Timber policies of Canada

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OF CANADA

by
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CHAPTER I

INTRODUCTION

The information in this paper has been gathered and presented to satisfy a dual purpose. Primarily, it serves as a condensed presentation of Canada's forest policies, intended for those persons who are professionally interested in that phase of forestry, and the part it plays in the forest economy of Canada. Secondly, it presents some of the more prevalent criticisms evolving from these policies as they persist in the face of a dynamic forest economy.

Only those events and situations which apply directly to timber management policies have been included in this paper. Since fire protection is tied in very closely with timber policies, it has also been included to lend further understanding.

Each province is discussed separately since most of the Crown timber (government-owned timber) is now under provincial administration and no two provinces have identical timber policies or situations. In discussing each province, some effort has been directed towards including a brief history of its forest economy development, so that some insight might be provided for interpreting the significance of the current policies and problems. A thorough knowledge of each province's economic and cultural environment would also be desirable, but the nature of this paper prohibits such
inclusions.

About ninety per cent of Canada's forest lands are owned by the Crown, in the right of the public, the remainder being held by private individuals and corporations. The general policy of the provincial governments has been to dispose of their timber by means of leases, licences, and permits to cut, rather than by permanent sale of timber land. This system of disposal has its origin in early legislation of Eastern Canada, and corresponds very closely with the legislation concerning land ownership and alienation from the Crown.

Throughout the forest history of Canada, several "Royal Commissions" have been appointed by federal and provincial administrations, to study the current forest situations within certain provinces and to suggest recommendations for improvement. These Commissions have played large roles in shaping the present day policies and keeping them in step with the dynamic forest concepts of our times.

The importance of forestry to the Canadian economy might well be deduced from the following statistics:
1. Forest industries provide direct employment for about seven per cent of Canada's total working force, and they yield the largest amount of foreign exchange of any industry.
2. Sixty-four per cent of the land area of the ten provinces is forested and thirteen per cent is occupied by farms, the main industry of the Prairie Provinces. 3. The total forest
area in Canada is estimated to be 1,621,000 square miles, comprising forty-six per cent of the total land area.

4. The pulp and paper industry is the nation's leading manufacturing industry, leading all other industries in net and gross value of production, total salaries and wages, and in fuel and electricity consumption. From these facts, it can be seen that forestry plays no small part in Canada's economy, and because of this, it is essential that policy should be designed to wisely manage and perpetuate this valuable natural resource, the forest.

Since pulp and paper is presently the nation's leading manufacturing industry, it would seem logical that forest policies for the future should be designed to harmonize with the expected expansion of this industry. The current forest policies, especially concerning forest-land lease and tenure, hardly lend themselves admirably to this development of industry. Therefore, the re-establishment of a sound, fair set of policies appears paramount to the economic expansion of the forest industry in the Canadian future.

Before proceeding into the ensuing chapters of this paper, the reader is asked to refer to Table 1 of the "Appendix", and study the terms defined therein. Space has not been provided for these definitions in the text of the paper, yet they are essential for clear understanding.
CHAPTER II

GENERAL POLICY DEVELOPMENT

I EARLY HISTORY

One of the first restrictions ever imposed on Canadian timber was decreed by the French Ministry in 1683. By this decree, all oak which was fit for ship construction, was reserved for the French Navy.

No other notable restrictions were enforced until the termination of the Seven Years War (1763) which ended French dominion in America. In that year of 1763, the British governor ordered reservation of all timber suitable for the British Navy. This order was expanded by cutting licences to help fill Britain's timber markets.

The nineteenth century was known as the "Free Timber" period during which vast areas were auctioned off for exploitation of the timber not suitable for the Navy. Much the same as in the United States, large areas of land were issued to encourage the westward movement of railroads and settlers.

In 1826, timber licences or "berths" were issued on large blocks of forest land in an attempt to encourage big forest industry. The "Crown Timber Act" of 1849, elaborated on these licences making them of one year duration, renewable as long as the holder paid the required ground rent, stumpage, royalty, or whatever assessment applied. As early as
1820, New Brunswick had attempted forest licensing, but it was not until the 1850's that timber was sold strictly without the sale of the land.

Dominion legislation to stop forest fires and the clearing of land with fire for settlement use was instituted in 1854. In conjunction with this, Select Committees set up in 1855, advocated the separation of agricultural and timbered lands for much timber was being destroyed to make way for settlement. However, their efforts were to no avail and the settlers continued to clear and plow the lands at will. Many areas which were more suitable for timber, were alienated from the forests to be used as croplands. This situation was not advantageous to either economy.

Finally, with the perfection of the Provincial System in 1867 1/, the administration of the natural resources was placed under provincial control, to develop and utilize them at their own discretion. Most of the Provincial administrations did adhere to the established federal policy of selling timber without the sale of the land.

II. TWENTIETH CENTURY DEVELOPMENT

With the expansion of the pulpwood industry in the early 1900's the need for long range forest policies became necessary. British Columbia's forest resources had been

1/ Establishment of the first provinces in Eastern Canada under the British North America Act, 1867.
tapped, and the center of the lumber industry was now on the west coast. The eastern provinces quickly responded to the newly discovered "sulphite woodpulping" process since their out-put of lumber had declined in relative importance to the west.

During the First National Forestry Conference held in 1906, Prime Minister Sir Wilfred Laurier pointed out the need for forest management and sustained yield (as we speak of it now) in Canada. Eastern provinces were specifying the maximum capacities for the sawmills being built in conjunction with their timber licences, but most of the western provinces were without timber-sustaining regulations. At this time, the provinces of Interior British Columbia, Alberta, Saskatchewan, and Manitoba were under the administration of the federal Forest Service and the vastness of the areas made policing very difficult. It was not until 1930 that these provinces finally received the administrative powers that were rightfully theirs under the British North America Act, and began to enforce more stringent laws.

By the 1920's forest inventories were underway in most of the provinces and measures were being taken to control the drain on forest resources. Unfortunately, the Provincial governments were finding the administration of their lands to be a very difficult problem, especially from the financial aspect. Some federal aid was offered to the provinces under a youth training scheme, the "National Forestry Program", 
during 1939 and 1940, but this program was cut short by the demands of World War II. Aid was limited to British Columbia for forest protection against fires caused by Japanese air-borne incendiary bombs.

In 1945, the Report of the Sub-committee on Conservation and Development of Natural Resources of the Advisory Committee on Reconstruction (commonly called the "Wallace Report") proposed the enactment of a Dominion Forest Act to provide, among other things, the granting of financial assistance to the provinces for the general improvement, protection, and development of their forest resources. A final bid for federal government control of the provincial powers took place in 1945 during a conference of Dominion-Provincial relations. The determination of provincial prerogative prevailed until 1949, when "Bill 62", an Act respecting Forest Conservation, was introduced to the House of Commons where it received Royal Assent as the "Canada Forestry Act". The terms of the Act authorized the Governor-in-Council and the Minister of Resources and Development to take certain action, the principle terms being as follows: 1. The establishment and carrying out of activities on National Forests and Forest Experimental Areas, as well as regulations governing the care and management of these areas. 2. Provisions for the establishment of Forest Products Laboratories. 3. Authorization to the Governor-in-Council to assist any province or private forest owner in the protection and development of forest
land, with a tendency towards conservation and wise utilization. 4. Authorization to the Governor-in-Council to enter into agreements with the provinces for protection and development of their forest resources.

In May of 1951, the Minister of Resources and Development announced that the Government of Canada was prepared to enter into agreements with the provinces to carry out certain forestry activities as allowed for in the Canada Forestry Act. Under the agreements, the federal government was prepared to pay one-half of the cost of forest inventory to each province for the next five year period, and one-fifth of the cost of reforestation, with certain qualifications. Since forest inventory and reforestation were considered as the primarily important factors for creating sustained yield management, they took priority over fire protection though the latter appeared foremost under the Canada Forestry Act. Under the terms of the agreements, the provinces were to administer the projects but general standards were to be adhered to for efficiency sake. With the exception of Prince Edward Island, the agreements with each of the provinces were identical. Since the Island's situation was unique, they received added assistance for reforestation of their many acres of waste lands which were unsuitable for agricultural production.

By June, 1956, all but two provinces had entered into these agreements either for forest inventory or reforestation.
The agreements had been arranged for five year periods, subject to renewal upon termination of each period. During the fiscal year 1951 - 1952, $820,945 of federal funds had been contributed under the agreements, $665,858 of which was for forest inventories.

Since receiving administrative power over their forest lands, the provinces have continued to promote the original federal policy of retaining public ownership of their timber lands in the name of the Crown, and have generally aimed at some form of sustained yield management. However, the degree of management has depended a great deal on the importance of the timber to each province's economy, as well as its accessibility and specific value. Also, the several forms of tenure that have been issued throughout Canada's history tend to complicate the issue still further. The following chapters of this paper are dedicated to explaining the situation in each province and the corresponding forest policies.
CHAPTER III

BRITISH COLUMBIA

British Columbia is traversed from the north to south by three principal ranges of mountains - the Rocky Mountains to the east, the Columbia and Cassier System in the interior, and the Coast Range to the west. The province, which is 760 miles long and 400 miles wide, supports most of its population in the extreme southerly portion. Lumber, pulp and paper, and wood products industries are of primary importance to this highly industrialized area. The Coast (or Cascade Mountains) divide the Province into two great climatic regions the "Wet Belt" of the Coast, characterized by a mild climate and precipitation ranging from thirty to 200 inches per year, and the "Dry Belt" of the interior, east of the Cascade range, characterized by extremes in temperature and precipitation ranging from ten to forty inches per year. The two regions are generally referred to as the "Coast" and the "Interior".

British Columbia, the most westerly province of Canada, joined the Confederation 1/ in 1871. At that time, due to the vast amount of coastal Douglas fir timber, the lumber industry in this province was booming. Upon entering the Confederation, the Provincial Government took over administra-

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1/ British North American Act, 1867 - perfection of the provincial system in Canada.
tion of its timber resources west of the Cascade Mountains, and immediately began encouraging the alienation of forest lands in an attempt to persuade the development of large timber industries. However, the foremost problem was the lack of private funds; only about seven per cent of the forest area was alienated before the Land Act of 1884 2/ was amended in 1887 to discontinue the sale of Government timber lands.

Seventy per cent of the private ownership is now held in the form of Indian Reserves with the remaining thirty per cent divided between large timber companies and the Esquimalt and Nanaimo Railway Company Grant 3/. Only those private lands granted before 1887 are held in full freehold title; the other freehold titles are accompanied by a royalty or a "use restriction" (such as on the E.&N. Railway Grant).

Special timber licences and pulpwood leases were issued during the period from 1884 to 1912. These licences were renewable annually until completion of the cut, at which time the land reverted to possession by the Crown. The licenced areas were limited to one square mile in size, and tenure charges consisted of an annual ground rent ranging from fifty to one hundred and forty dollars, depending on the location.

The first Royal Commission inquiry concerned with for-

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2/ Act providing for issuance of freehold title of timberland.
3/ Granted April, 1887.
estry in British Columbia, was carried out in 1909 to study
the forest fire problem of the Interior and northern portions
of the Province. This Commission also delved into the prob­
lem of creating sustained yield management, but it was not
until the 1950's that this practice actually came into use on
Crown-owned lands. Soon after, the "Forest Act" of 1912 pla­
ced all administration under the newly established Forest
Service and they proceeded to lay the foundation for fire con­
trol and forest inventory programs in preparation for sustain­
ed yield management. Up to this time, the Government merely
collected revenue with no appreciable input to the forests of
the future.

Following the second Royal Commission inquiry in 1945,
it was suggested that forest management licences be establish­
ed in an effort to reduce the gross over-cutting on the priv­
ate (Crown-granted) lands, and to create a program of sustain­
ed yield. Among the other recommendations adopted from the
Commission study were: 1. Increased allotments for the Forest
Protection Fund. 2. Establishment of a Silviculture Fund.
3. Establishment of a revolving fund for construction of
access roads to public working circles. 4. Granting of farm
woodlot licences to bona fide farmers for sustained yield pro­
graming. The British Columbia Forest Act of 1947 finally pro­
vided for the Forest Management Licences which are intended
to bring the Province's resources under regulated production.

The Government also carried sustained yield management
to Crown owned lands in the form of Public Working Circles which are considered to be the government counterpart to the Management Licences.

The current complex system of timber disposal has developed from the numerous types of tenure created throughout the Province's history. It is hoped that the following breakdown will show the pattern more clearly as it exists today.

I TIMBER DISPOSAL

Private Land:

Crown-granted timber lands (private lands) are held under four types of tenure: 1. Those granted prior to 1887 and held in full freehold with no royalties or other fees payable. 2. Those granted in freehold between 1887 and 1906, supporting a small royalty charge of fifty cents per M board feet, and the right to unmolested export of all forms of products. 3. Those granted between 1906 and 1914, possessing the same royalty charge, but denied the right of export. 4. Those granted in freehold after 1914, which are subject to a regular statutory royalty, adjusted from time to time by the Lieutenant-Governor-in-Council. These royalty charges are payable upon severance of the timber and adhere to the land no matter how many crops are grown. Since royalties exist as a form of partial government ownership of the timber crop, they are often thought of as deferred payments instead of a tax. On Government-owned lands, the royalty is merely a part
of the stumpage price paid for Crown timber.

Those lands which were granted to the Esquimalt and Nanaimo Railway, are not subject to any royalty so long as they do not change ownership or are used simply for railway right-of-way.

Crown Lands:

Licences. Near the end of the nineteenth century, sentiment changed from the out-right sale of timber land to a special form of licencing. The first forms were granted annually to cut one square mile, but later became transferable and were extended to a twenty-one year term, renewable for further terms as long as they remained in good standing. They carried various titles such as "berths", "timber licences", and "leases", and "pulp licences" and "leases". Many of them still exist today. They support only a one per cent property tax payment.

Dominion Timber Berths. These licences were established under Federal Government administration and, consequently, are not subject to stumpage charges. They do, however, pay royalties at special rates set by regulations, plus a ground rent and property tax.

Timber Sales. The leading form of timber disposal on Crown lands at present, is referred to as "Timber Sales" and is designed to facilitate a regulated removal of the annual allowable cut from the Public Working Circles. They are intended, chiefly, for the small, independent loggers and are
established in various sizes, for public auction. Bidding is based on an "upset price" determined by an appraisal system devised by the Forest Service. The number of years required to complete the cut is predetermined on the size of the sale and a stipulated annual removal rate. In essence, the upset price is a combination of statutory royalties and stumpage, subject in the case of public auction, to an "overbid" charge. In certain cases, the Crown advances as much as two-thirds of the road construction costs, recoverable as an additional stumpage charge. The purchaser may elect one of two systems of periodic price adjustment; 1. reappraisal every two years by the Forest Service, or, 2. a "sliding Scale" scheme which is adjusted whenever the average log market fluctuates more than fifteen per cent from the value used in the original appraisal.

The tenure is subject to an annual ground rent of one hundred to one hundred and forty dollars per square mile throughout its life.

Those timber sales of short term nature, were first used to cut small patches of timber adjacent to existing timber licences and leases for the purpose of more efficient cutting. Today, they play a major role in the attainment of a stabilized forest economy.

Forest Management Licences. Forest management licences were created in an effort to bring Crown timber lands under sustained yield management by allowing perpetual tenure by large,
permanent logging concerns. Once established and in operation, the payments consist of a nominal one cent per acre ground rent plus stumpage rates as determined in the contract. The company is usually given the option of paying the full stumpage price minus a predetermined cost of meeting sustained yield management, or paying sixteen per cent of the full stumpage with no allowance for sustained yield operational costs.

Any tenures previously held by the applicant can be retained under their original form of tenure, but must be included in the total sustained yield area allotment. If the owner desires, these tenures can be merged into the management licence thus being subject to the new preferred rates and terms of the contract.

The general terms of the contract require that:
1. Operation plans for the following ten years be formulated.
2. Deficient areas are established in full production.
3. An efficient access road system be established.
4. Company-held lands be included to provide a portion of the annual cut.
5. Foresters be employed.
6. Standardization of cutting methods and other sundry items be established.

Approval of the management plan, by the Forest Service, is essential before granting of the licence. The Forest Service also retains the privilege of retracting any Crown-owned lands from the licence in the event they should become necessary for other forestry purposes such as watershed
management.

In 1958, acting on the advice of the Public Inquiries Act of 1956 4/, the Forest Management Licences were changed in name to "Tree Farm Licences". However, the most drastic change occurred in the form of a reduction of tenure life from perpetuity to periods of twenty-one years, renewable. The Act also proved beneficial to the licensee by providing for cost sharing agreements with the Minister of Lands and Forests for suppression of insect and disease outbreaks within the licence area.

Farm Woodlot Licences. Sustained yield operation on farm woodlots was made available through an amendment of the Forest Act in 1948 to provide for "Farm Woodlot Licences".

Any bona fide farmer, who does not possess enough forest land to produce ten thousand cubic feet of wood products per year, can apply for a maximum of 640 acres or enough land to produce a minimum annual cut of ten thousand cubic feet, on a sustained yield basis. It is compulsory that the farmer include his private woodlot land in with the Crown land which is provided by the Forest Service. This woodlot licence is not transferable upon sale of the farm, but of course, the new owner could apply for a new agreement covering the same land. The licence is granted in perpetuity with

stumpage payable upon appraisal by the Forest Service. To remain in possession of the licence, the farmer is required to cut at least fifty per cent and not more than one hundred and twenty per cent of the annual allowable cut, cumulative over a five year period. Every five years, the farmer is required to purchase a cutting permit which states the stumpage payable for the first year of cutting and provides for re-appraisal during the following four years. For his personal use, he may obtain a "Free Use Permit", renewable annually, allowing for the removal of products, free of charge, from Crown land held under his licence.

Adequate regeneration must be secured within the first five years, otherwise, the farmer must plant seedlings which he may obtain, free of charge, from a local Forest Service nursery.

Annual volume harvests are established and supervised by the Forest Service either by stump diameter limits or selection marking.

Tree Farm Land. Private forest lands in British Columbia, which are held for the purpose of forestry, are classified as either "Timber Land" or "Wild Land" according to the board foot density per acre. The "Timber Land" classification contains more than eight MBM per acre, the "Wild Land", less.

In order to encourage sustained yield management of these private lands, the Government passed legislation in
1951, on a third classification known as "Tree Farm Land". "Timber Land" or "Wild Land" can be classed as "Tree Farm Land" by satisfying requirements set down by the Department of Lands and Forests concerning reforestation and the volume and timing of harvests. More specifically, eligibility includes any land which will find best economic use under a timber crop and which; 1. contains sufficient stocking of young growth trees per acre of at least minimum standards set by the Forest Service, or, 2. is accompanied by an approved work plan providing for a reforestation program designed to increase the growing stock up to the set standards, or, 3. contains a stock of mature timber which will be harvested on a sustained yield basis according to an approved work plan, or 4. is a combination of 1, 2, and 3. In other words they would then be operated on a sustained yield basis and would thereby become subject to a reduced tax rate. "Tree Farm Lands" are taxed from one-half to two per cent lower rate than the other two forms of private forest land.

II FIRE PROTECTION POLICY

Great effort has been made by the Forest Service to support their policy of sustained yield forestry from the direction of fire protection and suppression. A "Forest Protection Fund", used exclusively for fire protection, was originally set up using taxes from forest lands plus a government reimbursement amounting to about five times as much as the taxes each year.
In 1955, the Forest Act was amended to terminate the "Forest Protection Fund" and replace it with a "Forest Protection Vote". This vote consists of a minimum allotment of $2,000,000 per year plus the revenue received from the "forest protection tax" which is imposed on all holders of cutting rights on Crown Lands, owners of timber lands, and owners of Wild land over 640 acres in area. The tax varies from six cents per acre on timber land to nine cents per MBM on Tree Farm Licences. A further amendment to the Forest Act, provides for a sum of not less than the average amount spent on suppression, during the last ten years, to be voted yearly to the Forest Service Protection Division.

In addition to these financial grants, provincial law is very demanding on both industry and the public in an effort to combat the effects of forest fires. All railways, industries, engineering or construction concerns, and/or persons carrying out land clearing within one-half mile of a forest area, are required to maintain fire fighting equipment as prescribed by regulations. Also, they are required to attack fires occurring on or near their lands and to discontinue operations until the fires are subdued.

Much of the logging in British Columbia is carried on during the rainy winter months to help reduce the possibility of fires occurring from logging operations.

Improved fire fighting techniques have also been employed in respect to fire suppression, and public education
programs are developing rapidly.

III POLICY ADMINISTRATION

British Columbia's forest policies are carried out mainly by the Forest Service staff. Regulations of cutting are usually stipulated in sale or licence contracts and are in some cases more rigid than others. Since the Government retains the ownership of most of the land under tenure, any breach of contract on the part of the licencee causes a cancellation of the contracts and the tenure.

More so than many of the other provinces, B.C. has seen the need for policies to develop a high level of forest resources. To help enforce this policy, it has been required that all forest products must be manufactured within the Province (except from lands granted prior to 1906) unless the Minister issues a special licence for reasons he sees fit. Because this law does not apply to some alienated lands, a system of timber marking has been devised to identify each log's origin of cutting. Since each timber mark must be registered with the Forest Service, they also serve as a check for determining stumpage prices.

Timber sale inventories and stumpage appraisals are used as a basis for public auctions and sealed tenders, but payment of stumpage is made on the scaled log-volume before the log is converted to lumber. There is a statutory "Scaling Fund" into which scaling fees are paid and from which expenses for scaling services are drawn. All persons
engaged in the occupation of scaling must be certified by
the Forest Service as to their qualifications.

The law provides that the sale of logs at any time
must be based on official measurements by the Forest Service,
the object being to secure impartial arbitration between
logging industries and log-purchasing sawmills.

Regulations for proper silvicultural and logging pro-
cedure are strictly controlled under the laws of the Forest
Act. Fines as high as seven dollars per acre for improper
slash disposal and twelve dollars for each acre not properly
cleared of standing dead trees, are quite common when viola-
tions occur. The law also provides that planting must be
carried out if natural reproduction is not secured within
five years after cutting. The cost of this planting is
borne by the operator who may obtain the seedlings at cost
from Forest Service nurseries.
CHAPTER IV

ALBERTA

The province of Alberta has three marked physical features - the plains, the foothills, and a portion of the Rocky Mountains within its borders. The southern portion of the Province consists mainly of arid prairie farmland which, with the aid of irrigation, supports bountiful crops of grain and vegetables. In central Alberta, this breaks away to parkland where vegetation is more abundant and mixed farming is carried on, with emphasis on dairying. Northward again, this area merges into the mixed and coniferous forests which continue to the northern boundary of the Province. In general, the Province possesses a great wealth of natural gas and oil, large coal fields, several thousand acres of fertile farmland, plentiful hydro-electric power, and timber in abundance.

The development of the forest industries and policies is relatively new for several reasons. In the first place, the forests are generally located in the more slowly settled reaches of the north country where transportation was very difficult until fairly recently. Of no less importance, is the fact that Alberta was and still is primarily an agricultural province.

Until 1930, administration of the forest lands was the responsibility of the Dominion Forest Service, for Alberta,
like the other Prairie Provinces, did not obtain administration of its resources at the time of Confederation in 1867. The Dominion Forest Service let out a number of timber berths in the more heavily wooded areas of the north, but only a few of these exist today. It is interesting to note that the policy of retaining Crown ownership of forested lands became active before any significant amount of timber land was alienated in this province.

During the last thirty years, Alberta has progressed from a state of almost pure disinterest in its forest wealth to one with genuine interest in management and protection for a perpetual production of forest products. The development has not been easy considering the problems of gaining public interest and constructing roads in the heavily muskegged areas of the northern forest zone. Only within the last two decades has noticeable progress been evident.

In 1948, the Provincial Government initiated a plan for segregating the forested land from the agricultural lands referring to the "zones" as the "green" and "yellow" zones, respectively. The policy behind this zoning was to exhaust all arable land in the yellow zone before moving into the green zone for agricultural land.

The "Forest Act" of 1949 finally set the measures to establish a policy of sustained yield management of the

1/ Provincial Forest Act.
forests. From this Act, there developed the simple policy of safeguarding against needless waste and providing for good conservation practices. These general policies are provided for in the contracts of each timber sale, and since all the forested areas are owned by the Crown, possibilities for a high degree of regulation appear very favorable.

I TIMBER DISPOSAL

Private Land:

As mentioned earlier, private forest lands are almost non-existent in Alberta except for a few farm woodlots. To date, no significant effort has been made toward encouraging sustained yield management of these woodlots.

Crown Land:

Timber Berths. The most prevalent means of timber disposal is by the sale of timber berths. Individuals desiring berths make application for a particular area, and if inspection by cruising renders the timber saleable, the berth is advertised for sale either under sealed tender or open auction. The berth is awarded to the highest bidder, and all costs of cruising and surveying are borne by the successful bidder.

A security deposit is paid by the successful bidder, and varies from fifty dollars for areas smaller than two square miles to five hundred dollars for areas of ten square miles or more. Other charges include a ground rent of thirty dollars per square mile and a fire guard cost of about twelve dollars per square mile, or as prescribed by the
Lieutenant Governor-in-Council. The charges on the removed timber are established formulatively at ten per cent of the average selling price of dressed lumber in the province during the previous year, and are referred to as "dues" (corresponding with royalties in B.C.). This ten per cent designates the "upset price" which is the minimum stumpage for which the timber will sell. Often, the winning bid will exceed the upset price, and this "over-bid" will remain constant throughout the life of the sale, unlike the statutory upset price which may vary annually according to the selling rates of dressed lumber. Dues necessarily vary among species with white spruce occupying the highest rate category.

Dues payable on the few Dominion Berths still in existence today are the same as for provincial berths, except for sawn lumber and pulp logs, on which a slightly lower charge per MBM is made. Ground rent and fire guard costs are identical for both provincial and federal berths.

Other Cutting Permits. Three forms of cutting permits are available without competition: 1. special permits, 2. fringe permits, 3. special timber permits. Special permits apply to the cutting of 125 MBM or less where a survey is not necessary; dues are payable at the upset price. Patches of timber bordering on the boundaries of timber berths are let without competition in the form of fringe permits. These patches are often purchased by the berth holder, and the dues
payable correspond to the current changes on the timber in
the berth proper.

The third type of permit, the Special Timber Permit,
requires release by an Order-in-Council and applies to fire
killed or diseased timber. Dues are payable at four dollars
per MBM with a maximum cut of 250 MBM per permit. This form
of tenure was not made available until 1956, when it was
passed by an Order-in-Council.

None of these cutting permits require payment of a
ground rent or fire guard charge.

Pulpwood Lease. In 1956, the first pulpwood lease in the
province's history was issued to supply a newly constructed
pulp mill in the west-central area of the province. The
occupying company obtained tenure to three thousand square
miles of lease area (chosen from a large "Provincial reserve
area") for a period of twenty-one years, renewable. In
addition, the right was granted to select spruce less than
fourteen inches in diameter, and pine less than twelve in-
ches in diameter from the remaining Provincial reserve for
the next fourteen years. Also, if during these fourteen
years, part of the lease area should not appear operation-
ally profitable, or if the company should enlarge over its
original capacity, lands may be selected from the Provincial
reserve to replace or expand the original lease area.

Payments consist of a three dollar per square mile
ground rent, fire guard costs of two cents per acre, and
dues payable at the rate of thirty cents per unpeeled cord of balsam fir to one dollar and fifty cents per unpeeled cord of white spruce, with other species charges ranging between, or a flat rate of seventy-five cents per unpeeled cord of all species classified as conifers. Sawlogs are paid for at regular dues prescribed by the Forest Service, plus an average "bonus" per MBM as paid on licence berths by other operators during the previous calendar year.

Agreements in the contract require the lease to be operated on a sustained yield basis with all applicable planning and operating to be carried out by the company in accordance with the terms of the contract.

Presently, provisions are being made for establishment of two more similar leases, presumably to be granted in the near future.

II EASTERN ROCKIES FOREST CONSERVATION BOARD

Protection of the east slopes of the Rocky Mountains, which fall within the province of Alberta, is the responsibility of a joint board of federal and provincial government agencies called the "Eastern Rockies Forest Conservation Board". Federal participation is based on the need for watershed protection of the Saskatchewan River system, which originates in Alberta and flows east through Saskatchewan and Manitoba. Because so many prairie cities depend heavily on this river for their existence, the east slopes constitute a very important watershed area, and must be strongly
protected against fire and undesirable forestry practices.

The federal government provides only funds for financing road construction and improvements needed for further protection. Administration and operations are carried out by the Alberta Department of Lands and Forests, the provincial Forest Service.

III FIRE PROTECTION POLICY

Forest fire protection was very limited during the early part of this century; in fact, up until 1949 only about sixty-three per cent of the total forest area of the province was subjected to any form of human fire suppression. The east slopes of the Rockies were protected to a greater extent than elsewhere, but policy on fire suppression in the northern areas was confined to within ten miles of rivers or highways.

Following the reorganization of the area known as the "Northern Alberta Forest Division" into forest sub-divisions in 1954, the policy was revised with the decision to take action on all fires in the north where detection and suppression facilities allowed. A fairly extensive system of look-out towers had been developed and fire fighting facilities were greatly improved. The chief mode of transportation away from the rivers and highways was still by pack-horses or by foot. Finally, by 1958, both fixed wing and helicopter aircraft had been introduced for fire control and the effect of increased protection policy had become evident. Policy
was now advanced for suppression of all fires in the province and those in adjacent provinces which threatened to enter Alberta. Intensive protection was deemed more necessary than ever with the implementation and completion of a forest inventory of the province's resources.

The policy for increased fire protection can be demonstrated by the following figures: 2.93 per cent of the total forest area was burned annually between 1949 and 1954, and only 1.28 per cent from 1954 to 1959. This last five-year period contained two of the highest potential fire years ever recorded by the Forest Service.

IV POLICY ADMINISTRATION

In accordance with the policy of sustained yield, established under the Forest Act of 1949, efforts were made to regulate the annual cut of timber as much as possible, but the lack of sufficient forest inventory made this very difficult. The patchy pattern of the mature and over-mature spruce stands left isolated by innumerable uncontrolled conflagrations throughout the northern area, added to the problems of management as well as inventory. Inaccessability undoubtedly played a leading role in complicating the execution of a regulated annual cut in the province as a whole. Complicating the issue still further, was the strong desire to maintain a steady flow of volume from the Crown forests at a minimum cost.

To approach these problems, the Forest Service adopted
a scheme of regulation involving a combination of age and the amount of existing decadence within each prospective timber berth, which would result in the removal of about sixty per cent of the timber volume. An average maturity age ranging from one hundred to one hundred and twenty years, depending on the incidence of decay, was correlated as closely as possible with the suggested removeable volume to arrive ultimately at a minimum stump diameter for each species. This minimum stump diameter would supposedly offer the desired removeable volume without cutting too much immature timber. No system of selective marking was feasible due to the limited supply of forestry personnel to carry out such an operation. Broad management units were established and, with the use of cover-maps constructed from aerial photographs plus the existing forest inventory data, a rough record was kept of the volume removed from each unit in relation to the total volume. Using this guideline, a crude system of sustained yield was obtained which attempted to equalize the per cent removal from each unit.

This system of regulation exists in part today, but completion of the forest inventory has made the drawing up of management plans possible. It is expected that these plans will be in operation very soon.

Like most provinces, Alberta has legislation against export of raw materials. Log scaling has come into practice in recent years, but timber dues are made payable at the
time of sale of dressed lumber.

To secure favorable utilization during the logging operation, regulations provide for periodic inspections of both field and mill operations. Unsatisfactory compliance with the terms set down in the berth contract may result in forfeiture of the cutting right. Slash disposal and removal of undesirable species are often included in the berth contract, but it is interesting to note that fire is seldom used for slash disposal purposes since it is considered too difficult to control.

Present advancements are attacking the problem of reforestation and projects of seed gathering and scarification are currently under operation. In connection with reforestation, different methods of cutting are being experimented with, but no final results have been officially published.

Within the next few years, Alberta hopes to employ an extension forester on its staff to encourage management of farm woodlots.
CHAPTER V

SASKATCHEWAN

Saskatchewan lies in the center of the Great Plains Region and reaches, as do the provinces of Alberta and Manitoba, from the International Boundary on the south to the 60th parallel of latitude on the north. The economy of the Province is largely agricultural, but the northern region supports a vast amount of timber resources, not unlike those of Alberta, and is abundantly watered by lakes and rivers. The development of large uranium deposits in the northeastern region is proceeding rapidly, and this is gradually rendering some isolated areas accessible for forestry development.

Prior to 1870, the timbered areas of Saskatchewan, then known as "Rupert's Land", were in control of the Hudson Bay Company under charter from King Charles I. The land was used exclusively for fur trapping, and the only interest in the forest was as a habitat for fur-bearing animals. In 1870, the Dominion purchased Rupert's Land and control of the natural resources was made the responsibility of the Secretary of State.

The first Dominion Lands Act in 1872, made provisions for timber disposal. Certain areas were designated as "timber districts" from which settlement was excluded. When the Department of the Interior took over administration of the Prairie Provinces in 1873, the Crown Timber and Grazing
Branch took charge of resources in Saskatchewan. Administrative emphases were placed on collection of rents, royalties, and dues with very little attempt to promote forest management.

Legislation in 1877, provided for the establishment of "forest reserves", the first of which was set up in 1894. No more reserves were established until 1905 when the province of Saskatchewan was created and administration passed under the Forestry Branch of the Department of the Interior. By 1914, several reserves had been located, each with its own staff-in-residence, and steps to control fires and timber disposal were taken.

In 1930, the provincial government gained control of its natural resources. The Forestry Branch was set up under the Department of Natural Resources, and the "Forest Act" of 1931 provided the necessary administrative authority.

Although the federal "Prairie and Forest Act" was amended, allowing for more intensive control of forest fires, the provincial administration was suddenly confronted with the evils of settlement. Like the other prairie provinces, Saskatchewan's economy rests largely on agriculture so that the influx of settlers in 1930 resulted in a great amount of incendiarism, for the forest represented a barrier to farming. In 1938, over two million acres of forest land were burned.

The emergencies of World War II years caused a very
severe drain on the forest resources so that by 1945, a Royal Commission 1/ was necessary to investigate the forest situation at its "all time low". Out of this investigation, came the Saskatchewan Forest Inventory of 1947, the first step towards establishing a long-term policy for sustained yield production. Completion of the inventory in 1954, uncovered a need for: 1. An adjustment of current cutting in certain species. 2. Alleviation of over-cutting in certain areas. 3. Stand improvement cuts in certain stand classes. 4. Increased regeneration and stocking. 5. New utilization methods for Populus tremuloides which made up thirty-six percent of the commercial wood volume.

At present, Saskatchewan's forest policy is broadly concerned with the three major programs of; 1. attaining maximum benefits to the public while insuring production in perpetuity, 2. establishing an effective fire control system, and 3. public education.

I TIMBER DISPOSAL

Crown Land:

The method of timber disposal in Saskatchewan is unique among the provinces for it is carried out almost exclusively by a Crown corporation called the "Saskatchewan Forest Products". The corporation has two branches: "Saskatchewan Wood Enterprises", which manufactures boxes, grain-doors, and

1/ Inquiry concerned with matters of forest resources and industry in Saskatchewan.
graineries, etc., and the "Saskatchewan Timber Board", which is responsible for the logging, sawing, planing, and marketing of Crown sawlog timber. This latter division also exports some pulpwood.

The Department of Natural Resources (Forest Service) establishes the annual allowable cut, in advance, for each of the forest divisions and the bulk of the allowable cut is turned over to the Timber Board for exploitation. The Timber Board then lets contracts, each for a cut of about one-half to three MBM per season, to a number of loggers who then fell and rough-saw the timbers in the woods and deliver the rough lumber to the Board's planing mills.

In payment for the timber, the Corporation is charged "dues" as prescribed in the Regulations, payable to the Forest Service. In addition to the dues (which average about six dollars per MBM for the favored species *Picea glauca*) a nominal permit fee of one dollar per year is collected for each contract let to individual loggers. No fire protection cost or ground rent is paid.

**Dominion Timber Berths.** Prior to the above mentioned method of disposal, timber was sold under the form of Dominion Timber Berths, much the same as in Alberta. These berths paid a ground rent of twenty dollars per acre and a fire protection cost determined on a pro-rata basis of one-half the fire fighting cost incurred by the province each year, and dues according to old Regulations. The last of these berths expired in
1955 at which time the Province granted the licencsee a Timber Sale for one season at a charge of ten dollars per MBM for a total of twelve million board feet. This was the last Timber Sale, and the only forms of tenure on Crown timber-lands now are possible pulpwood berths or forest management licences which might be created through negotiation.

Permits. To take up the annual allowable cut not secured by the Corporation, several permits are offered for a small allowable cut of thirty MBM per permit. These permits may be obtained by persons residing within the three mile strip of land located adjacent to the Provincial forests, referred to as the "burning permit area". Veterans residing outside this area may obtain permits to cut fifteen MBM of timber. Mining companies and persons desiring to cut species other than spruce or pine, may also obtain permits. All permittees pay dues according to the Regulations schedule at the time of application; no other charge is made.

Pulpwood Licences. Through negotiation, the first pulpwood licence in Saskatchewan was issued in 1956. The length of tenure was set at twenty-five years, and payments of dues were established as fractions of a "basic dues" rate, changing at intervals of five and ten years, respectively. A ground rent of three dollars per square mile, and a fire prevention levy of three dollars per acre were also imposed.

Provision is made by the Forest Act for further disposal of Crown timber under Pulpwood Licences and Forest Management
Licences in the instant of negotiation, and at the discretion of the Department.

Department foresters are working in co-operation with the Canadian Forestry Association to encourage management of private woodlots, but at present, very little wood production comes from these lands.

II FIRE PROTECTION POLICY

The Department of Natural Resources provides all the fire protection within the Province, and much effort has been directed to this phase of timber perpetuation by this agency. No province has experienced the cruel effect of fire more than Saskatchewan, for the forested area is subjected to very dry weather during the hot summer months; the vastness of the Province complicates the problem still further.

Two main facets of attack have been active against fires; direct fire detection and suppression efforts, and indirect public relations programs on a rather large scale. A fairly effective and extensive system of lookout towers and roads has been established, and aircraft have been in use for detection for several years.

In 1948, smokejumpers were added to the fire suppression staff, and appear to have functioned admirably in reducing fires in the more isolated areas.

No fire protection charge is now levied in the Province, but strict measures of prevention are included in the Forest Act, subjecting violators to fairly heavy fines.
III POLICY ADMINISTRATION

With the commencement of a Provincial forest inventory in 1947, the Department set up divisions of Forest Management and Silviculture among its staff, to develop work plans and to set up cutting on a sustained yield basis. The Silviculture division marks all timber to be removed during each annual cut, plus some other stands for the purpose of thinning. Scaling for the collection of dues is carried out on the stump (100 per cent cruise and marking) for the most part, and the remainder is scaled as rough lumber upon its delivery to Corporation yards.

All permits for forest operations are issued by the Department of Natural Resource's district foresters. These permits include timber-cutting permits, sawmill permits, grazing permits, and haying permits. The district foresters also cruise and mark the annual cut, and collect fees and stumpage dues from all permits including timber held by the Corporation.

In Saskatchewan, as in most other provinces, no unmanufactured timber is to be removed from the Province without permission from the Minister of the Department. Since the Crown Corporation has cutting-rights to most of the timber, the chances of violation of this law are quite small.

To further implement forest policies in the Province, programs of reforestation, direct seeding, promotion of natural regeneration, effective access systems, and last but not
least, an extensive conservation-education program are being carried out to help keep the forests in a healthy, productive state.
CHAPTER VI

MANITOBA

Manitoba, the most central province of Canada, is a land of wide diversity, combining 400 miles of sea-coast along its northeastern boundary on Hudson Bay, great areas of mixed forests, large lakes and rivers, and a treeless prairie with very fertile soil. The rocky, northeastern region of the Province contains numerous deposits of base metals, while in the southern region where ninety per cent of the population resides, grain-growing, cattle-raising and dairying are dominant. The city of Winnipeg, in southern Manitoba, is the main railway center for Western Canada, which necessitates the operation of large shops for maintenance of rolling-stock. The Province's forests are vast, but quite inaccessible. Thus, the forests do not rank as the most important product in the area today.

Manitoba did not become a part of Canada until the purchase of Rupert's Land in 1870. Upon purchase, the Province of Manitoba was created by an act of Parliament. Under the provisions of the "Manitoba Act", all ungranted land in the province was vested in the Crown, and was administered by the Dominion Government.

Settlement of this province was very slow, and administration of the forests under the Dominion Lands Branch of the Department of the Interior was concerned with cruising appli-
cation areas, preventing trespass cuttings, and collecting fees. Even then, however, the need to preserve the forests for the future was recognised, evidenced by the establishment of the "Dominion Land Act" which provided for the creation of "timber reserves". Two of these reserves were set up prior to 1900. They were established for the production of timber, and provided for the exclusion of any form of occupancy or other settlement. Today, they remain as such, and can be withdrawn in part for settlement only if they are deemed more suitable as agricultural land than as forest land.

Since much of the settlement was on the prairies of the south, the Forest Service concentrated most of its early efforts to a program of supplying settlers with young trees for home and farm improvement. This scheme began in 1901 and became a primary venture of the Dominion Forest Service in all of the Prairie Provinces 1/. The program was still quite active in the 1930's, averaging an annual distribution between seven and eight million trees to Manitoba farmers alone.

In 1905, the first forest survey in Manitoba was initiated for the purpose of determining areas which would be suitable for dedication as permanent forest land. The "Forest Reserves Act" of 1906, established the old "timber reserves" as being permanent, and also created two more. In 1911, the Forest

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1/ Alberta, Saskatchewan, and Manitoba.
Reserves Act was replaced by the "Forest Reserves and Parks Act", under which authority the reserves remained until 1930.

The Forestry Branch of the Dominion Government was re-organized in 1912, and took over full control of fire protection throughout the Province. In the same year, Manitoba's northern boundary was extended to the 60th parallel, thus establishing its present boundaries, and including several square miles of new timber area.

The establishment of new timber reserves continued until 1930, at which time control of Manitoba's natural resources passed under provincial control, and became the responsibility of the Forest Service of the provincial Department of Mines and Natural Resources. The establishment of the Whiteshell Forest Reserve in 1931, by an Act of Manitoba Legislation, disclosed that the province was dedicated to the policy of reserving productive forests as inaugurated under the federal regime.

Today, provisions for sustained yield production have been inserted into provincial policy with the establishment of "public working circles", now well along in the process of being fitted with working plans.

The annual allowable cut from the public working circles is taken up by two principal forms of timber disposal: "Timber Sales", and "Permits". These along with the other minor instruments will be discussed in the following section.
Crown Land:

The disposal of timber in Manitoba today, is mainly through Timber Sales and Timber Permits, although some forms of tenure let under Dominion administration still remain.

Timber Sales. The largest form of tenure, the Timber Sale, is let for a period of two to five years, not to exceed a total cut of eight million MBM of timber. The timber is cruised by the Forest Service, put up for auction, and sold to the highest bidder.

Bids for primary products are expressed in dollars per cord of MBM as set in "Schedule 'A'" of the Forest Act Regulations; secondary products are expressed as a per cent of the Schedule "A" values. Schedule "A" is a standard set of dues which has been established by the Forest Service, and which is subject to adjustment from time to time. This schedule exists as a minimum rate from which upset prices are adjusted by means of a stumpage appraisal system. This adjustment formula is dissimilar from that used by the British Columbia Forest Service in that it does not adjust for changing market prices of logs or end-products of timber sales issued for more than a year.

Upset prices may be appraised as high as double the Schedule "A" rates, and the over-bids may in turn exceed upset prices by ten to fifteen per cent. Schedule "A" dues payable on the chief species Picea glauca in 1954, were five
dollars per MBM.

No ground rent or fire protection tax is charged on this form of tenure.

Timber Permits. The Provincial Forester, or officers acting under his instructions, may grant annual permits for small amounts of timber varying from ten to twenty-five MBM. Settlers, miners, persons engaged in authorized construction of roads, telegraph lines, trails, etc., commercial fishermen, and other miscellaneous categories, may obtain "Paid Permits" to cut twenty-five MBM maximum cut per permit. The counterpart to the Paid Permit is the Special Permit, issued for the salvage of burned, dead or diseased timber, silviculture cuts, and other special conditions. They are limited to the smaller cut of ten MBM.

Dues payable are established from an appraisal by the Forest Service who also designate the timber to be cut. There is no competition involved in the sale of these permits so over-bids are non-existant. No charge is made for ground rent or fire protection.

Dominion Timber Berths. Under the Dominion regime, three forms of tenure were issued and are extant today. Only one form, Licenced Berths", is provided for under the provincial administration today, but none have been issued.

The few Licenced Berths remaining today, were granted by the Dominion about forty or fifty years ago, and now cover a total area of about 115 square miles. The primary products
on these berths are sawlogs for which dues are paid at the fixed rate of seven dollars per MBM for spruce; other products are appraised according to Schedule "A" rates. Charges of ten dollars per square mile for ground rent, and a pro-rata share of one-half of the Province's fire protection cost, are also required. Licenced Berths are renewable annually until the sawlog timber is exhausted.

The second form of Dominion Berth, the "Permit Berth", occupies an area of only ten square miles today. The licencee company has priority right to obtain permits to cut on this area at prices set by annual stumpage appraisal. However, there is a peculiar stipulation that the licencee must pay the higher of two alternatives - the stumpage charges, or a ground rent of ten dollars per square mile of holdings. In the case where the ground rent alternative applies, stumpage prices are still paid, but the ground rent charges will equal the amount by which the stumpage dues fall below the maximum ground rent charge of ten dollars per square mile.

The fire protection charge is the same as for Licenced Berths.

The last form of Berth, the "Pulpwood Berth", exists in the form of a single holding of 1,800,000 acres. Tenure to this Berth will terminate in 1975, at which time the holding company will be given the privilege of applying for a "Forest Management Licence", which was authorized in 1955 under Bill # 66, and Act to amend the Forest Act. Conditions of this
new tenureship would necessarily include sustained yield
management.

The Berth is primarily for pulpwood, but carries condi-
tions that certain timber be used for lumber. Stumpage fees
are prescribed by Regulations at one dollar and fifty cents
to two dollars and forty-five cents per cord of spruce, one
dollar and twenty-five cents per MBM for pine and balsam fir,
and seven dollars and fifty cents per MBM for spruce lumber.
A two dollar per square mile ground rent is charged as well
as the pro-rated fire protection charge levied on the other
two types of Berths.

II FIRE PROTECTION POLICY

The Department of Mines and Natural Resources provides
complete fire protection throughout the Province. Charges
applying to Crown lands have been previously stated. Private-
ly-owned forest lands are exempt from fire protection taxes
since they are limited in extent and are of little value.

The "Fire Prevention Act" provides rules and penalties
for violations involving letting fire run loose, allowing
fire to spread to forest reserves from private lands, etc.
Railways are also required to protect against fire to the ex-
tent of providing fire guards where-ever their lines should
pass through forest reserves. The Province has authority to
bill negligent land-owners who allow fire to spread from pri-
vate lands.
The administration of Manitoba's forest resources is carried out under authority of the Forest Act of 1930, by the Forest Service. The Province is divided into four forest districts, each of which is the responsibility of a district forester.

An inventory of the forest land was completed in 1956, allowing for the establishment of management areas for regulation of sustained yield. Allowable cuts, which are set annually for these areas, are taken up by Timber Sales and Permits. To avoid "high-grading" the forest, licencees are required to carry out integrated operations, that is to say, removal of sawlogs, pulp, and any other products on any given licenced area. Some of the forests in the southern area are well established on a sustained yield basis with cutting being carried out on second and third growth stands. In the northern forests, the annual allowable cut has been held below the estimated annual growth in obeisance of the recently completed forest inventory. With the completion of the inventory, these forests are expected to be established on a sustained yield management basis.

Much the same as in other provinces, Manitoba law requires that all pulpwood or timber cut under licence must be manufactured with the Province. However, the holders of Permits (Timber Permits) are allowed the liberty of manufacturing anywhere in Canada. Timber Berth licencees are required
to construct sawmills capable of producing 1,000 board feet per hour, and where complete utilization is not possible in keeping up with the timber-cut, the excess board footage may be disposed of by jurisdiction of the Lieutenant Governor-in-Council.
CHAPTER VII

ONTARIO

Ontario lies between Quebec on the east and Manitoba on the west. On its southern boundary, it has a fresh-water shoreline of 2,362 miles on the Great Lakes, and its northern limits have a salt-water shoreline of 680 miles on Hudson Bay. Ontario has long been Canada's leading producer of minerals, accounting for eighty-two per cent (excluding the USSR) of the world output of nickel, and is a leading world source of copper and platinum metals. The great forest resources in proximity to vast amounts of hydro-electric power, form the basis of its large pulp and paper industry. Along the St. Lawrence River and the lower lakes, Ontario possesses highly productive general farming and fruit-growing districts.

The history of forestry in Ontario developed in common with that of the other Eastern provinces. Prior to 1867, at which time the provinces were given power to administer their own natural resources, the forests were administered under the laws developed by the Government of Canada. This administration existed, for the most part, as a revenue-collecting agency, relying on a "timber licence" system developed in 1826, for the expressed purpose of collecting revenue.

In 1849, the Legislative Assembly of Canada named a committee to carry out investigations concerning forestry
exploitation. From this investigation developed "The First Crown Timber Act" which served as the basis of legislation concerning the issue of timber licences in Ontario.

Following Confederation 1/1, the province began administration by attacking the forest fire problem through authorizing the Lieutenant Governor to create "forest fire districts" in 1878. The Bureau of Forestry was established in Ontario under the Department of Agriculture in 1883, and two years later, a system of fire rangers was devised at the common expense of the government and timber-limit holders.

The year of 1897 saw the organization of the Ontario Forest Commission for the purpose of studying the forest situation in the province. In the following year, the Ontario Forest Reserves Act was passed, and immediately resulted in the creation of three large forest reserves.

The present day forms of timber disposal were adopted during the 1880's, but have become subject to sustained yield management under authority of the "Crown Timber Act" of 1952.

In general, the policy of this province is directed towards the management of its timber lands, and stabilization of resident industry. Timber is offered for sale on a priority basis with the preference to the requirements of established industries. The larger timber licences are usually taken up by these companies, and are maintained as "Company

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1/ British North America Act, 1867.
Management Units*, requiring working plans subject to the approval of the Department of Lands and Forests. Licencess to areas exceeding fifty square miles, are required to prepare operating plans for their limits, and these are then incorporated into the Province's over-all "Management Unit Plan". The Department itself prepares working plans for "Crown Management Units" which include licenced areas of various sizes.

Until recently, only sawlogs could be cut from areas let under timber licences, but now cutting rights to all classes of timber are usually included in all licences.

I TIMBER DISPOSAL

Crown Land:

As mentioned earlier, a substantial part of the present forms of timber disposal on Crown-owned lands were adopted as early as the 1880's. These forms exist as "Negotiated Stumpage Sales" and "Sales by Public Tender".

Negotiated Stumpage Sales (Timber Sales). This form of tenure includes about ninety-five per cent of the total occupied Crown forests, and includes all pulpwood licences and most of those let to large timber companies. The licences are issued for periods of one to twenty-one years, and some are subject to re-adjusted stumpage rates at three-year intervals. Re-adjustment consists of bringing the rates into agreement with those paid for recent sales in the same area. This method of adjustment is applied to a great extent when establishing
stumpage charges for pulpwood licences even though the terms finally arrived at are a result of company-forest service negotiation. The stumpage charges are in addition to the statutory dues, and are referred to as a "bonus" or "Crown evaluation". The bonus on pulpwood licences usually averages about twenty cents per cord as compared with the basic dues of two dollars and eighty cents per cord for spruce pulpwood.

A nominal ground rent of one dollar per square mile, and a fire protection levy of twelve dollars and eighty cents per square mile also apply.

Sale by Public Tender (Timber Sale). This form of sale is also issued for one to twenty-one year periods, but applies only to sawlog companies and other small, private individuals. As the name suggests, sale is by sealed tender, but the Minister is not required to accept the highest bid. He may award the contract to anyone for reasons he sees fit, and in such situations, the bonus price will be set in accordance with other sales in the area by the Crown evaluation system.

As in the Negotiated Stumpage Sales, this type of tenure carries a ground rent charge of one dollar per square mile, and the fire protection charge of twelve dollars and eighty cents per square mile. The sealed tender is considered a bonus, and is paid in addition to the statutory Crown dues whether established by bidding or the comparable Crown evaluation.
Original Tenures (Timber Sales). As might be expected, some operators hold very old tenures, some dating from the 1880's. Sale terms at that time were the statutory dues, plus a cash lump-sum payment. Upon renewal, the bonus Crown charge is being gradually brought up to the charges paid on newer licences in the same cutting area.

Local Cutting Permits. Annual permits are issued to settlers and small operators for the purpose of satisfying the annual cut on the Crown Management Units. The value of timber cut under these Local Cutting Permits is not to exceed one thousand dollars in Crown charges. Dues rates are uniform within each Forest District, but vary among Districts according to the demand for timber. A ground rent is charged if the estimated timber value exceeds one hundred dollars, and fire taxes apply if the value exceeds fifty dollars.

Salvage Licences. These licences are offered for the removal of fire or diseased-killed timber. They carry no ground rent or fire protection charge, and are subject to a reduced stumpage rate.

Private and County Forest Reserves:

Under the Forestry Act of 1952, provisions were made for the establishment of "Private Forest Reserves" on freehold land. The owners are required by contract to dedicate their land to forestry for at least twenty years, during which time the Forest Service will supply planting and management of the tract, and thereby providing all or part of the
money required. Not many of these reserves have been estab-
lished.

The Forest Service will also enter into agreements to
reforest suitable land held by the counties, providing the
plantation will be maintained for thirty years or more. At
the end of thirty years, the county may resume full ownership
and responsibility or transfer title to the Province.

Woodlands:

In order to promote proper management of farm woodlots,
the Province has provided a tree-land classification called
"Woodlands", which are subject to a more lenient tax than
other private forested areas. These lands must be fenced
against grazing, must contain a specified tree density, and
must be dedicated chiefly to forestry in order to receive
this classification and reduced tax. More generally, they
must be what is considered "properly managed".

II FIRE PROTECTION POLICY

Huge conflagrations were on record in Ontario as long
ago as 1867, but their effect was not impressed upon the minds
of the people until 1878 when the first forest fire protective
legislation was passed. Steps were taken under the "Act" to
provide government-licencee cost sharing for the purpose of
paying rangers to patrol the licenced limits. It was not un-
til 1897 that steps were taken to protect unoccupied Crown
lands. A limited number of rangers were appointed at this
time to patrol the unlicenced lands.
Finally, in 1917, the "Forest Fire Prevention Act" was passed which with further amendments, is in force at present. It contains restrictions and penalties similar to those of other provinces, including closed fire seasons during the high fire hazard months of the summer.

On the fire suppression scene, Ontario adopted the use of aircraft as early as 1924 for use as a detection and transportation media. The Ontario Government Air Service was organized in that year, and was reported to be very successful not only for fire protection, but for aerial photography, and other services as well. Most of the aircraft were equipped with both wheels and pontoons since the many lakes of northern Ontario provided natural landing fields relatively close to remote fires. Today, the aircraft still plays an important part in fire suppression and detection of Ontario, aided greatly by innovations such as water-filled pontoons for the purpose of "water-bombing" incipient fires.

Fire protection throughout the Province is the responsibility of the Department of Lands and Forests. They have set up a system of "Fire Districts", each equipped with the most modern of fire-fighting equipment.

III POLICY ADMINISTRATION

The forests of Ontario are divided into a number of Management Units, thirty-nine of which are Company Management Units, and eighty-two Crown Management Units. The Forest Service of the Department of Lands and Forests administers policy
for all Crown-owned lands by requiring working plans from the licencees of fifty square miles or more, and requiring Department approval of these plans.

Under the "Crown Timber Act" of 1952, the licencees can be required to assume much or all of the responsibility and cost of insuring regeneration of their cut-over areas. Since natural regeneration is generally poor, reforestation by planting is often necessary.
CHAPTER VIII

QUEBEC

Except for the treeless zone north of latitude 58 degrees, most of Quebec supports a valuable tree growth, the exploitation of which gives the Province first place in the production of pulp and paper, Canada's leading industry. Quebec is also foremost among the provinces as a producer of hydro-electric power. Its mining industry ranks next to Ontario's and Alberta's, and it is a leading Canadian producer in copper, gold, and iron ore.

Quebec has probably been subjected to forest regulation longer than any other province in Canada. In fact, it has dwelled under the reign of two mother countries, France and England. The first regulation occurred in 1683 at which time all timber fit for ship construction was saved for the French navy. Though lands were being let to the settlers for farming, the most desirable trees were selected for the navy, and removed by the government before land clearing commenced.

Under the English rule, lands were also granted to the men who had served in the English army, but this granting was more restricted than under the French regime.

Up till 1826, the only persons allowed to cut timber from public lands were the contractors of the Royal Army. In that year, a system of timber licencing was established, being more advantageous to the Crown.
During the period from 1841 to 1867, Quebec and Ontario constituted one province and regulations, for the most part, were identical. The first session of this United Parliament dealt extensively with the timber disposal question, and regulations concerning the length of licence-period, and sales by auction were established. This was the first use of the auction principle of timber disposal in Canada. The system of annually renewable licences, which is still in use today in Quebec, originated at that time.

Quebec was the first province to make regulations involving the practice of sustained yield on Crown lands. This was provided by Article 12 in the regulations promulgated under the Lands and Forests Act of 1923, to the effect that special working plans for each decade had to be furnished in addition to a working plan for the whole licence area.

Since 1939, sustained yield management in Quebec has been governed by the provisions of Article 12 of the "Woods and Forests Regulations", revised in 1943, and exists as the first attempt at perpetual forest management of any of the Crown-owned forest lands of Canada.

I TIMBER DISPOSAL

Crown Land:

Licences. Most of the occupied Crown forests of Quebec are held under annual licence by large paper companies. Though granted for one year only, the licences are renewable indefinitely.
Stumpage prices are set by an Order-in-Council, and an annual ground rent is also required on the licences. The ground rent amounts to ten dollars per square mile.

The companies either supply their own fire protection or pay membership into a regional fire protection association.

A few recent licences have been issued for the purpose of rounding out existing holdings. These sales take place through negotiation between the licensee and the Department of Lands and Forests, resulting in a lump-sum payment per square mile of licence area. Cash payments recently, are said to have ranged from 700 dollars to 2,000 dollars per square mile, averaging about 1,250 dollars per square mile. The responsibility of surveying and producing work plans for the area are placed with the licensee. Variations have occurred in relation to the length of tenure, and the amount of tenure and statutory dues payable on these sales.

Recently, the companies have been engaged in consolidation of their timber holdings. A transfer fee of sixty-five dollars per square mile, payable to the Department, has been established for these transactions.

Special Permits. Three forms of cutting permits exist for the purpose of offering short-term sale of small amounts of timber, either for domestic or commercial use. These permits are referred to by the names of the areas or reserves to which they apply.

The first of these, on "vacant Crown lands", is limited
to a cut of 150,000 cubic feet of timber. When issued for
domestic purposes, only regular stumpage charges apply, but
the stumpage price is usually double for commercial cuts.

Permits for cutting on "Special Forest Reserves", are
established mainly for forest syndicates, and thus, commercial
use. Double stumpage rates apply to these permits as well.

The final class of permit, "Township Forest Reserves",
are set up for the benefit of farmers in areas of new settle­
ment where no woodlots are available. Regular stumpage dues
apply to these licences.

None of these permits carry a ground rent or fire pro­
tection charge.

Private Land:

Although the government policy is strictly adverse to
the sale of forest land in free-hold title, some companies
acquired possession of timber land from old railway grants
and abandoned colonist's land. Often, in exchange for these
lands, the government will offer "script". With this script,
the holder can obtain a licence to cut timber from vacant
Crown lands in exchange for the private forest land. The
cutting rights are usually negotiated for larger but more
remote areas of Crown land. The term of tenure varies from
five to thirty years. No ground rents or stumpage costs are
paid for the Crown timber. The amount of script on the mar­
et has been very small during the last few years.
II FIRE PROTECTION POLICY

Only the provinces of Quebec and Newfoundland have the privilege of a dual fire protection system, composed of both government and private associations. The first private fire protective association was established in Quebec in 1912. These associations are set up on a regional basis with membership consisting of a number of the larger Crown limit-holders. Some large isolated companies provide their own protection association, but whatever the case may be, the Department passes final judgement as to the adequacy of the protection.

In 1953, the average cost for protection was twenty-one dollars and fifty cents to twenty-five dollars per square mile payable on the gross area of each holding. At the end of each season, the government reimburses the associations with one-half the cost of actual fire-fighting expenses incurred during that period.

In areas where associations are not present, the government Forest Service provides protection to their unoccupied lands as well as free-hold private lands. In these instances, the government imposes fire protection charges from twelve to fourteen dollars per square mile.

III POLICY ADMINISTRATION

The forests of Quebec are administered by the staff of the Forest Service and the Forest Protection Service under authority of the regulations of the "Woods and Forests Regulations". All licences granted under the Regulations are subject
to such rates, regulations, conditions, and restrictions as may be established by the Lieutenant Governor-in-Council. Permission to grant these licences is vested with the Minister of Lands and Forests.

The staff of the Forest Service is constantly engaged in watching over the management, proper treatment, and use of the occupied Crown lands. They are responsible for seeing that the licencees comply with the terms and conditions of the licence contracts, and that the forest laws and regulations are carried out.

Working plans developed by the licencees are subject to inspection and approval by the Forest Service; furthermore, operations in the field must be carried out in accordance with the plans as approved by the Forest Service field staff.
CHAPTER IX

NEW BRUNSWICK

New Brunswick is the largest of the Maritime Provinces. There are only two high-land areas in the Province, one in the south and the other in the northwest. The remainder of the land is rolling country-side with many lakes and winding waterways. The production of forest products is by far the most important element in the area’s economy. About eighty-one per cent of the Province is under forest, most of which is merchantable timber, and is readily accessible. Agriculture and fishing are the other main industries present, but they rank far below that of forestry in importance.

New Brunswick was established as a separate province from Nova Scotia in 1784. Up to that date, very little land had been alienated from Crown ownership.

During the period from 1784 to 1826, land was sold on payment of grant-fees. In 1827, these fees were abolished, and there followed a decade of wild speculation with land selling for absurdly low fees as prescribed by the federal Secretary for the Colonies.

The faults of this procedure were finally recognized and acted upon in 1837, whereupon, it was discontinued, and the management of the Crown lands was placed under control of the Provincial Assembly.

In 1837, a "licencing system" was devised to let timber
under public auction at lump-sum stumpage prices. In 1843, a system of leasing on a "mileage" basis came into effect, again on an auction bid basis of sale.

The sale of land for agricultural purposes was still in effect, and much timber land was alienated from the Crown under the Labor Act and the Commutation Act of 1849.

The period of 1868 to 1878 was large tracts of public forest land alienated in the form of railway grants, many of which are managed presently for their timber resources.

Finally in 1883, the policy of disposing of land by sale was revised, and no more forest land was alienated from the Crown after that date. To that date, however, approximately one-half of the Province's forest land had passed into private ownership.

In relation to timber licencing, much experimentation was involved in setting the length of lease tenure. Tenure periods of five and ten years were tried, and in 1892, a Royal Commission attempted to have the period extended into perpetuity; however, public opinion forced a compromise at twenty-five years.

Presently, lease periods have been altered to a duration of fifty years for pulp leases, thirty years for sawmill licences, and ten years for licences not directly associated with industrial plants. Several licences will be expiring in 1963, and even now, policy is not too clear as to the length of tenure to be attached to these vacancies.
The year 1908 marked the beginning of true forestry in New Brunswick with the employment of professional foresters on the Forestry staff. Ten years later, legislation was passed on a forest survey program to furnish information necessary for the development of forest management. This forest inventory served only for a short period of years for it was rendered relatively useless by an epidemic of spruce budworm. A new survey was initiated in 1951, under the federal-provincial agreements. The last bits of this survey were being cleared up in 1959, and with this, further development of forest policy has followed.

In 1937, the "Crown Lands Act and Timber Regulations" were amended to require management plans from all operators who wish to cut Crown timber smaller than the stipulated stumpage diameter. Permits based on these plans were designed to both encourage utilization, and to conserve forest growing stock.

The Province has so far refrained from imposing restrictions on private lands, but there is some opinion on the part of the land-owners themselves, as well as others, that such legislation should apply.

I TIMBER DISPOSAL

Crown Land:

The cutting rights to the major part of New Brunswick's Crown-owned forests are held in the form of long-term leases by large forest industries, both sawmills and pulp companies.
A very small portion of timber is offered periodically for specified cuts on vacant Crown lands, but these serve only as supplementary devices to satisfy certain needs not met by timber licences. The length of tenure applying to "Pulp and Paper Licences" as well as "Sawmill Licences", vary according to the capital investment in the particular industry.

**Pulp and Paper Licences.** Since the investment in pulp mills runs into many millions of dollars, its supply of timber should be assured for a longer period of time than for other forest industries. Thus, these Pulp and Paper Licences are let for periods of fifty years.

Charges for Pulp and Paper Licences consist of a lump-sum "bonus" (now paid in the form of an annual two dollar per square mile payment), stumpage rates, and annual "Renewal Fees". In 1951, the upset price on the lump-sum bonus charge was twenty to forty dollars per square mile, with actual final bid prices running as high as 1,500 dollars per square mile. The Renewal Fees are made up of a fire protection charge of twelve dollars and eighty cents per square mile, a "mileage" of two cents per hundred cubic feet of softwood forest inventory, and a "bonus" of two dollars per square mile. In general, these annual charges are made in payment for the privilege of having an option on the timber, but when the timber is cut, it must still be paid for at the official stumpage rate as in the Regulations.

All cutting rights are transferable, and subject to a
payment of forty dollars per square mile.

Sawmill Licences. These licences differ from the Pulp and Paper Licences only in the length of tenure. Permanent sawmills require fairly sizable investments so they are given thirty year tenures. The other group of Sawmill Licences are not attached to permanent industries, and therefore, last only for a period of ten years.

All charges which applied to the Pulp and Paper Licence apply to all Sawmill Licences as well.

Vacant Land Permits (Stumpage Sales). As mentioned earlier, these short-term sales make up only a small part of the Crown timber held under licence. They are short-term agreements under which fairly definite quantities of timber are removed, and at which time the licence (permit) ceases to exist.

Stumpage payments for these sales usually run about 150 per cent of the regular stumpage dues, but no Renewal Fees are charged, nor is there the lump-sum payment that we find on the long-term leases. The timber removed under these sales is usually marked or otherwise designated, and cutting is strictly controlled.

Private Land:

Owners of private forest land pay only a provincial land tax called the "Wild Land Tax". This tax applies to all private lands in excess of 500 acres, and amounts to about three cents per acre in fees. It is interesting to note that this tax was originally intended to stimulate cultivation of lands.
and therefore, is actually discouraging the production of timber. Since the trees are assessed at their true value, most owners probably wish the trees would not occur at all.

Forest protection is intended to be the responsibility of each private owner, but in actuality, the Fire Protection Branch of the Department of Lands and Mines carries out the suppression activities at no extra cost to the owner. Some counties have agreed to pay one cent per acre on the total area of the county for provincial fire protection, but the agreements are not mandatory.

II FIRE PROTECTION POLICY

All forest fire protection in New Brunswick comes under the "Forest Fires Act" and its amendments. Although the Department of Lands and Mines applies protection to all the lands, both Crown and private, it does not have to fight fires on granted lands except in those counties where agreements have been established. Normally, it is the duty of the land owner to attack fires on his land, but that failing, the county is responsible to take charge. This system does not work well, and the ultimate result is that fire damage to private lands is about double that on Crown lands.

Funds to support the fire protection system come from four sources: 1. The "Fire Tax". 2. Fees from counties holding fire protection agreements with the Province. 3. Claims against private land owners and municipalities for recovery of costs incurred by the Province during suppression of fire on
private land. 4. Consolidated revenue of the Province. By far
the greatest amount is put up by the Province under the fourth
category. Another possible source would be the federal For­
estry Branch which stands ready to provide a cost matching a­
greement under the Canada Forestry Act.

The detection system is based on a net-work of some six­
ty look-out towers, some of which were built and are maintain­
ed by the pulp and paper companies. During times of poor vis­
ibility from the towers, a chartered aircraft is used for pat­
rol purposes. This aircraft is also used for transporting
men and equipment to and from fires.

III POLICY ADMINISTRATION

In general, the forest policy of the Government of New
Brunswick is to manage its Crown forests in such a way as to
offer the maximum supply of wood to its industries. In addi­
tion, it invites private owners to do the same, but interest
on the part of these private land owners has been low in this
respect.

The responsibility for forest administration rests with
the Department of Lands and Mines. Its functions are related
chiefly to Crown lands; in fact, the only duty of the Depart­
ment which concerns granted lands solely, is the administra­
tion of the Wild Land Tax. The Department does have a number
of duties related to both Crown and private lands, such as the
administration of the Forest Fires Act, the Game Act, and the
preparation of forest inventories. It is to be noted that
unlike most other provinces, New Brunswick administers its forests under the same department as its mines and other land uses, rather than being confined to a Department all their own.

The field force executes plans and policies laid down by headquarters on all phases of the Department's activities, including fire protection, forest management, scaling, colonization, game protection, and general forest administration. The government does not operate its own timber lands, but sells this right to private enterprise, and both parties expect to make a profit. The basic problem in administration of the Crown forests is to discover a system which gives maximum freedom of action to the forest user, while safeguarding the interests of the Crown as owner on behalf of the public. The present system is fairly adequate and is much less restrictive than in most other provinces, but it is generally felt that there is need for a more definite, clear forest policy which would undoubtedly become an impediment to the freedom of action among the large industrial operations.
CHAPTER X

NOVA SCOTIA

Nova Scotia is a peninsular province, almost entirely surrounded by salt-water. The northern shoreline is almost unbroken, and represents many fertile plains and river valleys. Inland, the country is well forested and has very good farming and orchard areas. Agriculture is the leading industry in this province, with mining and fisheries being the other basis industries. These three industries together with forestry, provide raw materials for the Province's growing manufacturing industries.

Ship-building and sawmilling developed at a very early date in Nova Scotia. The disposal of Crown lands by sale, was carried on for a longer period of time in Nova Scotia than in its brother province of New Brunswick. It was not until 1899, that legislation introduced the "Lease Act" to provide for leasing of timberland without the actual sale of the land. In 1903, it was estimated that less than eleven per cent of the total land area remained in the ownership of the Crown, and only five per cent of this was timbered. Under regulation of the Lease Act, twenty-year leases were issued to permit the cutting of timber over ten inches in diameter only. For the last two decades, it has been the policy of the government to lease timberland for shorter periods in the form of Timber Sales.
From the information disclosed by a forest survey in 1925, it was found that the Crown had not alienated as much land as was originally supposed. With the additional purchase of over one-half million acres of cut-over land, made possible by the use of a fund set up in 1930, the government now finds itself in possession of about twenty-eight per cent of the total forested land in the Province 1/. The policy of buying up private forest land is still practiced by the government today, and it is the eventual purpose of the government to attain an equally divided forestland ownership between public lands, and company free-hold and farm woodlots.

The great impact of World War II was strongly experienced by Nova Scotia's forest industry, and many felt that the future sawlog material was in danger of depletion. In retaliation, the forest industries requested the establishment of the "Nova Scotia Small Trees Act" which became a reality in 1946. By this Act, Nova Scotia became the first province to ever impose restrictions on the cutting of timber on private lands. The main provision of this Act states that no person, except by licenced permission, shall fell hemlocks, pine, or spruce of less than ten inches diameter at breast height, in any logging operation involving more than fifty MBM or one hundred cords.

Sustained yield forest management was a seldom used expression until comparatively recent years, but it is interesting to note that the lumbermen of Nova Scotia showed sufficient interest in their forest resources to urge a complete inventory of the Province in 1908. At this time, many farm woodlots were well managed, but the Crown lands were in very bad shape. Today, the Crown lands are probably the best managed in the Province, indicating a great amount of public as well as Departmental interest in the forest.

In 1953, under a federal-provincial agreement, the Province undertook the task of a forest inventory for all the forested land within its boundaries. This project was completed in 1957, and supplied a basis for harvesting the annual allowable sustained yield cut from the forests. This was the real beginning of sustained forest management in Nova Scotia.

In general, the timber policy now in Nova Scotia is to strive toward a regulated cut on all forest lands, and to bring all the Crown lands back under production. Although the cut-over Crown lands are poorly stocked and low in productivity today, it is expected that these lands will become the most valuable forest land of the Province in the future.

I TIMBER DISPOSAL

Crown Land:

The occupied and vacant Crown lands together, comprise about twenty-five per cent of the Province's forests, but only eight per cent of the total occupied forest land belongs to
the Crown.

**Timber Sales.** During the last twenty years, Crown timber has been sold by short-term "Timber Sales" only. The length of tenure for these Sales is two years, but the licences may be renewed in order to complete the stipulated cut. The only charge for the Sale is the full purchase price paid as a stumpage bid by sealed tender. There are no minimum Crown dues, but the Department fixes upset prices for each Sale. One-half of the expected stumpage payment accompanies the application for a Timber Sale, and the remaining payment is due when one-half of the timber allotment is cut.

These Sales may take on different names according to the products to be removed; thus the names "Timber Sale", "Christmas Tree Licence", and "Fuelwood Licence", are self-explanatory.

**Long-Term Leases.** Although no long-term cutting rights have been issued for the last two decades, several are still in operation today. These leases were created by contract, and differ radically as to the charges and conditions of tenure each possess. Some pay stumpage and no ground rent, while others carry the reverse terms. A fire tax and provincial land tax apply to all leases, but they vary in amounts among the leases. The range of these charges is from 6.75 cents per acre to 14.89 cents per acre.

The volume of timber cut annually from these leases is quite small since the pulp companies purchase most of their
raw materials from farm woodlots.

II FIRE PROTECTION POLICY

The Department of Lands and Forests is responsible for controlling all fires in the Province's forests. They have the authority to commandeer any persons necessary to aid in suppressing these fires. All expenses incurred during the fire suppression, are payable out of a Provincial Fire Protection Fund. This fund is maintained primarily by the revenue from the Fire Tax.

Strict regulations governing the use of fire for brush clearing are set down under the "Lands and Forests Act", and violators are duly prosecuted. All persons responsible for damage to Crown-owned lands through neglect or malicious action, are held liable for the damage and the cost of controlling the fire. If fire hazards on private lands are not removed upon request by the Department, steps are taken by the Department to remove such hazards at the expense of the violator.

III POLICY ADMINISTRATION

Nova Scotia's forest policies and regulations are carried out by the Department of Lands and Forests under authority of "The Lands and Forests Act" of Nova Scotia. Their amount of power differs quite greatly from most other provinces in that government control is exercised over cutting on private as well as Crown-owned forest land, as authorized by the "Small Trees Conservation Act".
Further efforts to develop the sustained yield forest policy have been aided by several extension programs to offer technical assistance to farm woodlot owners.
CHAPTER XI

PRINCE EDWARD ISLAND

Almost one-third, or 350,000 acres of Prince Edward Island is woodland, held exclusively under private ownership. Most of the woodland is in the form of farm woodlots, averaging about thirty-five acres in size.

The Province's forests suffered from the same process of liquidation so very common elsewhere among the eastern provinces, and it was not until 1951, that a Provincial Forestry Service was established to conduct programs of promoting proper management of the private woodlands.

In 1951, the Province passed "The Forestry Act" which authorized the Governor-in-Council to make regulations providing for licencing and regulation of cutting on woodlands. These Regulations were imposed to discourage the prevalent practice of clean-cutting the woodlots and leaving the land bare. Permits to cut, issued under the Regulations, were required of persons desiring to cut more than twenty cords of pulpwood or pit-props from any land in the Province. The permits usually specified the type and classes of trees to be cut.

At present, there is a limited forestry staff which is engaged in advising and encouraging farmers to make best use of their woodlots, and is conducting a reforestation program on tax-delinquent land with the aid of the federal-provincial forestry agreements.
CHAPTER XII

NEWFOUNDLAND

The development of Newfoundland is uniquely different from the rest of Canada. All attempts to colonize this island were complete failures, for Newfoundland was destined to be inhabited by the fishermen who visited the shores for their seasonal fishing expedition.

The Island remained a British Colony until 1949 at which time it became the tenth province of Canada.

The principal factor contributing to the development of the Province was the legislation to construct a railway in 1880. Large areas of timberland were granted to the contracting railway company and these were later sold to large forest industries. The remainder of the forest land was retained under government ownership, and has been let under different forms of long-term tenure for many years. About three-quarters of the Crown timberland is now held under lease to private companies with the bulk of these leases being controlled by two large pulp and paper companies.

The early Colonial Administration paid little attention to Newfoundland's forests. Their main emphasis was placed on collecting revenue, forest fire protection, and logging camp inspections. From 1900 to 1934, all forestry activity was under the Department of Agriculture and Mines; their staff was very meager. In 1934, the Department of Natural Resources
was created, within which a separate Forestry Division was established. It was at this point that the foundation for the Island's forest policy was established. Forest inspection districts were set up, and the field staff appointed. Their duties included timber cruising, lay-out and control of pulpwood operations, inspection of logging camps, and collecting revenue. A so-called "three mile limit" was set up at that time, and in recent years, has played an important role in the Island's history. The organization established in 1934 has persisted with minor changes up till the last few years.

Presently, the Forestry Division condones the policy of administering their three mile limit which makes up the major part of the un-leased Crown forests. By the nature of the timber disposal in this limit, it is quite evident that a regulation of the annual cut from the Crown forests is not possible. In explanation, the term "three mile limit" is applied to lands lying within three miles of tidal waters. It came into use subsequent to the alienation of Crown land to various persons and companies under long-term leases. No legislation established the "strip", but the "Crown Lands Act" did allow that timber licences would not include lands situated within three miles of the Island's shoreline. The purpose of this strip along the shoreline was to meet the requirements of the fishermen and other persons settled there, for use as firewood and personal constructions. No permits are required
to make these cuts, and hardly any record is kept of the cut-
tting. Also, the cutting has been very patchy, resulting in
over-cutting in some areas and loss through decay in others.

In 1955, a Royal Commission study was carried out to
determine the forest situation in Newfoundland. The recom-
mendations of this Commission were to dispose of the "no
permit" strip and the practices thereon, and to establish
"Management Areas" and "Community Forests". The Commission
also recommended that a Newfoundland Forest Service be es-

tablished and fully organized by 1960. In 1957, there was
only one professional forester on the Forestry staff.

In mention of the pulp and paper companies, it was
stated by the Commission that the two major companies were
operating on a rather crude system of sustained yield manage-
ment, but were displaying much interest in silvicultural cut-
ting methods aimed at securing good reproduction.

I TIMBER DISPOSAL

Crown Land:

Timber Licences. Although most all the forest land in New-
foundland is held under title by the Crown, about three-quar-
ters of its timber is under ninety-nine year lease to private
concerns. The bulk of the leased timber is held by two pulp
and paper companies - Bowater's Newfoundland Pulp and Paper
Mills Limited, and the Anglo-Newfoundland Development Company
Limited. Under their contracts, neither company pays royal-
ties on the timber manufactured in their mills, but Bowater's
is obligated to export at least 50,000 cords of pulpwood annually on which it pays an export levy of thirty cents per cord. The A.N.D. Company is obliged to pay a charge of fifty cents per MBM for timber cut on its Crown limits and not manufactured into pulp and paper. The only charge for timber and tenure for either company is an annual ground rent of two dollars per square mile.

Since Bowater's was exempt from any tax in perpetuity, except income tax, fair treatment has made it necessary to apply the same rule to the A.N.D. Company.

A few lumber companies also hold licences to cut timber on Crown land, and pay the annual ground rent of two dollars per square mile.

Provisions of the new Crown Lands Act, also provide for the issuance of new "Timber Licences" to cut areas less than twenty-five square miles in size. This licence is renewable annually so long as commercially valuable timber remains on the area. Charges on these licences include the cost of cruising and advertising, an annual ground rent of ten dollars per square mile, and an upset stumpage price.

Since the forest resources of Labrador are also administered by Newfoundland, arrangements have been made for special agreements, by private statute, for the concession of these areas. Agreements have been made with two large companies for exploitation of the Crown's timber in Labrador. One of these agreements contains a stumpage payment of fifty
cents per cord. The other company has an option for a Timber Licence which, if exercised, will require payment of an annual ground rent not exceeding two dollars per square mile, and a "rental" equal to eight per cent of the net profits of the corporation.

Timber Permits. Permits to cut timber on Crown land are issued freely to sawmill operators who are allocated to special cutting "zones", but not specific areas. The permittees pay only a minimum stumpage of fifty cents per cord, or one dollar per MBM, and can normally cut only 10,000 cubic feet per permit. The permits expire on the date stated thereon.

Fuelwood. No permit is required for farmers, fishermen, or other persons of similar occupations, to cut timber for firewood for domestic use from the Crown's three mile limit area. Such persons may cut up to 2,000 cubic feet of timber free of charge. As stated earlier, no commercial cut can be taken from this area.

II FIRE PROTECTION POLICY

Organized fire protection began in Newfoundland in about 1935. The legislation for protection occurred in 1905 under the "Forest Fires Act", but it was not until 1935 that modern effective equipment and an effective suppression system were established.

There are actually four elements of administration in forest fire control in Newfoundland: 1. The Department of Mines and Resources of the Provincial Government which provides
protection to Crown lands and privately-owned and licenced lands, except those held by the two large pulp and paper companies. Most of its activities are carried out on the so-called "three mile limit". All forest fire laws are necessarily administered by the Department. 2. The Anglo-Newfoundland Development Company Limited, which is responsible for fire protection on its own limits. 3. The Bowater's Newfoundland Pulp and Paper Mills Limited, which also undertakes protection of its own limits. 4. The Newfoundland Forest Protective Association, which has been established and maintained through funds from the Canadian National Railway, the two pulp and paper companies, and the provincial government. The Association operates largely as a patrol group, and also carries out the initial attack on all fires within the Province. Each of the above organizations maintains their own lookout tower system, patrols, equipment depots, and firefighting equipment. Essentially, these four control groups allocate protection regions for which each is responsible. The regions are allocated to a considerable degree by mutual consent and understanding.

It is interesting to note that the Association is the most active agency in public relations for fire prevention, but of course, is acting under the auspicious of the other three agencies by virtue of providing its source of funds.

III POLICY ADMINISTRATION

At the time of the Royal Commission study in 1955, the
administration of forest policy in Newfoundland was quite lax due to the lack of information and forestry staff. Under the recommendation of the Commission, a forest inventory was carried out and was completed by about 1957. Since 1955, the administrative staff has grown somewhat so that by 1959, they were prepared to adopt a new forest policy of sustained yield management to the extent of cutting not more than the annual growth in any one year. Though this policy is not actually in full realization as of 1960, with the newly provided information, plus a substantial long-term goal, it is reasonable to expect some exciting progress to finally establish the last of Canada's provinces under a regulated sustained yield production of timber products.
CHAPTER XIII

FEDERAL FORESTRY ACTIVITIES

I ADMINISTRATIVE STRUCTURE

Although most of the Crown timberland of Canada is administered by the provinces, the federal government has retained jurisdiction over the Crown forest of the Yukon and Northwest Territories, in addition to the Indian and military reserves, national parks, and forest experimental stations within the provinces. The federal government also cooperates with the Government of Alberta by providing one member who is appointed to the Eastern Rockies Forest Conservation Board.

Three major branches within the Department of Northern Affairs and National Resources have been allotted their respective responsibilities. The Forestry Branch of the Department is chiefly interested in the functions of research, utilization, and providing information and assistance to provincial authorities and forest industries. They are also responsible for the administration of the federal-provincial agreements 1/(under the Canada Forestry Act), and conducting the removal of timber from military reserves.

The second branch, the National Parks Branch, controls all activities concerned with timber disposal and other administration within the National Parks.

1/ Discussed in Chapter II of this paper.
In the Yukon and Northwest Territories, all forest resources are administered by the Lands Branch, the third large division of the Department.

Research and comprehensive surveys relating to insects and tree diseases are grouped within the jurisdiction of the Forest Biology Division of the federal Department of Agriculture. This division provides technical and advisory service in relation to diseases and insects which affect trees as well as those affecting agricultural crops.

II TIMBER DISPOSAL

The Territories:

The timber resources of the Yukon and the Northwest Territories are administered by the Lands Branch of the Department of Northern Affairs and Natural Resources under authority of the "Territorial Timber Regulations". Four classes of timber disposal permits are issued; 1. to cut timber for commercial purposes, 2. free of timber-dues, 3. to cut 100 cords or less, and, 4. free permits.

Permits issued to authorize cutting for commercial use, are issued for one year periods, renewable, and may not exceed 640 acres. An annual ground rent charge of one hundred dollars per square mile, a permit fee of two dollars, and statutory dues as listed in the Regulations are payable on these berths.

Permits free of dues may be issued for the permit fee of two dollars, to educational, religious, or charitable groups
for their own use. This type of permit also applies to holders of mineral claims for use in working the claim, or to any government organization.

Members of the Royal Canadian Mounted Police or Government Timber Agents may issue a permit to cut 100 cords of timber for the price of the permit fee (two dollars), plus prior payment of the dues in full. A refund of over-paid dues will be made if more than half but less than all of the authorized volume has been cut within the year.

Any Indian, Eskimo, trapper, or exploration group may cut timber, not in excess of 100 cords, for their own use without a permit.

All commercial berths must be "staked out" on the ground in as close to a rectangle shape as possible, and the stakes used must carry a number and the name of the berth holder.

In reference to the timber and the policy of disposal in the Territories, it should be borne in mind that these regions are either bordering on or are within the Arctic Circle where populations are very small. Thus, sustained yield management of these relatively poor timber resources is neither possible nor of any great concern for the present.

Military Reserves:

The removal of timber from military reserves is administered by the Forestry Branch of the Department of Northern Affairs and National Resources.

If the estimated stumpage value of the proposed timber
cut exceeds 2,000 dollars, disposal must be made by way of a Sale; otherwise, either a Permit or a Sale may be used. The Sale is awarded to the highest bidder if the amount tendered is at least seventy-five per cent of the estimated stumpage value. If it is less than seventy-five per cent, then approval by the Minister of the Department is required.

National Parks:

Only timber cuttings for the purpose of maintaining the health and vigor of the forests or for use in the park are allowed under the "National Parks Timber Regulations". The cutting areas are designated by the Director of the National Parks Branch, and permits are seldom granted for areas exceeding 160 acres. Dues are payable as prescribed in the Regulations, but allow an exemption of twenty MBM under permits issued for the construction of educational or religious institutions.

Of exception, there have been four large timber berths awarded by the Lands Branch of the Department, who administer the timber resources of Wood Buffalo National Park. This park lies partly within the Northwest Territories, and is maintained as a refuge for wood buffalo rather than a public park.

The four berths issued in this park are for terms of fifteen and twenty-one years, and for large volumes of 170 to 850 million MBM. The largest of the holders is required to build a sawmill and plywood manufacturing plant to process
his raw materials. This berth also pays a fire guarding charge of six cents per acre per year which does not apply to the smaller berths.

**Forest Experiment Stations:**

The disposal of timber from experimental stations is accessory to the main purpose of the station.

In general, the timber is disposed of by Sale or Permit for dues not less than those of the province in which the station is located. Charges and conditions of sale vary from station to station, and may be subjected to public competition or directly awarded to individuals.

**Indian Reserves:**

Indian Reservation timber is not owned by the Crown, but is held in trust for the Indians by the federal government. All proceeds from the sale of timber must be put into the appropriate Indian Trust Fund.

Sale of the timber to the Indians is encouraged as a source of employment, but sales to the general public do exist. Purchase by the individual Indians or by recognized bands, is carried out by the issuance of permits. The rate of dues is similar to those charged on provincial Crown timber in that area.

Before Indian timber can be let to outsiders, it must be released to the Crown by the Indians, at which time it is then put up for public auction (only if the dues payable exceed 2,500 dollars). Licences issued in this manner, carry
stumpage charges of the upset price plus the over-bid. Upset prices are established in comparison with those on local Crown lands. Other charges consist of a ground rent of ten dollars per square mile, and a ten dollar licence fee.
Because the policies and systems of timber disposal differ from province to province, an ideal discussion would consider each one separately and in detail. However, in keeping with the principal purpose of this paper, and because of the inadequacy of current, up-to-date statistics, only the more critical situations will be discussed.

The national policy of public forestland ownership looms large as the nucleus of most forestry controversy in Canada. By this, it is not inferred that this policy is wrong; examples of the opposite situation have not presented themselves as being free of vexation. Rather, it is the specific systems of removing the timber from these Crown lands that provide the trouble spots.

Some of the provinces impose a royalty charge on the timber which they sell. This royalty exists as an equity reserved by the government in timber which was grown by nature without the intervention of man. From the standpoint of long term forest management, the question arises as to whether or not man has aided in creating the second and third timber crops on the given licence or lease area. According to law, royalties will still apply on these future crops. As a result, the licencees often take very little interest in aiding a second crop, and large areas of cut-over land remain understocked in both quantity and quality of trees.
From the standpoint of private industry, the form of tenure and its length are felt to be too uncertain to justify long-term fixed investments at present. Proper management normally requires fairly extensive road systems and experimental efforts for protecting and improving the growing stock, but large-scale private industries are often hesitant to invest heavily in projects which carry such feeble guarantees of tenure.

In the best interest of free enterprise, it would seem desirable for the government to offer longer term leases, under which the lessee would be able to amortize his mill investment over a longer period of time. Also, the government would recognize a greater immediate revenue from their forests, since stumpage prices could be held higher in respect of the longer amortization period. Although the exact length of tenure would be difficult to state in a "blanket form", in general, the timber crop rotation age might serve as a possible period. This period of time would encourage the lessee to contribute an adequate investment for a road system for fire protection purposes. One could hardly expect an investor to carry out steps of optional road building to protect a timber stand which would very possibly be leased to a new operator within the next twenty or thirty years. By using the rotation age as the tenure period, all the timber presently standing on the lease area would be essential to the satisfaction of the lessee's investment. It should be
cautioned, however, that as forest technology progresses, rotation ages will generally change, quite possibly to shorter lengths of time. This would tend to serve as a public protection situation in that the length of tenure would decrease with the decreasing rotation age. This would still fit the needs of the private leasees, and yet would protect the general public as the economic conditions of Canada change in the future.

Most pulpwood and timber leases at present, are for twenty-one to fifty years, and they are renewable upon expiration. However, this instant of expiration presents itself as an ideal moment for the provincial government to withdraw the lease-area from renewal, on the basis of being necessary for other uses than timber production. The investor considers this to be the insecurity of short-term leases, and would be more interested in investing if the rotation age period of tenure was guaranteed by contract. In other words, the instant of renewal would occur at greater time intervals, namely at the end of each rotation rather than each twenty-one years.

Because the increased term of tenure would "tie up" large areas of land and river systems (in the case of pulp mills) it remains essential that the government should protect the public by including "withdrawal" clauses in the separate lease contracts. Future development of Canada will no doubt magnify the value of certain land areas as watersheds,
wildlife preserves, and recreational areas, etc., and this should be allowed for in each long-term contract. In conjunction with this reservation, it would be necessary for the government to establish and maintain their unleased land under a proper form of management so that these areas could be offered in fair exchange for areas withdrawn from the long-term leases. Ideally, the government management units would be maintained as a source of short-term timber sales for small individual logging concerns. The sales would be let by auction or directly upon request, and the cutting and degree of utilization could be very strictly controlled by the provincial forest service. By concentrating their attention on the costs of managing and harvesting these management units, the forest service would be able to arrive in time, at a more exact method of stumpage appraisal. This information could serve as a basis of setting rates of dues on the long-term leases. This idea assumes that forested areas vary quite widely from province to province, and a local sample area such as the government management units, would be similar to the long-term leases in relation to operational costs.

The application of government management units would also tend to satisfy the criticism concerning the low government expenditures for forest development. By being required to maintain management units as a source of exchange, the government would be forced into increased expenditures, which in fact, would be made possible through the larger stumpage
return from the longer terms of tenure. As opposed to securing the greatest revenue for the public as of the present, it would appear more desirable for the government to invest the stumpage returns from existing trees into management schemes which will yield a greater profit in the long-run. This statement faces the problem of proving the value of interest returns on forestry investments, but would be maintained by virtue of being a direct method of attaining sustained yield management.

Tied in very closely with the previous statements, is the situation of timber sale appraisals. In most provinces, the methods used for stumpage appraising are relatively crude "rules-of-thumb" in that they are adjusted at periods that are few and far between. It is expected, however, as more cost data information is made available through management, that more frequent adjustments will be possible and justifiable.

As a final point on tenure, it should be noted that the author's opinions are based on the assumption that the most reliable forest policy exists as an integrated system of both private and government management. Since the policy of government forest ownership is presently established in Canada, the one way of obtaining integrated ownership would be to offer long-term tenure which would approach private ownership quite closely, yet would allow the government to retain the prerogative of changing the policy quite easily in case the practices of private management prove to be undesirable to the
future of the country. Alienation of forest land immediately places that land under the personal opinions of individuals, and this situation is corrected only by government dictitorial intervention. This ultimately leads to a maze of laws and amendments which soon become bothersome and burdensome.

Especially in the larger provinces of the west, the problem of protecting the forests against fire has always been paramount in the minds of the forestry agencies. Although suppression work has been increased grossly in the past decade or so through the purchase of modern equipment and greater accessibility of the more remote areas of forest, the problem is far from being solved adequately in most of the provinces. The majority of forest fires in Canada are reported to be man-caused, and along with greater accessibility into the remote forest areas, there naturally follows large populations of people. Thus, we find one of the greatest gaps in the fire protection program to be lack of public education and information. Several provinces are presently developing public relations programs of one sort or the other, but there is much room for improvement in this situation.

Fire protection is also being attacked more directly through the fire research efforts of the Department of Northern Affairs and Natural Resources, but their staff is at present, quite meager.

The foremost complaint of the licencees and leasees of Crown forest land in relation to fire protection policy, is
the question of the "burden of proof". In most every province, the onus of proof rests with the licence holder in the event of fire on his holdings, and this appears to be quite unjust. In essence, the defendant is guilty until he proves himself innocent; this is contrary to standard law.

If larger permanent industries were established, the possibility of setting-up private fire protection associations such as in Quebec and Newfoundland, would be possible. The funds for these associations would be provided by permanent mills for the protection of their holdings, and these costs could be compensated by reduced stumpage prices. The government would then become responsible for their unleased management units only. Some provinces now operate on this basis, and the possibility of applying this to the other provinces hinges to a great extent on the establishment of large, permanent industry.

In its national policy statement of 1943, the Canadian Society of Forest Engineers made the following observation, which might well be the answer for Canadian timber policy:

"Since wood-using industries are national in scope and must meet inter-regional as well as foreign competition, it is essential that forest laws and regulations enacted by provinces be rendered as uniform as possible. It is recommended that a permanent liaison board of representatives of the various governments be constituted to work towards this end. Existing legislation should be amended where necessary
in order to provide adequate security of tenure to licence and lease holders, and to encourage permanent forest management of their holdings".
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APPENDIX
Table 1. Definitions

Standing timber is usually paid for in Canada shortly after it has been felled and scaled. Timber rates are paid on a unit volume basis such as so much per thousand board feet, cord, cunit (100 cubic feet), linear foot, or piece (such as a railway tie). The timber charges differ in value and name from province to province.

Crown dues - are minimum prices for Crown timber. They apply uniformly throughout a given province, and make no allowance for quality or accessibility. They are established by statute or by Order-in-Council, and vary for different species and, in British Columbia, for different grades of logs.

Stumpage - when paid for Crown timber, this consists of charges in addition to Crown dues. In New Brunswick, "stumpage" refers to "Crown dues".

Royalties - this term is used in British Columbia and means the same as "Crown dues".

Up-set price - constitutes the combined values of "Crown dues" and "stumpage". It is the value stipulated as the minimum selling price for a particular sale and the species of timber involved. Up-set prices are established by appraisal or by formula, according to the province involved.

Over-bid price - in the case of public auction, the term indicates the amount per thousand board feet, by which the final sale price exceeds the "up-set price". Obviously, it varies from sale to sale and for each species of tree.

Timber Berths - areas of Crown land held under lease by operators in forest industry. They are customarily renewable for a specified number of years. Annual renewals are granted if the holder secures an annual licence to operate, and complies with the conditions under which the berth was let. The boundaries of the berth are described in the lease.

Pulpwood Berths - large areas leased to pulp and paper companies. They are usually established by agreement between the government and the company, and are good for periods of twenty-one to fifty years (ninety-nine years in Newfoundland),
renewable upon expiration of the original agreement. Usually they require the construction and operation of a specified mill according to the terms of the contract agreement.

Timber Sales - the area of a timber sale is defined the same as that of a "timber berth". They are made by public competition at upset prices per MBM, per cord, or other unit of measure. Periods of tenure vary from one to five years, and payment is made as the timber is cut.

Timber Permit - are designed to allow individuals the right to cut specified small quantities of wood from Crown lands, for their own use or for sale.
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<td>Sub-total</td>
</tr>
</tbody>
</table>

Total Occupied Forest Lands 7,999 10,119 16,550 275,333 28 275,361
### LEGEND

<table>
<thead>
<tr>
<th>FOREST REGIONS</th>
<th>PRINCIPAL TREE SPECIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boreal</td>
<td>Spruce, balsam fir, aspen, white birch, jack pine</td>
</tr>
<tr>
<td>Predominantly Forest</td>
<td></td>
</tr>
<tr>
<td>Forest and Grassland</td>
<td>Aspen</td>
</tr>
<tr>
<td>Forest and Barren</td>
<td>Spruce</td>
</tr>
<tr>
<td>Subalpine</td>
<td>Engelmann spruce, lodgepole pine, alpine fir</td>
</tr>
<tr>
<td>Montane</td>
<td>Lodgepole pine, aspen, spruce, Douglas fir</td>
</tr>
<tr>
<td>Coast</td>
<td>Douglas fir, hemlock, Sitka spruce</td>
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<tr>
<td>Columbia</td>
<td>White pine, larch, Douglas fir, spruce</td>
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<tr>
<td>Deciduous</td>
<td>Maple, beech, tulip-tree, walnut, etc.</td>
</tr>
<tr>
<td>Great Lakes-St. Lawrence</td>
<td>Maple, beech, white pine, yellow birch, hemlock</td>
</tr>
<tr>
<td>Acadian</td>
<td>Spruce, balsam fir, birch, maple, beech, pine</td>
</tr>
<tr>
<td>GRASSLAND</td>
<td></td>
</tr>
<tr>
<td>TUNDRA</td>
<td></td>
</tr>
</tbody>
</table>
Figure 1. FOREST CLASSIFICATION OF CANADA