Canadensis</i> , Carr..... <i>Abies Canadensis</i> , Michx ..	Pruche..... Sapin du Canada..... Pérusse (France). Tsuga du Canada.	Hemlock. Hemlock Spruce.
<i>Ulmus Americana</i> , Linn.....	Orme blanc..... Orme d'Amérique.....	White Elm. Rock, Water Elm.
<i>Ulmus pubescens</i> , Walt..... <i>U. fulva</i> , Michx.....	Orme rouge..... Orme gras..... Orme fauve.....	Slippery Elm. Red Elm. Budded Elm.

LIST of the principal trees and shrubs of the Province of Quebec.—
(Continued).

BOTANICAL NAMES	FRENCH NAMES	ENGLISH NAMES
<i>Ulmus racemosa</i> , Thomas....	Orme liège.....	Cork Elm.
<i>Viburnum lentago</i> , Linn.....	Viorne..... Viorne à manchettes.....	Sheepberry. Sweet Viburnum.
<i>Viburnum lantanoides</i> , Michx	Bois d'original..... Viorne à feuilles de lan- tane.	Hobble Bush.
<i>Viburnum opulus</i> , Linn.....	Pimbina..... Viorne obier..... Sureau d'eau.	High Cranberry. Guelder Rose.
<i>Xanthoxylum Americanum</i> . Michx.....	Clavaliér d'Amérique..... Frêne épineux. Frêne piquant.	Prickly Ash.

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